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ENCYCLOPÆDIA BRITANNICA.

EIGHTH EDITION.

ENCYCLOPÆDIA BRITANNICA,

OR

DICTIONARY

OF

ARTS, SCIENCES, AND GENERAL LITERATURE.

EIGHTH EDITION.

WITH EXTENSIVE IMPROVEMENTS AND ADDITIONS; AND NUMEROUS ENGRAVINGS.

VOLUME V.

ADAM AND CHARLES BLACK, EDINBURGH.

MDCCCLIV.

[The Proprietors of this Work give notice that they reserve the right of Translating it.]

Bombay. and with great expedition, by the Parsees, who are generally accounted excellent ship-carpenters. Here is a rope-walk, equal to any in England, with the single exception of the king's yard at Portsmouth, where cables and all sorts of lesser cordage are manufactured. It has also a covering to protect the workmen from the heat or inclemency of the weather. The dockyard is large and well contrived, having ample supplies of naval stores deposited in the warehouses, together with large quantities of timber for repairing and building ships, and forges for all kinds of smith-work. With these advantages Bombay claims a distinguished rank as a naval arsenal. Many merchant-ships of from 600 to 1300 tons, partly for the country trade and partly for the service of the East India Company, have been built in its docks, and, in beauty of construction, good workmanship, and durability, they have been considered superior to any other class of merchant-ships in the world. Some ships of the line, and several frigates for the British navy, have also been built at this port. Among them may be mentioned the Minden, a 74-gun ship launched in 1810; this was followed some years later by the Wellesley, also a 74-gun ship; and more recently the Meeanee of 80 guns has been added to the list. These ships were all built of Malabar teak, which is esteemed superior to any in India. The teak forests, from which supplies of wood are derived, lie along the western side of the Ghaut Mountains, and other contiguous ridges to the north and east of Bassein; the numerous streams which descend from them affording water-carriage for the timber. The docks belong to the Company. They are entirely occupied by Parsees, who are esteemed remarkably skilful and assiduous. Bombay, thus possessing, in the skill of its workmen, the excellence of its timber, and the superiority of its docks, all that is necessary for a naval arsenal, is a station of the first importance to the British power in India.

From its position, Bombay commands an extensive commerce with the countries situated in the Persian and Arabian Gulfs. It also possesses much facility of commercial intercourse with different parts of the territories subject to the other presidencies of India, and it carries on a valuable trade with Europe, America, and China. The chief articles of export are cotton, cashmere shawls, wool, opium, coffee, pepper, ivory, and gums. The principal imports are British manufactures, raw silk from China, wine, beer, and tea. The foreign trade has more than doubled within the last twenty years; and its exports alone now amount to seven millions sterling. The value (in rupees) of the imports and exports to the United Kingdom has increased thus:-

	Imports.	Exports.
1813-14	Rs. 926,980	Rs. 3,051,543
1823-24	5,571,313	5,953,859
1833-34	9,042,390	10,184,795
1843 -44	24,335,718	17,046,748
1852-53	29,319,750	29,385,955

The shipping that entered and cleared the port in 1852-53, was as follows:--

	ARRIVED.		DEPARTED.	
Square-rigged Country craft	Vessels. 522	Tonnage. 227,751 679,696	Vessels. 522 41.696	Tonnage. 215,209 693,119
•	,	0,0,000	11,000	000,110

According to the census of 1849 Bombay Island, with Colaba, contains a population of 566,119. This amount is inclusive of the military and also of the floating population of the harbour. More than one-half of the inhabitants are Hindus. The Mahometans somewhat exceed one-fifth of the entire population. Next in point of numbers are the Parsees. Many of this last-mentioned class are extensively engaged in commerce; they are the brokers and factors of Europeans, and share largely in most of the foreign speculations of European mercantile houses. They are a rich, industrious, and active body of men, who contribute greatly to the prosperity of the settlement. The Parsees are the descendants of the ancient fire-worshippers of Persia, who Bombay. took refuge in Khorassan upon the conquest of that country by the Moslems in the seventh century. Their first appearance in India occurred about the year 766, and their earliest settlement was the island of Diu, on the south coast of the peninsula of Kattywar. From thence they migrated to Surat and Broach, and finally to Bombay. The various castes into which the total population of Bombay is distributed, and the proportion comprised in each, are thus particularized:—

Jains, Lingaehs, or Boodhists	
Hindus of other castes	289,995
Mussulmans	124,155
Parsees	114,698
Jews	1,132
Native Christians	7,456
Indo-Britons	1,333
Indo-Portuguese	5,417
Pure European	5,088
Seedee, Negro, African	839
Other castes	7,118

Total, 566,119

It has been often remarked that the people of India differ from Europeans, not only in race, in language, and in creed, but also in their manners and modes of thought. A striking illustration of the truth of the observation is afforded in the organization and existence to a very recent period of the great plundering confederacy of Bombay. This partnership, Plundering composed of upwards of forty individuals, and affording em-confederployment to between two and three hundred subordinates, acy. had been established upwards of thirty years for the receipt of goods stolen from merchant-ships. The harbour was the principal scene of plunder, where the members of the gang were each day systematically distributed at the different quays, from which their boats and canoes were sent off to the loading and unloading ships. The plunder obtained was conveyed openly to the shoreas though legally acquired, and thence transported to the partnership warehouses, where each morning it was brought to auction without any attempt at concealment. The books were kept with strict regularity, and the division of profits made with scrupulous honesty; two shares being invariably reserved to be distributed in charity. This successful perpetration of offences, though practised without interruption for a series of years, had been carried on without suspicion on the part of the European officers of the government; while the silence of the natives was secured either by the respect for caste, or by resort to intimidation. It was not till the year 1843 that the system was discovered, and those concerned in it brought to justice.

The Company's naval force at Bombay, including frigates, Naval iron steamers, and other craft, consists of forty-six vessels, and force. to man this navy a regular establishment of officers and seamen is required. The western coast of India, from the shores of the Persian Gulf to Goa, was formerly infested by hordes of pirates, who were distinguished, particularly those in the northerly tracts, by courage, address, and habits of extreme ferocity. It was to protect the country trade against the depredations of these banditti, who had haunted those seas since the time of Alexander the Great, that the East India Company found it necessary to maintain an armed maritime force.

The military force of the presidency, composed of the Military regular troops of the Crown and Company, but exclusive of force. local and police corps, amounts to 41,426 men, of whom 10,244 are Europeans, and 31,182 natives. If the strength of the local and police corps be added, the aggregate will be swelled to 59,430. An augmentation of force being required, consequent upon the recent extension of the British dominions in India, another European regiment is about to be added to the infantry of this presidency.

Bombay. The principal divisions of the Bombay army are as follow:—

	European.	Native.	Total.
Presidency Garrison— Headquarters, Bombay Southern Division—	678	3,264	3,942
Headquarters, Belgaum Poonah Division—	1,399	8,117	9,516
Headquarters, Poonah Northern Division—	3,736	10,729	14,465
Headquarters, Ahmedabad Asseerghur fortress	1,376 14	11,828 573	13,204
Aden force	659	1,405	2,587
Headquarters, Kurrachee Rajpootana field force	2,461 181	12,964 3,757	15,425 3,938
Deduct Madras troops	10,504 207	2,637 3,504	63,141 3,711
Deduct local and police corps	10,297 53	49,133 17,951	59,430 18,004
Total regular troops, Crown and Company's	10,244	31,182	41,426

Education.

A board of instruction presides over the government educational establishments of this presidency. These institutions consist of two principal classes. The first comprehends all the vernacular schools in which knowledge is communicated through the medium of the native languages. Under the second are ranked the institutions in which the higher thranches of learning are taught through the medium of English. Various particulars connected with these seminaries are detailed in the following table.

	Expense.	Teachers	Pupils.
English and mixed Instruction. Elphinstone Institutions— College Schools (two)		} 30 {	42 520
Branch schools (two) Grant Medical College		6	404 27
Poonah school		8 6 2 1	169
Ahmednuggur schoolSurat school			$\begin{array}{c} 52 \\ 290 \end{array}$
Ahmedabad.school	••••	9 2 1	99
Broach school			67 51
Dharwar school		1 2	40
Poonah Sanscrit College	••••	•••	305
		62	2,066
Vernacular Instruction. No. of Schools.			
Presidency 7		7	429
First Division		133 37	5,059 2,298
Third Division 56	•••••	56	3,608
	•••••	233	11,394
TotalRs.	1,50,408	295	13,460

Judicial establishment. In 1827 a supreme court of justice was established at Bombay, constituted under letters-patent from the crown, under powers granted by act of parliament. It consists of a chief justice and one puisne judge, from whose decision an appeal lies to the queen in council. The modes of procedure in this court are assimilated to those of the courts at Westminster; but its jurisdiction is restricted to the city of Bombay, except in regard to British subjects.

Bombay is the seat of a bishopric, subject to the ecclesiantical jurisdiction of the bishop of Calcutta as metropolitan. The ecclesiastical establishment consists of a bishop, an Ecclesiasarchdeacon, seven chaplains, and sixteen assistant chaplains, tical estarchdeacon, seven chaplains, and sixteen assistant chaplains. There are also at this presidency two ministers of the Church blishment, of Scotland, appointed and maintained by the East India Company.

Subject to the superintendence, direction, and control of Population the governor-general of India in council, the government and extent of the territories of Bombay is vested in a governor and of presithree councillors, styled "the Governor in Council of Bom-dency. bay." The following table exhibits the details of the area and population of the several subdivisions into which the Bombay territories are distributed:—

	Area			
	in		Population	n.
	uare Mil	es.	•	
Surat	1,629		492,684	
Breach	1,319		290,984	
Ahmedabad	4,356		650,223	
Kaira	1,869		580,631	
Khandeish	9,311		778,112	
Tannah, or Northern Concan	5,477		815,849	
Poonah	5,298		666,006	
Ahmednuggur, including the			000,000	
sub-collectorate of Nassick	9,931		995,585	
Sholapore	4,991		675,115	
Belgaum	5,405		1,025,882	
Dharwar	3,837		754,385	
Rutnagherry, or South Con-	0,001		104,000	
can	3,964		665,238	
Bombay Island, including	0,00±		000,200	
Colaba	18		566,119	
Kolaba Territory, now in-	10		000,119	
cluded in Tannah	3 18		58,721	
Sattara				
Sinde-	10,222		1,005,771	
Shikarpore	6,120		350,401	
Hyderabad			551,811	
Kurrachee			185,550	
		52,120		11,109,067
Native States in connection		,		,
with the Bombay govern-				
ment				
Baroda (Guicowar)	4,399		325,526	
Khyrpore (Sinde)	5,000		105,000	•
Kattywar			1,468,900	
Kolapore	3,445		500,000	
Sawunt Warree	800		120,000	
Cutch	6,764		500,536	
Mahratta jaghiredars	3,775		419,025	
Petty States in Guzerat			1,030,938	
Tour Deales II Guzotal	10,011	60,650		4,469,925
				±,±00,020
		180,715		15,578,992

Facilities of communication, so important to the prosperity Roads and of commerce, agriculture, and manufactures, as well as so railways. essential to social improvements, are for the most part rare in India. In the Bombay territories government has made considerable efforts to effect beneficial changes in this respect, but the difficulties are many, various, and sometimes almost insurmountable. The great expense of constructing roads of materials calculated for durability, with drains, bridges, and other appurtenances essential to their completeness, and of maintaining them in a state of efficiency, is but one among those difficulties. Another is the character of the country to be traversed; roads, in many cases connecting places of some importance, have in the intermediate space to pass through a tract of country little if at all removed from the character of a desert. A further, and in a great degree a peculiar difficulty arises from the frequent deficiency of water. The construction of roads in the hot climate of Bombay is useless unless water can be found for the consumption of the beasts of burden, and this has frequently to be provided by additional works, involving an increased outlay. If to these sources of difficulty and expense be added that arising from the rugged and mountainous character of

Bomb-Ketch Bona.

History.

a large part of the country, the feeling likely to be excited will be that of surprise that so much should have been effected. The grand obstacle, after leaving the coast, is the range of mountains known as the Western Ghauts, the principal passes in which are at present the Tull and the Bhore Ghaut, traversed by what may be termed two radical roads, connecting the port of Bombay with the interior. A railway from the city of Bombay, traversing the country in a northerly direction, and intended to effect a junction with the Calcutta and Delhi trunk line, is now under construction, and has been opened as far as Tannah. A branch line from this will connect the cotton districts of the valley of Berar with the port of shipment on the western coast; while another in a south-eastern direction, via Poonah and Bellary, is projected, to facilitate communication with Ma-

Bombay Island appears to have been first occupied by the Portuguese about the year 1530, having been previously dependent on the ruler of Guzerat. In 1661 it was ceded by the crown of Portugal in full sovereignty to Charles the Second of England, by the treaty of marriage concluded with that power when he espoused the Infanta; and shortly after it was transferred by royal grant to the East India Company. In process of time it superseded in importance the factory at Surat, and became the principal British settlement on the western coast. Aurungzebe, emperor of Delhi, invaded the island in 1688 and laid siege to the town, but was prevailed upon to withdraw his troops upon the receipt of a sum of money.

The extension of the British dominions on the western side

Bonald.

of India was both slow and subject to frequent checks. Bona Dea Previously to the year 1775 the possessions of the East India Company in this quarter of the empire were limited to the island of Bombay, the harbour of Bankote, with Port Victoria, and the factories of Ahmedabad, Broach, and Surat. In the year last-mentioned, Salsette and the adjacent islands were obtained by treaty with the Peishwa. About the same period various acquisitions were made in Guzerat, but these, after a brief occupation by their new masters, again reverted to the Mahrattas. It was not till the close of the eighteenth century that the company obtained the grant of the city and territory of Surat, nor until the commencement of the nineteenth, that the district of Broach became permanently a British possession. By the treaty of Baroda in 1805, portions of the collectorates of Ahmedabad and Kaira were ceded by the Guicowar, as were the ports of Malwan, Vingorla, and some others, by the rajahs of Kolapore and Sawunt Warree. These, however, in the aggregate constitute but a fragment of the territory now comprised within the presidency, the great bulk of which is of still more recent acquisition. One vast accession took place in 1818, upon the downfall of the Peishwa, when the possessions of that potentate were incorporated with the Company's dominions. Since that period the limits of the British empire on the side of Western India have been still further extended by the annexation of Sinde, and the transfer to the Company of the Angrias territories, and the principality of Sattara. The first of these became subject to British rule by the results of war; the latter two lapsed to the paramount power upon the failure of heirs to their last native rulers.

BOMB-KETCH. See GALLEOT.

BOMBUS (βόμβος), literally, a deep hollow sound or humming noise, such as the buzzing of bees. The word was used to denote a kind of applause with the hands in ancient auditories. (Suet. Nero, 20.) This term is also employed to designate a genus of insects, of which our common Humble Bee is the type. See Entomology.

BOMBYX, the silkworm. See Entomology.

BOMONICÆ (βωμονείκαι), the name given to those Lacedæmonian youths who contended at the altar of Artemis Orthia for the prize of endurance, by submitting their bodies to the lash. (Hyg. Fab. 261.)

BONA, GIOVANNI, a learned and pious cardinal, was born in 1609, at Mondovi in Piedmont, and died at Rome in 1674. His principal work is his Rerum Liturgicarum Lib. II., Rome, 1671, which is an authority on all that pertains to the Romish service of the mass.

Bona, a fortified town and seaport of Algiers, in the province, and 85 miles N.E. of the town, of Constantine, is situated on an open bay at the mouth of the Seybouse in Lat. 36. 54. N. Long. 7. 47. E. The town is about two miles in circumference, and is surrounded by a high wall with square turrets and four gates. It has been much improved since it came into the possession of the French, by the formation of good streets and squares, and the erection of many handsome and commodious houses. It now has bazaars, markets, coffeehouses, reading-rooms, hospitals, two Roman Catholic chapels, synagogue, mosque, theatre, barracks, and several schools; and it is the seat of a tribunal of primary instance. It is the principal seat of the coral fishery, and has a considerable trade in corn, wool, hides, and wax; and manufactures of native garments, tapestry, saddles, &c. The town and harbour are defended by a citadel, Casbah, on a hill a little to the north of the town, and surrounded by thick walls, about a quarter of a mile in circuit.

Remains of the ancient Hippo-regius, celebrated as the see of St Augustine, are to be found about a mile to the

south of the town, and consist principally of large cisterns, and part of the Roman walls. The population of Bona in 1850 amounted to 8134, of whom 5250 were Europeans.

Bona Dea, a Roman divinity, who is described as the wife, sister, or daughter of Faunus, and so famous for her chastity that after her death she was deified. Her sacrifices were performed only by women, and in so secret a manner that it was death for any man to intrude himself into the assembly. Cicero reproaches P. Clodius with having entered this temple disguised as a singing woman, and by his presence polluted the mysteries of the Bona Dea. What kind of mysteries these were, we learn incidentally from Juvenal, Sat. vi. 313, where the abominations practised in them are very significantly pointed at.

Bona Fides, in Law. When a person performs any action which he believes at the time to be just and lawful, he is said to have acted in bona fide, "in good faith."

Bona Mobilia, movable effects or goods.

Bona Notabilia are such goods as a person dying has in another diocese than that in which he dies, amounting to the value of five pounds at least; in which case the will of the deceased must be proved, or administration granted, in the court of the archbishop of the province, unless, by composition or custom, any dioceses are authorized to do it, when rated at a greater sum.

Bona Vacantia, goods, such as royal fish, shipwrecks, treasure-trove, waifs, and estrays, in which no one can claim

BONALD (Louis Gabriel Ambroise) Vicomte De, a French philosophical writer, was born in the year 1754 at Monna, near Milhau, in the department of Aveyron. He began life as a soldier, but having little sympathy with the revolutionary principles then abroad, he emigrated in 1791 and joined the army of Condé. Soon afterwards he quitted the service and retired to Heidelberg, where he devoted himself entirely to literature. His first work, entitled Théorie du Pouvoir Politique et Religieux, was published at ConBonaven-

Bonaparte stance in 1796, but was interdicted by the French Directory. It was republished at Paris in 1843. Though a staunch supporter of the Bourbons, Bonald returned in 1804 to Paris, where he supported himself for many years by his pen, refusing various advantageous offers from the family of In 1815 he was chosen deputy for Aveyron, and distinguished himself by his efforts to check the abuses of the press. In 1823 he was nominated a peer of France, and accepted office under the government; but he lost both his title and his place by refusing to take oath to the new government of 1830. In that year he retired to his birthplace, where he died on the 23d November 1840, at the age of eighty-six. His philosophical, social, and political theories are based on this proposition, "L'homme pense sa parole, avant de parler sa pensée. Loin que la parole soit le produit de la pensée c'est elle-même qui en est le principe. Or, si la parole est antérieure à la pensée d'ou peut elle venir, si non de Dieu même?" The principal works of M. Bonald, besides that already mentioned, are La Législation Primitive, Paris, 1821, 3 vols. 8vo; Recherches Philosophiques sur les premiers Objets des connaissances morales, 2 vols. 8vo, 1818 and 1826; Démonstration Philosophique du principe constitutif de la Société, Paris, 1830, 8vo.

BONAPARTE, or BUONAPARTE. See NAPOLEON. BONARELLI, DELLA ROVERE, COUNT GUID' UBALDO, an Italian poet, born at Urbino, A.D. 1563, was the son of Count Pietro Bonarelli, minister of the Duke of Urbino. He was intrusted with several important negotiations, and was esteemed an able politician and learned philosopher. He was the author of a pastoral entitled Filli di Sciro, printed for the first time at Ferrara in 1607, with cuts, 4to; and of an amatory production entitled Discorsi in difesa del doppio Amor della sua Celia, first printed at Ancons in 1612, 4to. He died at Fano in 1608. His brother Prospero and his

nephew Pietro were also writers of poems, &c.

BONASONE, Giulio, an admirable engraver, born at Bologna about 1498. He studied painting under Lor. Sabbatini, but attained small proficiency in that branch. The freedom and expression, however, of his etching needle and burin are most excellent, and we owe to him engravings from the works of Michael Angelo, Raffaello, Titian, and many other illustrious painters, that will always hand down his name as among the most eminent in that department of the arts.

BONASSUS. See Mammalia, Index.

BONAVENTURE (Bonaventura) St, one of the brightest luminaries of the scholastic age, was born of a good family, at Bagnarea in Tuscany, in 1221. His original name was Giovanni di Fidenza, but from a particular incident in his childhood he received the name by which alone he is now generally known. In 1243 he entered the order of St Francis, and after several years' study at Paris under the celebrated Alexander of Hales, he was in 1253 appointed to lecture publicly on the Sentences of Lombard. In 1255 he took his doctor's degree on the same day with Aquinas. The year following he was chosen general of his order, which he governed till his death with vigour and prudence. He is said to have declined the offer of the see of York from Clement IV. in 1265; and might on the death of that pope have been elected in his stead, the cardinals having solemnly engaged themselves to abide by the choice of Bonaventure, even if he should nominate himself. The person whom he recommended was Theobald, archdeacon of Liège, at that time in the Holy Land. The new pope, who assumed the name of Gregory X., appointed Bonaventure in 1273 to the bishopric of Albano, and soon after raised him to the dignity of a cardinal. Bonaventure died July 15. 1274, while attending the second council of Lyons as legate of the pope. His remains were attended to the tomb by the pope and the whole council: they were exhumed in the sixteenth century by the Huguenots, burnt, and cast into the Saône.

Bonaventure was canonized in 1482 by Sixtus IV., and

ranked in 1587 by Sixtus V. as the sixth great doctor of Bonavista the church. The city of Lyons chose him as her patron saint. The purity and gentleness of his character, and the Bondman. heavenly thoughts with which his writings abound, procured him among scholastic divines the title of the seraphic doctor. By the Franciscans he is regarded as the greatest doctor of their order, and held up as a rival to St Thomas, the glory of the Dominicans. His works, printed at Rome 1588-96, in eight vols. folio, comprise commentaries on the Scriptures and on the Book of Sentences, numerous tracts chiefly on ascetic and practical subjects, sermons, letters, &c. This collection includes several apocryphal works, among which is the famous Psalter of the Virgin. His efforts to make philosophy (which with him is a combination of Peripateticism and Neoplatonism) subservient to faith, resulted in a pious mysticism which makes his meaning often obscure. Union with God he regards as the sovereign good, and this principle he has developed in his Itinerarium Mentis in Deumand his Reductio artium in Theologiam. The latter treatise is devoted to a proof of the thesis that theology is the final consummation of all science and art. Bonaventure is distinguished above all the schoolmen by his freedom from trivial subtleties, his religious fervour, and the practical tendency of his spirit. His commentary on Lombard contains a most acute refutation of the doctrine of the eternity of the world, and some new arguments for the immortality of the soul. He is eulogized by Luther as an excellent man (Bonaventura, præstantissimus vir); and characterized by Bellarmin as a doctor alike beloved by God and man.

BONAVISTA, or BOAVISTA, an island near the western coast of Africa, forming part of the group called Cape de Verd, from their vicinity to that remarkable promontory. It was the first of the number discovered by the Portuguese in 1450. Captain Porter describes the island as consisting of a level plain, rising in the centre into rugged and rocky A great part is capable of cultivation, and eminences. might yield in abundance cotton and indigo, were these properly attended to by the indolent natives. Pop. 4395, chiefly engaged in the manufacture of salt. There are three good roads for shipping. The north-west point is in Long.

22. 56. 24. E. and Lat. 16. 13. 18. N.

BOND, John, a commentator on Horace and Persius, was born in Somersetshire in 1550, educated at Winchester school, and at New College, Oxford, by which society he was appointed master of the free school at Taunton. In this situation he acquired some reputation; but growing weary of teaching he applied to physic, and practised, it is said, with considerable success. He died in 1612. short marginal annotations upon Horace and Persius (1606 and 1614, 8vo) are generally feeble, and without erudition; yet his edition of the former has often been reprinted. Saxius describes him as minorum gentium philologus.

BONDAGE properly signifies slavery, but in old law Tenants in bondage paid books it is used for villenage. kenots, did fealty, and were prohibited from felling trees in their own garden, without license of the lord. The widow of a tenant in bondage held her husband's estate quamdiu

vixerit sine marito, as long as she lived single.

Bondage by the Forelock, or Bondagium per anteriores crines capitis, was when a freeman renounced his liberty, and became a slave to some great man, which was done by the ceremony of cutting off a lock of hair from the forehead, and delivering it to his lord. If he reclaimed his liberty, or became fugitive from his master, he might be drawn again to his servitude by the nose, whence the origin of the popular menace to pull the nose.

BONDMAN, in Old English Law, a villain, or tenant in villenage. The Romans had two kinds of bondmen; one, called servi, who were those either bought for money, taken in war, left by succession, or acquired by some other lawful title; the other, born of their bondwomen, and called

Bondou

vernæ. We may add a third kind of bondmen mentioned by Justinian, called adscriptitii glebæ, or agricensiti, who were a species of serfs or boors, not bound to the person, but to the ground or place, and who followed him who had the land. These in our old law are called vilains regard-

ants, as belonging to the manor or place.

BONDOU, a kingdom of Western Africa, between 14. and 15. N. Lat., and 11. and 13. W. Long. The country is elevated, and the mountains are generally unproductive, and covered with stunted wood. The intervening valleys, however, are fertile, and finely clothed with the baobab, the tamarind, and various valuable fruit trees. They are traversed by beds of torrents, which flow rapidly during the rains, but are empty in the dry season. Cultivation, though it extends over only a comparatively small proportion of the whole surface, is carried on with considerable activity. The products consist of four species of grain, rice, cotton, indigo, and fruits. The workmen in the different parts display considerable dexterity, though they employ very rude and defective tools. The people consist chiefly of Foulahs, though the country is much frequented by Mandingoes and Serawoollies for purposes of trade. The exports consist of provisions and cotton cloth manufactured in the country, in exchange for slaves and salt. The caravans, bringing the former from the interior to the coast, pass usually through Bondou.

The religion and laws of this country are Mahommedan, though the precepts of that faith are not observed with the same rigour as in more northern countries. There are schools, however, in every town, where the Koran and the reading and writing of Arabic are taught; but the scholar is treated as the servant of the teacher, for whom he is obliged to perform the most menial offices. The king is nearly absolute, and commands a considerable body of troops, who are much employed in predatory expeditions, chiefly for the purpose of collecting slaves. His revenues are derived from a tenth part of the produce of the land, and of the salt imported, as also from duties on goods passing through his territories, with numerous presents expected or extorted. Mr Park experienced to his cost the rapacity of the reigning prince, being obliged to give up even the coat which he wore. He was introduced to the king's twelve wives, who had never before seen a European, and thought that the white skin had been produced by his having been bathed in milk by his mother, who had also artificially pinched up his nose into its unnatural elevation. The royal residence was then at Fatteconda; but when Major Gray visited Bondou it had been removed to Boolibani, a small town surrounded by a strong clay wall. The palaces of the king and his sons consist merely of inclosures about an acre in extent, containing a number of cottages, somewhat larger, but not more commodious, than those of his subjects.

BONE DUST. See AGRICULTURAL CHEMISTRY.

Bone, Henry, R.A., the most eminent enamel painter of Great Britain, was born at Truro in 1755. He was much employed by London jewellers for small designs in enamel, before his merits as an artist were well known to the public. In 1800 the beauty of his pieces attracted the notice of the Royal Academy, of which he was then admitted as an associate, and in 1811 as an academician. From the beginning of this century until 1831, he executed many beautiful pieces of much larger size than had been attempted before in this country: among these his 85 portraits of the time of Queen Elizabeth, of different sizes, from 5 by 4, to 13 by 8 inches, are most admired. They were disposed of by public sale after his death, which took place in 1834. His "Bacchus and Ariadne," after Titian, painted on a plate, brought the great price of 2200 guineas.

BONES. See ANATOMY and Index.

Bones of the Dead. Different usages and ceremonies relating to the bones of the dead have obtained in different ages; as gathering them from the funeral pile, washing,

anointing, and depositing them in urns, &c. Among the ancients, the bones of travellers and soldiers dying in foreign countries were brought home to be buried; but during the Italic war this was prohibited by the senate.

The Romans acknowledged a deity, called Ossipaga, or Ossipanga, to whom the care of the induration and knitting of the human bones was committed, and who on that account

was invoked by pregnant women.

BONET, or BONNET, THEOPHILUS, an eminent physician, born at Geneva, March 5. 1620. He took his degree in 1643, and then applied himself to the practice of his profession, in which he acquired great reputation. On retiring from practice, he found leisure to collect all the observations he had made during an experience of forty years. But his principal title to distinction is rather as a medical writer than a practitioner, and as having in some measure created pathological anatomy, which Morgagni afterwards illustrated. He died March 29. 1689. His most valuable work is Sepulchretum, sive Anatomia Practica ex cadaveribus morbo denatis, a valuable mine of morbid anatomy. The best edition is that of Magnetus, Geneva, 3 tom. folio, 1700. His other works are, Mercurius Compitalitius, Geneva, 1682, fol.; Zodiacus Medico-Gallicus; Medicina Septentrionalis Collatitia, Geneva, 1684-86, 2 vols. fol.; Polyanthes, sive Thesaurus Medico-Practicus, Geneva, 1690-93, 3 vols. fol.; Theodori Turqueti de Mayerne Tractatus de Arthritide, Geneva, 1671, 1674, 12mo, Jacobi Rohaultii Tractatus Physicus, Geneva, 1674, 8vo, both translations; Bibliothèque de Médecine et de Chirurgie, Geneva, 1670, 4 vols.

BONFADIO, Jacopo, a celebrated Italian writer, born at Gazano, in the diocese of Brescia, about the commencement of the 16th century. He was secretary to Cardinal Merinos, archaishop of Bari, and afterwards to Cardinal Ghinucci at Genoa. He read public lectures on Aristotle's politics, and on rhetoric, and was appointed professor of philosophy and historiographer to that republic. He had completed five books of the annals of that state, which were to have been followed by others; but having spoken too freely of some noble families, they resolved upon his ruin, and accused him of an unnatural crime. As witnesses were found to convict him, he was condemned to the flames; but the sentence was commuted, as an act of special grace, into beheading. This took place in 1550. Authors have varied in their opinions as to Bonfadio's alleged guilt; Tiraboschi among others, maintains the affirmative of the question. His works are, 1. Annalium Genuensium ab anno 1528 Recuperatæ Libertatis usque ad annum 1550, libri quinque, Pavia, 1586, 4to; 2. Lettere Famigliari di Jacopo Bonfadio, con altri suoi Componimenti in prosa ed in verso, with a life of the author by Mazzuchelli, Brescia, 1746, 8vo.

BONFINI, ANTHONY, a Latin historian, born at Ascoli, in the marquisate of Ancona, in December 1472. His literary fame induced Matthias Hunyadi, king of Hungary, to invite him to his court, where he was retained and pensioned by that sovereign, as well as by his successor Wladislaus. He wrote by royal command the early history of Hungary, which he brought down to the year 1495. It is a well-executed work, and has gone through several editions. Bonfini died in 1502. He has left, 1. Rerum Ungaricarum decades tres, Basle, 1545, fol.; 2. Flavii Philostrati Lemnii Libri ii. de Vitis Sophistarum, 1516, 4to; 3. Hermogenis Libri de Arte Rhetorica et Aphthonii Sophistæ Progymnastica, Lyons, 1538; 4. In Horatium Flaccum Commentarii, Rome, without date, 4to; and, 5. Symposion Beatricis, Basle, 1572 and 1621, 8vo.

BONFRERE, JACQUES, in Latin Bonfrerius, a learned Jesuit, born at Dinant-sur-Meuse in 1573. He wrote a commentary on the Pentateuch, and notes on the Onomas-

ticon, or description of the places and towns mentioned in Scripture. He died at Tournay in 1643.

BONGARS, or Bongarsius, Jacques, counsellor and

Bonet Bongars.

Boni Boniface. maitre d'hotel to Henri IV., and one of the ablest critics of his time, was born at Orleans in 1546. He studied the belles-lettres at Strasburg under an anabaptist professor, and law at Bourges under Cujas. He was for about thirty years employed in the most important negotiations of Henri IV. at the courts of the princes of Germany, first as resident, and afterwards as ambassador. Bongars was a Protestant, and happening to be at Rome when Sixtus V. fulminated his famous bull of excommunication against Henri IV., he wrote a spirited answer, which he had the boldness to post up in a conspicuous place, and which was afterwards published with his name in the Mémoires de la Ligue. He died at Paris July 29, 1612. His printed works are, 1. A Collection of the Historians of the Crusades, under the title of Gesta Dei per Francos, Hanau, 1611, fol.; 2. Jacobi Bongarsii Epistolæ, Lugd. Bat. 1641; 3. Collectio Hungaricarum Rerum Scriptorum, Francf. 1600, fol.; 4. An edition of Justin, with learned notes; besides notes on Petronius, and various readings of Paulus Diaconus.

BONI, or Bony, a state in the island of Celebes, stretching for part of its extent along the western shores of a great cognominal bay which indents the southern side of the island to the depth of nearly 180 miles. The inhabitants of this once powerful and independent country are the Bugis,-a people in many respects the most remarkable of the Eastern Archipelago. Their numbers, by the Dutch census in 1824, amounted to about 200,000. Living, as they do, surrounded by nations notorious for treachery, piracy, and indifference to the arts and objects of civilized life, they have always shown themselves honest, industrious, and ingenious. Agriculture is by them more extensively practised than by any of the adjoining tribes; and of the cotton cloth called cambays worn in these regions, they not only manufacture enough for their own use, but also export considerable quantities to the Malay islands. They likewise carry on a considerable traffic in the mineral and vegetable productions of their country, such as gold dust, tortoise-shell, pearls, nutinegs, camphor, and various medicinal preparations; and for these they find a ready market at Singapore, the chief commercial entrepôt of these Eastern seas. In the form and constitution of their government, likewise, they approach more nearly the spirit of true civilization than any other Asiatic people. The highest officer of state is the king or president, who is elected generally for life, and always from their own number, by the chiefs of the eight petty states that compose the nation. His power, however, is so limited that he cannot decide upon any measure of public polity, without the consent of the minor chiefs by whom he was originally appointed. In some of the petty states the office of chief is the hereditary prerogative of a family; in others any member of the privileged classes may aspire to that dignity. Hence it happens not unfrequently that the state comes to be governed by a woman, as the principle of the Salic law is here unknown. Of the history of Boni not much is known. According to Temminck, it first acquired importance in the year 1666, when the rajah Palakkah, whose father and grandfather had been murdered by the family of Hassan the tyrant of Sumatra, made common cause with the Dutch against that despot. From that date till the beginning of the present century the Dutch influence in the polity of the kingdom remained undisputed. In 1814, however, Boni fell into the hands of the British, who retained it for two years; but by the European treaties concluded on the downfall of Napoleon it reverted to its original colonizers.

BONIFACE, the name of several eminent men, particularly of nine popes. To the first of these, who was chosen pope in December 418, St Augustin dedicated his four books in answer to the two epistles of the Pelagians.—Boniface II. was elected pope in October 530, and succeeded Felix IV., who had been nominated by a part of the clergy, the senate, and the people assembled in the basilica of Con-

stantine, and whose memory he caused to be condemned. Boniface His pontificate was distinguished only for its turbulence.-Boniface III. was elected in February 606. He prevailed upon the emperor Phocas to consent that the title of Universal Bishop should be conferred on no other but the bishop of Rome, and that the Holy See should have the supremacy over that of Constantinople.-Boniface IV., raised to the papal chair in August 608, obtained from the same emperor the Pantheon, or temple of all the gods, built by Agrippa, and converted it into a church, which he consecrated to all the martyrs and the Virgin, under the name of Santa Maria della Rotonda.—Boniface V. was elected in December 618, and died in October 624.—Boniface VI was elected in April 896, but died of the gout fifteen days thereafter.-Boniface VII., called Franco, is styled an antipope. He was suspected of having caused Benedict VI. to be strangled in prison in 974; and after the election of Benedict VII. he removed the treasures of the church to Constantinople. He returned on the death of Benedict, whose successor John XIV. was disposed of in the same way as Benedict VI. This intruder died in December 985. -Boniface VIII., a pontiff conspicuous for his pretensions to temporal authority, was elected in December 1294. He canonized St Louis in 1297, and in 1300 appointed the jubilee to be solemnized every hundred years thereafter.— Boniface IX. was elected pope on the 2d November 1389, after the death of Urban VI., and during the schism of the west. He supported Ladislaus of Hungary in his pretensions to the kingdom of Hungary, against Louis of Anjou, protected by the Avignon pope, Clement VII. Some writers have praised his moral character; but the greater number have accused him of simony, of cupidity in order to enrich his family, and of exactions for the support of his government. He died on the 1st October 1404.

Boniface, a saint designated as the Apostle of Germany, was an Englishman, by name Winifrid, and was born in Devonshire, A.D. 670. He went to preach the gospel among the barbarous nations of Germany; and although created archbishop of Mayence, he soon after resigned his office, in order to preach in East Friesland, where during a tumult he was murdered by the pagans, June 5. 755. With him also perished Eoban a bishop, three priests, three deacons, four monks, and forty-eight laics. The Bollandists collected the Acta Bonifaciana, containing an account of the miracles of the saint; and a collection of his Letters, amounting to 152, was published by Serrarius in 1605, 4to. In the Spicilegium of D'Achery may be found the canons which he promulgated for regulating the conduct of his clergy; and one of his sermons is preserved in the Thesaurus Anecdotorum Novissimus, tom. iii. part 2, published by D. Bernard Pez, at Augsburg, 1729.

BONIFACIO, a town in the island of Corsica, beyond the mountains, near the strait called Bocca di Bonifacio. It is well fortified, and has a secure harbour, with some trade. Pop. 3120. Long 9. 9. 16. E. Lat. 41. 23. 10. N.

BONN, the chief town of the circle of the same name in Rhenish Prussia, is pleasantly situated on the left bank of the Rhine, 15 miles S.S.E. of Cologne, with which it is connected by railway. The town has several good streets and a fine market-place. A statue of Beethoven, who was born here on the 17th December 1770, was erected, in 1844, in one of the squares. The cathedral is a fine old edifice in the Byzantine style, surmounted by five towers. Bonn is chiefly celebrated for its university, established by the king of Prussia in 1818, and occupying the extensive palace of the electors of Cologne. It has faculties of philosophy, law, medicine, and theology, both Protestant and Roman Catholic. The number of students in 1849 was 833, of whom 116 were foreigners. It has numbered among its professors Niebuhr and A. W. Schlegel, and among its students, H.R.H. Prince Albert. The library contains about 150,000 volumes. A beautiful avenue of chestnut trees, about a mile in length, extends

Bonnefons from the university to the chateau of Poppelsdorf, which contains a valuable museum of natural history, and has attached to it a spacious botanic garden. Bonn has one Protestant and three Roman Catholic churches, a synagogue, a gymnasium, and riding-school. Pop. (1849), including the military, 17,688, of whom 14,725 are Catholics. Its principal manufactures are cotton, silk, tobacco, and soap; and it has a considerable trade in wine, grain, &c. The circle has a population of 55,872.

BONNEFONS, or Bonefonius, Jean, a Latin poet, born at Clermont in Auvergne, A.D. 1554. He studied law under Cujas at Bourges; became an advocate in the parliament of Paris; was appointed lieutenant-general of Bar-sur-Seine; and by his poems acquired great but unmerited reputation, especially by his Pancharis, written in the style of Catullus. He died in 1614. He must not be confounded with John Bonnefons, his son, another Latin poet, nor with Dom Elia Benedict Bonnefons, a learned Benedictine of the congregation of St Maur, who died in 1702. The most complete edition of Bonnefons' works is that of Amsterdam, 1767, 12mo, entitled, Joannis Bonnefonii patris, Arverni, Opera Omnia.

BONNER, or Boner, EDMUND, an English prelate, notorious for his persecutions of the Protestants during the reign of Queen Mary, was born at Hanley in Worcestershire about the end of the fifteenth century, and generally passed for the natural son of George Savage, a priest, who was the natural son of Sir John Savage of Clifton in the same county. Strype, however, says he was positively assured that Bonner was the legitimate offspring of a poor man, who lived in a cottage long afterwards known by the name of Boner's Place. About the year 1512 he entered as a student of Broadgate Hall (now Pembroke College), Oxford; and in 1519 was admitted as bachelor of the canon and of the civil law. Having been admitted into orders, he obtained some preferment in the diocese of Worcester. In 1525 he took his degree as doctor; and having attracted the notice of Wolsey, that prelate took him under his patronage. Bonner was with the cardinal at Ca-wood when he was arrested on a charge of high treason. After the death of Wolsey he saw his way towards adopting Lutheran sentiments, and found means to insinuate himself into the favour of Henry VIII., who made him one of his chaplains, and employed him in several embassies abroad. In 1532 he was sent to Rome with Sir Edward Carne, to answer for the king, who had been cited to appear in person or by proxy. In 1533 he was again despatched to Pope Clement VII., then at Marseilles, to intimate Henry's appeal to a future general council from the sentence which had been pronounced against his divorce. On this occasion he threatened the pope with so much resolution, that His Holiness talked of having him burned alive or thrown into a cauldron of melted lead. Bonner accordingly judged it prudent to decamp without the ceremony of taking leave. His Holiness did not foresee that the man whom he had thus menaced with the flames was destined to burn heretics in England in support of the very faith which, under Henry, he had lent his aid to overthrow. In 1538, being then ambassador at the court of France, he was nominated bishop of Hereford; but, before consecration, he was translated to the see of London, and enthroned in April 1540. Henry VIII. died in 1517, at which time Bonner was ambassador at the court of the emperor Charles V. During this reign he was constantly zealous in his opposition to the pope; and, in compliance with the king, favoured the Reformation. Henry VIII. was a man to exact a rigid compliance with all his whims and caprices; but on the accession of young Edward, Bonner refused to take the oath of supremacy, and was committed to the Fleet, where he remained until he thought fit to promise obedience to the laws. After his release he continued to comply with the Reformation, but with such manifest neglect and reluctance, that he was twice reprimanded

by the privy council, and in 1549 was, after a long trial, Ronnet. committed to the Marshalsea, and deprived of his bishopric. The succeeding reign, however, gave him ample opportunity of revenge. Mary was scarcely seated on the throne when Bonner was restored to his bishopric, and soon afterwards appointed vicegerent and president of the convocation. From this time he became the chief instrument of persecuting cruelty, and is said to have condemned no less than 200 Protestants to the flames in the space of three years. Nor was this vindictive and persecuting priest less remarkable for his impudence than his cruelty. On the accession of Elizabeth lie appeared with the rest of the bishops at Highgate, to congratulate her on the occasion; but the queen refused to permit him to kiss her hand. Having, in the second year of her reign, refused to take the oath of allegiance and supremacy, he was again deprived and committed to the Marshalsea, where he died, Sept. 5. 1569, after a confinement of ten years' duration. The character of Bonner was remarkable for obstinacy and inflexibility in everything save principle; yet even in this respect it exhibits some striking contrasts. In the early part of his career he accommodated his principles to his convenience and ambition; in the latter, after his return to Catholicism, he remained stedfast in his adherence to the church, and, when disgraced, bore his deprivation and imprisonment with apparent calmness and resignation. The charge of atheism brought against one so defiled with blood was superfluous. He was constitutionally merciless and austere; fitted by nature for a persecutor of all opinions adverse to his own; and equally capable of employing the same burning zeal either against or in favour of any cause that he esponsed.

BONNET, CHARLES, an eminent naturalist and philosophical writer, born at Geneva on the 13th March 1720, of a French family whose religious principles had obliged them to leave their native country. At the early age of sixteen his attention was so deeply engaged by the study of Pluche's Spectacle de la Nature, that it seems to have given a bias to his future studies. The history and habits of the antlion, formica leo, particularly attracted his attention. He discovered the haunts of this curious insect, studied its habits, and added many observations to those of Pluche and Reaumur. Reaumur's memoir on Insects he also perused with great avidity; and to the observations and experiments of that naturalist Bonnet added many new facts, the detail of which he communicated to Reaumur; who was not less surprised than pleased to find so much sagacity and acuteness of research exhibited by a youth of eighteen.

Bonnet had been destined by his father for the profession of the law; but the bias of his mind leaned too strongly to natural history to permit him to occupy his attention with other pursuits, and the study of law was submitted to merely as a task. In 1738 and 1739 he sent to Reaumur many interesting observations on different species of caterpillars; and in 1740 he communicated a paper to the Academy of Sciences respecting the propagation or multiplication of aphides, or tree-lice, without actual conjunction. This question, which had been left unsettled by Reaumur, was now determined by decisive experiments; and his paper on the subject obtained for Bonnet the honour of being admitted a corresponding member of the Academy. His experiments on the generation of these insects were conducted with such close attention and minuteness of research as permanently to affect his eyesight. In the year 1741 he instituted a set of experiments on the division of worms; and he found that many species possessed in some degree the same reproductive power as the polypus. In the following year his investigations and experiments were directed to the respiration of caterpillars and butterflies; and he proved that this function was performed by means of pores to which the name of stigmata has been given. It was about the same time that he made some curious discoveries respecting the tænia, Bonnet.

or tape-worm. In 1743, when he became a doctor of laws, he procured a ready dispensation from the further prosecution of his legal studies, which he now relinquished for ever. A memoir on insects which he communicated to the Royal Society of London in the same year procured his admission into that body. Next year he published his *Insectology*, and prefixed to it a preface, in which he exhibits a philosophical sketch of his ideas concerning the system of the development of germs, and the scale of organized beings. This work was in general well received, though by some of the journals it was taxed with a want of delicacy in the descriptions of the mode of propagation of tree-lice.

Bonnet's health now began visibly to decline. His eyes particularly were affected with severe pains, which obliged him to lay aside the use of the microscope, and to forego for a time all reading and writing. Like a true philosopher, he bore his afflictions with patience; yet, although he was interdicted from all observation, his mind was fully occupied in reflection. He was at last restored to tolerable health; but he never could employ his eyes with the same freedom as formerly. About the year 1746 he undertook a course of experiments on the vegetation of plants in moss and other substances; and in the following year his researches were directed to the functions of the leaves of plants, with the view of ascertaining the different action of the two sides of the leaf. He also made experiments on the ascent of the sap; and to determine whether it rose by the bark or wood, he employed coloured injections. This investigation, with some observations which he made on vegetable monsters, was the foundation of one of his most interesting and original works, entitled Inquiries into the use of the Leaves of Plants, Leyden, 1754, 4to. A supplement was added to it in 1779.

Bonnet's inquiries in natural history now led him on to physiology and metaphysics, where he followed in the footsteps of Malebranche and Leibnitz. The first fruit of his meditations was a kind of abridgment of the materials he had collected, under the title of an Essay on Psychology, published in London in 1754, but without his name, nor did he acknowledge it till nearly thirty years afterwards. This work contains, in a concise form, the fundamental principles of his philosophy; some account of which will be found in Mr Stewart's Dissertat., part ii., §§ 2, 3, 5. It met with some censure, yet its success was brilliant. His next work was a development of the same subject. In 1760 he published, at Copenhagen, in 4to, his Analytical Essay on the Faculties of the Soul, in which, like Condillac, he supposes a statue organized like the human body, which by degrees he animates, and shows how its ideas would arise from impressions on the organs of sense. This essay was well received, though it subjected the author to a charge of materialism, which it cannot be denied was the logical result of its principles. In the case of Bonnet, however, the charge was of easy refutation. His retired and studious habits, together with his deafness and other bodily infirmities, rendering domestic comforts more essential to him, he married, in 1756, a lady of the family of De la Rive, and with her he passed thirty-seven years of domestic happiness. The celebrated Saussure was nephew to his wife, and was brought up as a son by Bonnet, who had no children of his own.

His next work, Considerations on Organized Bodies, 2 vols. 8vo, Amst. 1762, was properly the physical part of his great system. Its principal objects were, to give in an abridged form all the most interesting and well-ascertained facts respecting the origin, development, and reproduction of organized bodies; to refute the different systems founded upon epigenesis; and to explain and defend the system of germs. His Contemplation of Nature, Amst. 1764-65, 2 vols. 8vo, was a popular work, in which the principal facts relative to the different orders of created beings are displayed in a manner both instructive and entertaining, and set off

by the charms of an eloquent style; with a continual refermence to final causes, and proofs of creative wisdom and benevolence. It has been translated into most of the European languages. The concluding work of Bonnet was his Palingénésie Philosophique, Geneva, 1769, 2 vols. 8vo. In this he treats of the past and future state of living beings, and supports the idea of the survival of all animals, and the perfecting of their faculties in a future state. Attached to this work is An Inquiry into the Evidences of the Christian Revelation, and the Doctrines of Christianity, which, with a treatise On the Existence of God, was published separately at Geneva in 1770 and 1771.

Again directing his attention to natural history, he published in 1773, in Rozier's Journal, a memoir on the method of preserving insects and fishes in cabinets; and, in the following year, another on the loves of plants, originating in the discovery of a kind of cleft or mouth in the pistil of a lily. This was followed by various memoirs and observations on subjects in natural history. His reputation was now fully established. Most of the learned societies of Europe enrolled him among their members; and in 1783 he was elected into the small and very select number of foreign associates of the Academy of Sciences at Paris. Although attached by inclination to scientific pursuits, he did not entirely withdraw from public duties. He entered into the great council of the republic in 1752, and kept his seat in it till 1768; having frequently distinguished himself by his manly eloquence in support of moderate measures, and his zeal in the cause of morals and religion. The last twenty-five years of his life he passed entirely in the country, in a simple and uniform mode of life, happy in an easy competence, and in a small circle of friends. It appears that he was for some time engaged in the education of youth, in which employment he secured the warmest attachment of his pupils. His health was greatly impaired by the excessive labour he bestowed for nearly eight years on a collective edition of his works. This appeared at Neufchâtel in 1797, in 8 vols. 4to, and 18 vols. 8vo. Besides the works already mentioned, it contains a number of smaller pieces, both in natural history and metaphysics. They are all written in French. After a long and painful illness, which he bore with exemplary patience and serenity, this excellent man died on the 20th May 1793, at the age of seventythree. Public honours were rendered to his remains by his fellow-citizens, and his funeral oration was pronounced by his illustrious friend and kinsman M. de Saussure.

BONNEVAL, CLAUDE ALEXANDRE, COMTE DE, known afterwards as Achmet Pasha, was descended from an illustrious family of Limousin, and was born July 14. 1675. He entered at the age of sixteen into the service of the crown, and married the daughter of Marshal de Biron. He distinguished himself at the combats of Dieppe, La Hogue, and Cadiz; and he made the campaign of Flanders in 1690. He soon after left the French army, and, entering into the imperial service under Prince Eugene, signalized himself greatly on several occasions, particularly at the battle of Peterwardin, where the victory was due in a great measure to his intrepidity. The intrigues of the Marquis de Prie, however, ruined his credit at the court of Vienna, and caused him to be banished the empire. He then offered his services to the republic of Venice and to Russia; and these being declined in both instances, his next tender was to the Sultan, who gladly received him. It was stipulated that he should have a body of 30,000 men at his disposal; that a government should be conferred on him, with the rank of pasha of three tails, and a salary of 10,000 aspers a-day; and that, in the event of war, he should be commander-inchief. The first expedition he engaged in after his arrival at Constantinople, was to quell an insurrection in Arabia Petræa, which he happily effected. On his return he had large offers made him by Kouli Khan, which, however, he

Boodroom.

did not choose to accept. Some time after, he commanded the Turkish army against the emperor, over whose forces he gained a victory on the banks of the Danube. Bonneval afterwards fell into disgrace, and notwithstanding his services, was first imprisoned, and then banished to the island of Chio. The sultan, however, continued his friend; and, the evening before his departure, made him pasha of the Archipelago, which, with his former appointment of beglierbey of Arabia, rendered him one of the most powerful persons in the Ottoman empire. In this island he found a retirement quite agreeable to his wishes, but was soon recalled, and made topidgee or master of the ordnance, a post of great honour and profit. He died in 1747. Doubts have been thrown on the genuineness of the Mémoires du Comte de Bonneval, purporting to be his autobiography.

BONNYCASTLE, Joun, an eminent English mathematician, long professor of mathematics at Woolwich, and well known by his valuable Elements of Algebra, in 2 vols. 1813, his Guide to Arithmetic, and other works. He died

in 1821.

BONONCINI, or Buononcini, Giovanni Maria, of Modena, a composer of music in the seventeenth century, whose merit as compared with that of Handel for some time caused a division of public opinion. Bononcini was also the author of a work entitled Il Musico Pratico, published in 1673, and translated into German in 1701.

BONONIA. See Boulogne.

Bononia, a town in Pannonia Inferior, between Meursa to the N.W. and Taurinum to the east; also a town in Mœsia Superior, on the Danube, now Bonus in Bulgaria.

BONVINCINO, or Bonvicino, Alessandro, called IL Moretto, an eminent Italian painter, born at Brescia, A.D. 1514. He was originally a pupil of Titian, whose style he imitated admirably; and afterwards, by the diligent study of Raphael's works, he united in some degree the peculiar excellencies of both those masters. His works were eagerly bought up, being admired for the tenderness of the penciling, the correctness and expression of the figures, and the rich variety of the draperies. He was also excellent in portrait, and by many was placed in competition even with Titian himself. He died in 1564.

BONZES, a general term employed by Europeans to denote the sacerdotal orders of China, Japan, Cochin-China, Burmah, &c., but more particularly applied to the priests of the two first-named kingdoms. The bonzes, like the Catholic priests, practise celibacy, and some of them, like the ancient monks, live in monasteries. Some of their orders are remarkably superstitious, and pay homage to symbolic figures, and not unfrequently to hideous idols. Far from enlightening their countrymen, they mystify them by the practice and inculcation of their ridiculous devotions; and being grossly ignorant themselves, they cannot be expected to dispel the thick darkness in the midst of which they live. Some of them lead lives of contemplation and reflection, and if they do no positive good, set a praiseworthy example by the purity of their lives. In the eighteenth century, the philosophes often allegorically designated the clergy of the Latin church under the name of bonzes, whom they represented as intolerant bigots. The allegory, however, was unjust, for the bonzes, though they disdain other forms of worship than their own, bear no personal ill-will to those that practise them. They differ still more from the clergy of most Christian countries in this, that in civil affairs they have neither influence nor authority of any kind.

BOODROOM, or BAUDRUN, a small town of Anatolia, in Asia Minor, situated at the bottom of a deep bay. It is supposed to occupy the site of the ancient Halicarnassus, and the vicinity abounds with many relics of antiquity. houses are irregularly built along the shore, and are inter-

and in different parts of the bazaar, are scattered fragments of columns and mutilated sculptures. The castle stands on a broad square rock, which projects into the bay, and has a small harbour on the western side, which, though it has fallen into decay, is still convenient and safe, and is frequented by Turkish cruisers. This castle is adorned with the most exquisite sculptures in different parts of the walls, and is said to have been built by the knights of Rhodes in 1402. There are still some traces of the ancient walls, and above the town are the remains of a theatre, about 280 feet in diameter, which appears to have had thirty-six rows of marble seats. Near the harbour is the palace, with some small mosques. Pop. about 11,000, consisting chiefly of Greeks and Turks. Long. 27. 33. E. Lat. 37. 7. N.

BOOK, the common name for any literary production of bulk; but more particularly applied to a printed composi-

tion forming a volume.

Various substances have been used for writing upon; such as plates of lead and copper, the bark of trees, bricks, stone, wood, &c. Josephus speaks of two columns, the one of stone and the other of brick, on which the children of Seth wrote their inventions and astronomical discoveries; and Porphyry mentions some pillars preserved in Crete, on which the ceremonies observed by the Corybantes in their sacrifices were recorded. Hesiod's works were originally written upon tablets of lead, and deposited in the temple of the Muses, in Bœotia; the ten commandments delivered to Moses were written upon stone; and the laws of Solon were inscribed upon wooden planks. Tablets of wood and of ivory were common among the ancients; but when of wood, they generally received a coating of wax, on which the let-The leaves of the ters were traced with a pointed style. palm-tree were afterwards used instead of wooden tablets; and also the inner bark of such trees as the lime, the ash, the maple, and the elm; whence the word liber, literally the inner bark of a tree. As these barks were rolled up, the rolls were called volumen, a volume; a name afterwards given to similar rolls of paper or parchment.

The first writing was upon blocks and tablets; but when flexible matter came into use it was found more convenient to make books in the form of rolls, which were composed of several sheets fastened to each other, and rolled upon a staff, the whole forming a kind of cylinder. The ends of the staff-were usually ornamented with bosses of wood or ivory, and sometimes of silver, and even gold and precious stones. The title (titulus index) was either suspended to the roll or pasted on the outside; and the whole volume, when extended, might be about a yard or more in breadth, and sometimes fifty in length. The square form composed of separate leaves was also known, though little used by the ancients.

The internal arrangement of books has undergone many modifications. At first the letters were divided only into lines; then into separate words; and these, by degrees, were noted with accents, and distributed by points and stops, into periods, paragraphs, chapters, and other divisions. some countries, as among the orientals, the direction of the lines was from right to left; in others, as among the northern and western nations, from left to right; while the early Greeks followed both directions, writing alternately from right to left and from left to right, which was called boustrophedon, from its analogy to the path of oxen in ploughing. In this manner Solon's laws were written. In most countries the lines run from one side to the other; in some, particularly among the Chinese, their direction is from top to bottom The Egyptian monumental writing, or hieroglyphics, is arranged in all these directions, and in several peculiar to itself. Sometimes we find it proceeding from right to left; sometimes from left to right; very frequently from top to bottom, in regular parallel columns; in a few instances, and but a spersed, as is usual in Asiatic cities, with gardens, burying- few, boustrophedon; occasionally arranged in groups or clusgrounds, and cultivated fields. Throughout the streets, ters, as in anaglyphs; and where the space was irregular

Book.

Book. as on the sides of obelisks, disposed in an arbitrary manner, varying according to the circumstances. But this total want of system, or rather this mode of arranging the characters upon all systems and in all ways, can never be productive of any difficulty or ambiguity, as the disposition and true sequence of the writing is in every case clearly and almost intuitively indicated by the direction given to the principal figures, more especially to those which represent animals, or the human form. With regard to the other modes of writing practised by the ancient Egyptians, that called the hieratic follows to a certain extent the varieties of the hieroglyphic; but the demotic, enchorial, or civil form, is generally disposed from right to left, in the ordinary manner of oriental writing.

Of the scarcity of books during the seventh and subsequent centuries Warton gives the following curious account: -" Towards the close of the seventh century," says this writer, "even in the papal library at Rome, the number of books was so inconsiderable, that Pope Saint Martin requested Sanctamund, bishop of Maestricht, if possible, to supply this defect from the remotest parts of Germany. In the year 855 Lupus, abbot of Ferrières, in France, sent two of his monks to Pope Benedict III. to beg a copy of Cicero de Oratore, and Quintilian's Institutes, and some other books: 'for,' says the abbot, 'although we have part of these books, yet there is no whole or complete copy of them in all France.' Albert, abbot of Gemblours, who with incredible labour and immense expense had collected a hundred volumes on theological, and fifty on profane subjects, imagined he had formed a splendid library. About the year 790 Charlemagne granted an unlimited right of hunting to the abbot and monks of Sithin, for making their gloves and girdles of the skins of the deer they killed, and covers for their books. We may imagine that these religious were more fond of hunting than reading. It is certain that they were obliged to hunt before they could read; and at least it is probable that, under these circumstances, and of such materials, they did not manufacture many volumes. At the beginning of the tenth century books were so scarce in Spain, that one and the same copy of the Bible, Saint Jerome's Epistles, and some volumes of ecclesiastical offices and martyrologies, often served several different monasteries. Among the constitutions given to the monks of England by Archbishop Lanfranc, in the year 1072, the following injunction occurs. At the beginning of Lent the librarian is ordered to deliver a book to each of the religious: a whole year was allowed for the perusal of this book, and at the returning Lent those monks who had neglected to read the books they had respectively received are commanded to prostrate themselves before the abbot, and to supplicate his indulgence. This regulation was partly occasioned by the low state of literature which Lanfranc found in the English monasteries. But at the same time it was a matter of necessity, and is in a great measure to be referred to the scarcity of copies of useful and suitable authors. In an inventory of the goods of John de Pontissara, bishop of Winchester, contained in his capital palace of Wulvesey, all the books which appear are nothing more than Septendecim species librorum de diversis scientiis. This was in the year 1294. The same prelate, in the year 1299, borrows of his cathedral convent of St Swithin at Winchester, Bibliam bene glossatam; that is, the Bible with marginal annotations, in two large folio volumes; but gives a bond for due return of the loan, drawn up with great solemnity. This Bible had been bequeathed to the convent the same year by Pontissara's predecessor, Bishop Nicholas de Ely; and in consideration of so important a bequest, that is, pro bona Biblia dicti episcopi bene glossata, and one hundred merks in money, the monks founded a daily mass for the soul of the donor. When a single book was bequeathed to a friend or relation, it was seldom without many restrictions and stipula-

tions. If any person gave a book to a religious house, he believed that so valuable a donation merited eternal salvation; and he offered it on the altar with great ceremony. The most formidable anathemas were peremptorily denounced against those who should dare to alienate a book presented to the cloister or library of a religious house. The prior and convent of Rochester declare that they will every year pronounce the irrevocable sentence of damnation on him who shall purloin or conceal a Latin translation of Aristotle's Physics, or even obliterate the title. Sometimes a book was given to a monastery on condition that the donor should have the use of it during his life; and sometimes to a private person, with the reservation that he who receives it should pray for the soul of his benefactor. The gift of a book to Lincoln Cathedral by Bishop Repingdon, in the year 1422, occurs in this form, and under these curious circumstances. The memorial is written in Latin with the bishop's own hand, which I will give in English, at the beginning of Peter's Breviary of the Bible. 'I Philip of Repyndon, late bishop of Lincoln, give this book, called Peter de Areolis, to the new library to be built within the church of Lincoln; reserving the use and possession of it to Richard Trysely, clerk, canon, and prebendary, of Miltoun, in fee, and to the term of his life; and afterwards to be given up and restored to the said library, or the keepers of the same. for the time being, faithfully, and without delay. Written with my own hand, A.D. 1422.' When a book was bought. the affair was of so much importance, that it was customary to assemble persons of consequence and character, and to make a formal record that they were present on this occasion. Among the royal manuscripts in the book of the Sentences of Peter Lombard, an archdeacon of Lincoln has left this entry: 'This book of the Sentences belongs to master Robert archdeacon of Lincoln, which he bought of Geoffrey the chaplain, brother of Henry vicar of Northelkington, in the presence of master Robert de Lee, master John of Lirling, Richard of Luda clerk, Richard the almoner, the said Henry the vicar, and his clerk, and others; and the said archdeacon gave the said book to God and St Oswald, and to Peter abbot of Barton, and the convent of Barden. disputed property of a book often occasioned the most violent altercations. Many claims appear to have been made to a manuscript of Matthew Paris, belonging to the last-mentioned library; in which John Russel, bishop of Lincoln, thus conditionally defends or explains his right of posses-'If this book can be proved to be or to have been the property of the exempt monastery of St Alban, in the diocese of Lincoln, I declare this to be my mind, that in that case I use it at present as a loan under favour of those monks who belong to the said monastery. Otherwise, according to the condition under which this book came into my possession, I will that it shall belong to the college of the blessed Winchester Mary at Oxford, of the foundation of William Wykham. Written with my own hand at Buckdane, 1st Jan. A.D. 1488. Jo. Lincoln. Whoever shall obliterate or destroy this writing, let him be anathema.' About the year 1225, Roger de Insula, dean of York, gave several Latin Bibles to the university of Oxford, with a condition that the students who perused them should deposit a cautionary pledge. The library of that university, before the year 1300, consisted only of a few tracts, chained or kept in chests in the choir of St Mary's church. In the year 1327 the scholars and citizens of Oxford assaulted and entirely pillaged the opulent Benedictine abbey of the neighbouring town of Abingdon. Among the books they found there were one hundred psalters, as many grayles, and forty missals, which undoubtedly belonged to the choir of the church; but besides these there were only twenty-two codices, which I interpret books on common subjects. And although the invention of paper at the close of the eleventh century contributed to multiply manuscripts, and consequently to facilitate know-

binding.

Books binding. ledge, yet, even so late as the reign of our Henry VI. we have discovered the following remarkable instance of the inconveniences and impediments to study which must have been produced by a scarcity of books. It is in the statutes of St Mary's College at Oxford, founded as a seminary to Oseney Abbey in the year 1446: 'Let no scholar occupy a book in the library above one hour, or two hours at most, so that others be hindered from the use of the same.' famous library established in the university of Oxford, by that munificent patron of literature Humphrey Duke of Gloucester, contained only 600 volumes. About the commencement of the fourteenth century there were only four classics in the royal library of Paris. These were one copy of Cicero, Ovid, Lucan, and Boethius. The rest were chiefly books of devotion, which included but few of the fathers; many treatises of astrology, geomancy, chiromancy, and medicine, originally written in Arabic, and translated into Latin or French; pandects, chronicles, and romances. This collection was principally made by Charles V., who began his reign in 1365. This monarch was passionately fond of reading; and it was the fashion to send him presents of books from every part of the kingdom of France. These he ordered to be elegantly transcribed and richly illuminated; and he placed them in a tower of the Louvre, from thence called La Tour de la Librairie. The whole consisted of 900 volumes. They were deposited in three chambers, which on this occasion were wainscotted with Irish oak, and ceiled with cypress curiously carved. The windows were of painted glass, fenced with iron bars and copper wire. The English became masters of Paris in the year 1425, on which event the Duke of Bedford, regent of France, sent the whole library, then consisting of only 853 volumes, and valued at 2223 livres, into England, where perhaps they became the groundwork of Duke Humphrey's library just mentioned. Even so late as the year 1471, when Louis XI. of France borrowed the works of the Arabian physician Rhases from the faculty of medicine at Paris, he not only deposited, by way of pledge, a quantity of valuable plate, but was obliged to procure a nobleman to join with him as surety in a deed. by which he bound himself to return it under a considerable forfeiture. Of the excessive prices of books in the middle ages there are numerous and curious proofs. I will mention a few only. In the year 1174, Walter, prior of St Swithin's at Winchester, afterwards elected abbot of Westminster, a writer in Latin of the lives of the bishops who were his patrons, purchased of the monks of Dorchester in Oxfordshire. Bede's Homilies and St Austin's Psalter, for twelve measures of barley, and a pall, on which was embroidered in silver the history of St Birinus converting a Saxon king. Among the royal manuscripts in the British Museum there is Comestor's Scholastic History in French, which, as it is recorded in a blank page at the beginning, was taken from the king of France at the battle of Poictiers; and being purchased by William Montague, Earl of Salisbury, for 100 marcs, was ordered to be sold by the last will of his Countess Elizabeth for forty livres. About the year 1400 a copy of John of Meun's Roman de la Roze, was sold at Paris for forty crowns, or L.33, 6s. 6d." (Warton's History of English Poetry, vol. i.) For further information regarding books, see BIBLIOGRAPHY

BOOKBINDING is the art of fastening together the sheets of paper composing a book, and inclosing them in cases of pasteboard covered with leather of various kinds, or other materials; the object of which is the preservation of the book, and its protection from injury while in use.

At the time when books were rarities,—either manuscripts produced by patient secluded labour, or the productions of the printing-press during the infancy of typography,—they were naturally very highly prized; and as much labour, skill, care, and expense were bestowed upon the protection and embellishment of a cherished folio as would suffice at the

present day to the building of a house. The wooden cover of a book, with its metal hinges, bosses, guards, and clasps, seems, in all but dimensions, fit for a church door; but since the great improvement in all the mechanical arts connected with the production of books, together with the extension of education to all classes, and the consequent diffusion of knowledge, literature has become almost as necessary as clothing and shelter to the comfort of civilized man; hence the multiplication of books, and the gradual but radical changes witnessed during the present century in the art of bookbinding. When libraries were comparatively of limited extent, large sums of money were expended upon binding; but, at the present day, when a well-selected library must of necessity be extensive, a substitute for the old method of binding is sought and obtained in the recent adoption of cloth covers.

As the binding of a book adds considerably to its cost, we find that in France, Germany, and other Continental countries, as well as in the United States of America, most books when first published are merely sewed together, and covered with a paper wrapper, like our magazines. In England, the now elegant and durable cloth binding presents so finished an appearance when ranged upon the shelves of a library, as to supersede the necessity of resorting to the style of binding so long prevalent. The libraries of the affluent, however, continue the demand for that durable and ornamental style of work which has continued in vogue, with slight variations, for the past century; and since all the essential features of other descriptions of binding are contained in this, we shall briefly describe the operations in the successive stages of binding a book, and afterwards indicate the variations included in the other kinds of binding.

The dimensions of the sheets of paper upon which a book is printed, together with the number of pages into which the sheet is divided, necessarily determine the size of a book; for instance, a sheet of the size known as foolscap may, according to the number of times it is folded, make a folio book, a quarto, or an octavo; and so with other sheets of different dimensions, such as demy, royal, imperial, &c. Previous to the present century, folios and quartos were the predominating sizes of library books; but, at the present time, the more portable and convenient octavo is preferred, generally the demy sheet folded into that form, making sixteen pages.

The sheets of a book are readily distinguished from each other by signatures at the foot of the first page of each sheet; and it is to these, and not to the paginal number, that the binder looks in arranging and collating. In foreign countries these signatures consist of consecutive numbers; while in this country alphabetical letters are adopted: we give the preference to the former, as being less productive of error in collation, and as possessing certain other advantages.

The operations of binding may be conveniently grouped under two main divisions—"forwarding" and "finishing." Under the first is comprehended everything necessary to the preservation of a book—the second concerns merely the embellishment.

In the first place, the sheets of a book are folded in such a manner that the pages follow each other in consecutive order. In this operation the binder is guided by the "signatures," which indicate the part of a sheet to be superimposed upon another. This labour is performed by women and girls, who acquire incredible dexterity by long-continued practice. The sheets, after being folded, are loose and bulky. The next operation has for its object the bringing them into a more compact form, which is accomplished either by beating them with a broad-faced hammer upon a smooth flat stone, or by passing them between the cylinders of a "rolling machine," invented for that purpose by Mr Burn of Hatton Garden, London. A book must not be submitted to the "beating" process until it has been printed one or two years; for the heat generated by the compression of the air under the blows of the hammer, causes the printing-ink to soften, and "set off" or transfer a portion of its substance to the opposite pages, by which the book is always disfigured, and frequently entirely ruined. This objection does not lie against the rolling machine, provided

Bookbinding. the cylinders are kept clean; while a great saving of time is effected by its use.

The next operation is that of sewing the sheets together, and to the bands of string or cord by which the book is sub-sequently secured in its case. The sheets being carefully collated, are given to the sewer, who sits before a contrivance called a "sewing machine," in which the bands are fixed at suitable distances apart: the number of these bands depends upon the size of the volume and the quality of the binding; six bands are usually allowed to folios, and five or four to quartos and octavos: the sewer places a folded sheet with its back to the bands, and pierces it through the middle fold with a needle carrying the thread, at distances corresponding to the bands. The thread, when passed through the sheet, is twisted round the contiguous band, and so with each in succession, until all the sheets composing the volume are fastened to the bands. This method involves what are termed raised bands, which are recognised by a projection over each on the back of the book; but if the back is required to be flat and smooth, sunk bands are adopted. To obtain these, the sheets, before being given to the sewer, are by means of a saw grooved at the back, sufficiently deep to admit the bands. If plates are to be inserted, they are either pasted in at the appropriate places, or, which is preferable, stitched through a marginal fold. When the is preferable, stitched through a marginal fold. book is released from the sewing machine, about half an inch of each band is left attached on either side: these ends are "frayed" out and beaten flat, to prevent their forming protuberances on the cover to which they are fastened; the "endpapers" intended to line the inside of the cases are now attached, and the back of the book is covered with glue. Before the glue is quite dry the back is rounded with a hammer, and subsequently placed between two feather-edged boards, above which the back of the book slightly projects; these are then placed together in a press, for the backing process; that is, the back of the book is well beaten until it projects a little over each side of the levelled boards, so as to form a groove or place for the millboard covers to lie in. The book is now removed to the "cutting-press," where, by means of an instrument termed a plough, the edges are smoothly cut; but, in order to preserve the concavity of the fore-edge, the back is temporarily flattened, and after the edges are cut, it is restored to its former roundness. The boards were formerly, as the name indicates, really of wood, but now of thick brown paper or millboard, of various thicknesses, according to the size of the book. They are cut a little larger than the book itself, and attached by the ends of the bands, left for that purpose, being passed through holes in the sides of the boards, glued down, and then hammered flat and smooth. The edges of the volume are now coloured, marbled, or gilt and burnished.

The head-band is an ornamental appendage employed for the purpose of concealing the leather folded over the back. It consists of a piece of parchment or card-board, worked over with coloured silk, which is sewed to the glued back of the sheets, and gives an elegant finish to that part of the book.

Sometimes books are preferred with hollow backs, that is, when the leather of the cover is not attached to the glued back, but this latter is covered with a piece of thick paper. The book is now ready to receive its external covering.

This external covering may be of various materials. For the most part of modern books it is of calf-skin dyed of various colours; but kid-skin, and its imitation in sheep-skin or roan, and sheep-skin acknowledged as such, in which school-books and many law-books are bound, are also used in great quantities. The piece of leather, cut to a proper size, is moistened with water, next covered on the inner side with paste or glue, and then applied evenly to the millboard sides; the superfluous edge of the leather, first pared to reduce its thickness, is turned over on the inside, and concealed from view by the end papers attached to the sheets forming the book, which are subsequently pasted down upon the millboards. The book is now "corded," that is, firmly tied between two boards until it is dry, so as to msure perfect smoothness in the cover; it is next removed from these boards and transferred to the finishers. Besides the "lettering" at the back of a book, there is generally a variety of ornamental work, on the back, edges, and sides, the patterns of which may be executed either in blind-tooling, wherein the leather is simply embossed, without the use of gold, leaf; or the metal may be applied only partially to the patterns, or they may be executed wholly in gold-leaf. This is a matter

affording much room for the display of taste and skill on the part of the binder, and in many instances is taken advantage of; by none more, at the present day, than by Mr James Hayday of London, whose productions fully equal those of the most eminent binders of past times. The embossing is performed with the aid of brass tools cut to various patterns; when leaf-gold is applied, it is made to adhere by moistening the leather with the glair of egg mixed with olive oil; the gold-leaf being laid upon this, the hot embossing tool is carefully applied, and the pattern permanently impressed upon the leather.

There are many other minute details into which it is not our purpose to enter. Enough has been said to indicate the various operations to which a book is submitted in being "bound;" but as good binding is necessarily expensive, those who have large libraries to bind are frequently obliged to study economy. This end is attained without in any degree sacrificing elegance of appearance, or any of the essential qualities of binding, by adopting the method of having the books half-bound, as it is termed. The only difference between this method and that just described consists in the sides of the millboards being covered with paper or cloth, while the back and corners of the cover are protected with leather: the edges of the leaves are often not cut on the front and bottom, but only on the top, which is usually gilt, to protect the book from disfiguration by dust.

The various styles of binding are distinguished from each other by appropriate names, according to the material which is used for the covers. Russia leather is much prized on account of its not being liable to mould in damp apartments, nor to the attacks of insects. These qualities, together with its agreeable odour. it derives from being treated with the empyreumatic oil of birch bark: its peculiar red colour is due chiefly to a dye of Saunders' wood. Many of the Continental books are bound in vellum, a very elegant but expensive style. In Holland and Spain much hog-skin was formerly used. Besides these various leathers, textile fabrics have at all periods been extensively employed for the purposes of binding; some specimens of the earliest dates are covered with velvet and satin; in recent times silk was in great demand for annuals and kindred works; but lately cotton cloth embossed and dyed has, in the extent of its applications, exceeded any other material ever employed. Previous to the year 1825, new books were generally published in boards; that is, millboards covered with drab paper, upon which the title, printed on a white label, was pasted. Although this was greatly superior to the Continental mode of covering new books with thin paper, something more elegant and durable was needed, and Mr Archibald Leighton of London endeavoured to meet this want by introducing coloured cloth (glazed calico). One of the first books of importance bound in this material was the edition of Lord Byron's works in 17 volumes.

Since that period there has been a progressive improvement in the adaptation of coloured cloth to the purposes of binding, both in the colours imparted to it, and in "embossing" upon its surface the grain peculiar to morocco and other kinds of leather; and so perfect is this imitation, that an experienced eye can scarcely detect the difference. The sides and backs of "cases" covered with this fabric are also ornamented in bold relief, with elegant patterns, by means of brass tools applied by powerful arming-presses; while the "lettering," at first so clumsily executed, is now as perfect as that impressed upon leather. Skilful artists are constantly employed in designing ornamental patterns; and a new class of tool-cutters, who cut these patterns in solid brass, has been called into existence. Expensive machines also for folding, pressing, cutting the edges, &c., have been contrived.

This style of binding has been received with so much favour that the rapidity of its extension is almost incredible. At one of the numerous large establishments in London, 310 persons are employed, distributed as follows:—200 women and girls are occupied in folding, collating, and sewing; and 110 men and boys in the more advanced stages: of these, 40 men are engaged in backing, cutting the edges, &c.; 5 in gilding or marbling the edges; 15 in making cases; 24 in stamping the sides; 12 as extra binders and finishers of the better kind of work: and 14 as clerks, porters, &c. Ten arming presses for stamping the sides of the covers, each worked by two men, will furnish 3000 impressions per day from a brass block "in blind," i.e. without gold leaf, or 1500 impressions if with the gold. The value of the gold leaf consumed amounts to L.4000 perannum. The superfluous gold wiped off the pattern is saved.

Bookbinding. Bookbinding. and sold for L.800 per annum. The quantity of millboards used is at the rate of 8 tons per month. Four men are constantly employed at as many cutting-machines, each of which yields a hundredweight of shavings per week. One man is employed solely in sawing the backs of books; two others in cutting millboard to the required sizes, and four pairs of men in making cloth cases, each pair producing on the average 1200 cases per diem.

The operations in the process of cloth-binding differ from those described under calf-binding in this,—the sheets are not beaten or rolled, nor the edges cut, except that the fore-edge and the tail are usually trimmed; the cases are made separately, and not fastened to the sheets by the bands, but only by the end papers, or by a strip of coarse muslin attached to the glued back of the sheets, being also fastened to the inside of the case. Cloth-covered books have always hollow backs.

There is a recent improvement in fastening together books of plates, music, account-books, &c., which are required to lie open flat; these are not sewed, but the back edge of the leaves is cut even, rasped, and cemented with liquid India-rubber.

The material with which books are covered should be selected with reference to the "tear and wear" to which they may be subjected. For public libraries, the very best workmanship in the forwarding should be secured, while the finishing bestowed must have reference to neatness and economy. The lettering of books rarely receives the consideration it demands; a simple rule is, that it should clearly indicate, 1. The author's name; 2. The subject, and even the divisions of a subject; so that the book may be identified without removing it from its place. In serial works, besides the consecutive number, the date should be affixed, and sometimes even the place of publication. These details may appear trifles, but whoever has to do with large libraries will appreciate their utility. If they are left to the discretion of the binder, he generally contents himself with lettering a book "History of Rome, "Travels in Europe," which obviously necessitates the opening of the volume before its individuality can be ascertained. For private libraries of large extent there is no better style of binding than "half morocco" with gilt tops, occasionally interspersed with specimens of other styles.

The classification of books in large libraries may be greatly facilitated by appropriating certain colours to specific subjects; e.g. theology might be clothed in black or dark purple; history in scarlet; poetry in light-blue or green. In this manner, and by combining them with coloured labels of various hues, the labour of sorting and replacing books upon the shelves may be much lightened to the librarian.

Bookbinding still lacks its historian: it is much to be regretted that on a subject so well deserving the attention of the curious and learned, no researches have been made into the origin, progress, and decline of this art. Beyond a few incidental and fragmentary passages in the writings of bibliographers and travellers, merely descriptive, we may seek in vain for reliable information. In this place we have endeavoured to collect the scattered materials, and present them in a concise form.

Although it is customary to refer binding to remote antiquity, it obviously could not have been practised before books assumed their present form. The manuscripts of the ancients consisted of continuous rolls of papyrus or parchment, a form which did not admit of being bound like the single leaves of a modern book. These manuscripts were wound upon rollers, as our maps are mounted, to which labels bearing the titles were attached at the ends: these rolls were inserted in parchment cases, and preserved from dust and injury in cylindrical boxes with lids (see Gell's Pompeii, &c.) It is more probable, however, that the modern book derived its form from the means taken to

preserve the waxed tablets of the Greeks and Romans which were inclosed in covers of wood, ivory, &c. (diptycha, triptycha). It would be easy to substitute pieces of papyrus or parchment for these pieces of waxed wood, upon which the writing was graven by the stilus. These diptycha were frequently elaborately carved and ornamented, and many of them, preserved to the present time, very nearly resemble our modern octavos in size. When parchment came to be exclusively employed as a writing material, it gave rise to the invention of libri plicatiles and volumina, names which very clearly indicate the form given to manuscripts. The volumen, so called a volvendo, was the form mostly employed with papyrus and parchment, and now that our books are square or oblong, the term is anomalous; the word remains, but the thing itself has long since entirely disappeared.

binding.

It would be exceedingly difficult to determine what the art of bookbinding, or that which occupied its place, was during the middle ages, as no evidence remains, and the light of discovery has not been thrown upon it. All that we can at present learn is, that in the ninth and tenth centuries, owing probably to the impulse given to letters, and to everything connected with literature, by Charlemagne and the princes of his line, the external decoration of manuscripts was carried to a high state of perfection. The parchment, in leaves, was inclosed between two tablets of wood or ivory, inlaid and incrusted with jewels and precious stones, bosses of gold and silver, sometimes with hinges and clasps of these metals. The Bibliothèque Impériale at Paris is very rich in this description of bindings.

The library of the Louvre contains the celebrated Book of Hours, written with letters of gold upon purple parchment: it is covered with red velvet. This book was given to the city of Toulouse by Charlemagne. A New Testament of the eighth century, bound in wooden covers, covered with black satin, in an excellent state of preservation, enriches a private collection.

It was probably only at the epoch of the invention of paper from rags, and its extended use, that modern binding arose: this was towards the end of the thirteenth century (1280). From this period to the sixteenth century the bindings are numerous, but no name of a binder has reached us; they generally followed the good or bad taste that prevailed at the time in other ornamental arts. Thus, during the fifteenth century, binding, like architecture and the ornamental letters of MSS., abounded in foliages and flowers (arabesque), but at no period do we find the elegant simplicity that prevailed in the arts at the commencement of the fourteenth century. The most beautiful bindings preserved to us of the fifteenth century are those of the famous library formed at Buda by Matthias Hunyadi, king of Hungary; it consisted of nearly 50,000 volumes of Greek and Latin manuscripts. They are but very little known. The greater portion of the treasures of this sort collected by Matthias are now in the public library at Munich.

Apart from mere decoration, the main object aimed at in the early bindings was strength and durability, and whether it was owing to the binders being fettered in their ideas to the ivory or wooden covers of the tablets they first imitated, or from an excess of care in securing the preservation of the treasure they inclosed, it is certain they laboured overmuch in their vocation. A folio of this era, with its timber and metal, must have been a formidable affair; and the very means employed for the preservation of the book doubtless frequently led to its destruction.²

1 The oft-repeated encodes which attributes the erection of a statue to Phillatius, an Athenian, for the invention of bookbinding, is evidently founded upon a misconception of the text of Photius; all that the Athenian did was to glue together into one continuous roll (volumen) the pieces of papyrus, which were previously sewed together.

In the Laurentian Library at Florence is Petrarch's manuscript of Cicero's Epistolæ ad Atticum, remarkable for its calligraphy and workmanship. The binding is only of the time of Cosmo. The old wooden covers of this volume, so often handled by the poet, had so wounded him by falling repeatedly on his left leg, that he narrowly escaped amputation. So rude and almost murderous were literary pursuits at that period. This volume has still, as before, brass clasps and corners, but they would not inflict such a wound.—Valery.

Book-

The sixteenth century, the epoch of the Renaissance. keeping. is doubtless that in which the art of binding attained its greatest perfection, and the books extant in various public and private libraries confirm this view. It would be out of place to enumerate these treasures, but it would be difficult to meet with one more beautiful than that of the Hours of Margaret of Savoy. At the court of France, during the time of Catherine de' Medicis, there was a perfect rage for ornamental binding, its greatest promoters being Diana of Poictiers, the treasurer Grollier, the presicent De Thou, and M. d'Urfé.

In the seventeenth century, with the exception of the bindings executed by Ruette, bookseller and binder to Louis XIV., the art at first remained quite stationary, and afterwards quickly declined; the intrigues and troubles of this period were by no means favourable to so innocent and harmless a passion as that for choice bindings. The eighteenth century was, however, more congenial; the names of eminent binders are sufficiently numerous to indicate that their vocation was in the ascendant. We can only enumerate Enguerrand, Boyer, Desseuille, Padeloup, Gascon, Derôme, Chameau, Pontchartrain, Simier, father and son, Purgold, Vaugelles, and Bauzérian. Bauzonnet was cotemporary with our Lewis. Upon the whole, the bindings of France excel those of any other nation; they always exhibit a refined taste, and perfect manipulation in the tooling. At the present day the best designs are generally but close imitations of the productions of the past.

The most eminent cotemporary binders of France are Madame Gruel, MM. Niédrée, Lortic, Simier, Cape, and keeping.

The earliest ornamental binding extant in England is of the time of Henry VII.; many specimens of this period are preserved in the British Museum and the Record Office. Stamping the covers with brass tools appears to have been first practised in the reign of Henry VIII., many of which are supposed, upon what authority we know not, to have been designed by Holbein. In the reign of Elizabeth velvet covers embroidered with gold and silver thread and coloured silk were fashionable. It was only in the eighteenth century that binding assumed importance as an art in Eng-The first, and still unsurpassed binder, is Roger Payne, who was so completely the founder of his art, that he performed every operation with his own hands, from folding, beating, sewing, cutting, mending, head banding, colouring his end-papers, covering, tooling, even to the cutting of the brass tools and letters. The other eminent names since his time are Johnson, Lewis, Kalthoeber, Baumgarten, Bohn, Staggemeir-the last four being Germans; Mackenzie, Clarke, Bedford, Jones, Hering, Hayday, Wright, Rivière. In the present day we have produced no original style of decoration for leather-binding; our highest achievements are in imitating the productions of past centuries. When these imitations combine good taste with good workmanship the highest aim of binding is accomplished, until a new style is origi-(C. M-L.)

BOOK-KEEPING.

BOOK-KEEPING is the art of keeping books of account, whether in public offices, manufacturing establishments, or mercantile counting-houses; but the name is generally applied to the books of merchants, on account of the complexity of their transactions, and the care consequently required to prevent obscurity or confusion. It was accordingly among merchants, and in particular among those of Venice, Genoa, Pisa, and other trading towns in Modern Italy, that book-keeping was first reduced to a system, and that the remarkable refinement of double entry was adopted. This, like the discoveries of the Italians in manufactures, the fine arts, navigation, and commerce, was owing, not, as some imagine, to any peculiarity of disposition, or power of invention, inherent in that people, but to their country being the part of Europe in which, in modern times, townpopulation first became considerable, and men derived advantage from living together in large communities. It is in populous towns that employment is divided and subdivided; that discoveries and inventions take place; and that the education of youth exchanges its antiquated and scholastic form for one of direct utility, adapted to the progress and the wants of the existing generation.

The first printed work on book-keeping was the production of an Italian teacher, who, without knowing much of trade by his own experience, observed the manner in which the intelligent merchants of his country kept their accounts. It was published as early as 1495, and was followed in the succeeding century by several works on book-keeping in French, composed with evident care and solicitude to explain the art, but affording by their complexity a remarkable contrast to the short and clear system afterwards adopted by merchants. English publications on book-keeping came forth somewhat later, but all resembled the foreign treatises in being the composition, not of merchants, but of teachers and accountants. In 1652 Collins, a well-known London accountant, published a long work entitled An Introduction to Merchants' Accounts, which, like the work of one of his contemporaries on a very different topic (Rich On Short Hand), continued during a century the best, or, to speak more correctly, the least imperfect publication on the subject of which it treated. About a hundred years later, Mair, a well-known writer of books on education, pub-

lished his Book-Keeping Modernized, a work containing a correct statement of the principles of double entry, but in other respects much less clear and concise than it might have been had the author adopted the method of our principal merchants, who had now greatly simplified their plan of keep-

ing accounts.
In 1789 appeared the work of a practical merchant, under the title of A Complete System of Book-Keeping, by Benjamin

Booth, London, 4to.

The favourable expectation excited by Mr Booth's experience in business was fully confirmed by his book, which contained a great deal of information in short compass, unembarrassed either by minute detail or fanciful theory. The plan which he recommended and exemplified was the Italian method of double entry, in conformity with the practice of the first merchants in this country and the Continent, for more than a century. Practical men could no longer complain of the nonexistence of a correct summary of the principles and practice of book-keeping; and the Italian method seemed likely to be as firmly fixed in the admiration of our young merchants as it had long been in that of their predecessors, when its title to clearness and accuracy was strongly called in question by a writer at that time unknown to the mercantile public.

Mr Edward Thomas Jones, an accountant in Bristol, had occasion, like Mr Booth, to see a series of perplexities and losses arising from books being badly kept, namely, disputed accounts, actions at law, and occasionally even bankruptcies. In the case of many merchants the books submitted to him had remained for years unbalanced; in others the balancing had been incorrect, and deception had been practised either on a partner or the creditors. Such irregularities, ascribed by Mr Booth wholly to the misconduct of book-keepers, is charged by Mr Jones on the system itself, which (the Italian method) he does not scruple to describe as "insufficient to prevent or detect error, rendering the process of balancing very difficult, and not necessarily correct when the balance is completed." To find a safeguard against such errors, to devise a method by which accuracy in book-keeping might be insured, and the perplexity in balancing removed, was, said Mr Jones, a work of great time and difficulty. He began to give his plan to the public in 1796, and improved on it in the succeeding years. He published a treatise on this subject in 1821, and again in a much more extended form in 1831. Of this work we shall

Book- treat more fully in the subsequent part of the present article, keeping. after explaining to our readers the nature of the system in

> In the earlier stages of commerce, such as the fifteenth and sixteenth centuries were for the north of Italy, and the seventeenth for England, the transactions of merchants, though varied in their nature, were on a small scale as regarded any particular department. The same individual did business in a number of articles, but in none to an extent to require separate books of account. Hence the practice of recording all transactions, whether purchases, sales, receipts, or payments, in a diary, which, from the rough manner in which it was kept, was commonly called a waste-book. The practice in those days was for a merchant or his chief clerk, as soon as any transaction was made or agreed on, to insert a memorandum taking little trouble as to the form of the entry: for that they relied on the book-keeper, who was not then a partner, or even clerk in the house, but generally gave his aid by intervals in different counting-houses, passing one or two days in the week at each, and bringing the rude entries in their waste-books into regular form in the journal. At present, and for a great length of time, each

mercantile house has its own book-keeper; the art being simplified so as to be within the attainment of most clerks of ability, instead of being, as in remote times, a mystery to all except men of long standing and more than usual instruction. But in process of time, as mercantile concerns have acquired extension, the art of book-keeping has been simplified, because particular departments of business have required separate books. Thus money receipts and payments, instead of being mixed, in the waste-book, with the amount of invoices, account sales, and other entries quite different in their nature, are all registered in the cash-book, or book for that special purpose. The same principle of division holds in regard to bills; also as to invoices, account sales, and, in short, every department of business.

We shall now give a practical illustration of book-keepof it in this book, minuting the particulars correctly, but ing, by exhibiting the course followed by a mercantile establishment. Let the example to be given be a London house under the supposed firm of Baring, Hall, & Co., established during several years, and engaged in the West India and North American trade. Their journal ought to contain, at the beginning of each year, a summary of the monies owing by and to them; in other words, of their debts and assets, in the following form.

Folio of Ledger.	January 1, 1831. SUNDRIES Drs. to STOCK.			
	For the following Assets and Balances due to the House.			- 1
2	Cash; amount at the Bankers' this day L3,730 0 0			ı
	Petty cash in the house	•		1
1		L.3,775	10	0
3	Exchequer Bills; amount in hand	,		ō
4	THREE PER CENT. CONSOLS; L.15,000, valued at L.82 per L.100 Stock	12,300		ō
5	DEBENTURE ACCOUNT; sundry drawbacks on articles exported, payable at the Custom-house	1.473		0
8	BILLS RECEIVABLE; in hand as follows:-	,		i l
1	(Here give a list taken from the Book of Bills Receivable)	14,715	10	0
7	SHIP HECTOR; our three-eighths of that vessel	4,500		0
52	ADVENTURE IN ST DOMINGO COFFEE; cost price of 100 tierces purchased on speculation	2,500	0	0
9	Adventure in Lint Osnaburghs; cost price of 20 bales do. bought on speculation	540	0	0
10	James Anderson, Dublin; balance due by him	1,561	0	0
12	Thomas Story & Co. Liverpool; do	1,382	10	0
14	George Fox, Kingston, Jamaica : do	3,350	0	0
16	James Annand & Co. New York; balance due by them	3,138	0	0
18	Allan Dewar & Co. do. do	2,890	0	0
20	HENRY STEPHENS, Kingston, Jamaica; do	2,243	0	0
21	DAVID REYNOLDS, Philadelphia; do	2,673	0	0
1				
		L.67,792	0	0

26 28 30 32 33 35 37 39	STOCK Dr. to SUNDRIES. For the following Sums due by the House. To Bills Payable; amount of acceptances at this date, as per Book of Bills Payable (Here recapitulate the Bills.) To Insurance Account; premiums due to various underwriters; amount in all To Gregg and Lindsay, Liverpool; balance due to them To Thomas Hughes, Jamaica; do. to him To John Ravenshaw, New York; do. to him To John Campbell, senior, & Co. Glasgow; do. to them To Henry Tritton & Co. London; do. to them To Robert Dimsdale & Co. London; do. to them Balance, being the capital of the House.	L.5,785 2,915 713 1,236 831 2,351 3,153 2,673 L.19,660	10 10 5 10 15	000000000000000000000000000000000000000
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Such is the form of the inventory of the debts and cent. interest, would in general be fruitless; but the case Bookmust be admitted, much more satisfactory than balance sheets in general; because, from the nature of foreign business, the funds of almost every house become unavoidably much more scattered than is stated in this outline. All countries recently settled, such as North America and the West Indies, are bare of capital, and have an interest in drawing money from Europe. This they have found it practicable to do to a great extent from England and Holland, where money is in general abundant, and the rate of interest low. In recently settled countries there generally prevails a spirit of adventure, a strong desire to extend their undertakings; hence a high interest for money, and sometimes little scruple as to the means of obtaining it. To apply to a merchant in London or Amsterdam for a loan of L.2000, for a year, at five per rally dependent on those of his customers.

assets of a mercantile house; and the foregoing is, it is different when the correspondent abroad holds out the keeping. tempting prospect of selling manufactures to the amount of L.2000, and remitting for them in cotton, tobacco, or sugar. Such a transaction offers a double commission, viz. 5 per cent. on the amount exported, and 2½ per cent. on the amount received in return; advantages which incline a merchant, in particular a young merchant, to take a favourable view of the chances of the proposition. The usual result, however, is, that the balance sheet of a house in such a line of business generally exhibits a long list of debts on the part of correspondents abroad, the recovery of which is more or less doubtful according to the prudence, integrity, or health of the debtor, or according to the degree of prosperity in the country of his residence; for, being obliged to sell on credit, his means are gene-

THE CASH-BOOK .-- Of the entries for the various receipts and payments which daily occur in a counting-house, the following is a specimen:-

Dr.	Cash.		الاقتداد			Contra.	Cr		
1831.					1831.	T	\overline{L} .		
Jan. 1	To balance in hand	2,510	s. 0	0	Jan. 1	By James Davis & Son, paid them for linen per bill of	L.	s.	d.
	payment of No. 320, James Jacobs	351	10	o	2	parcels	157		
-	To Ship Hector, received of James Williamson & Co. for				3	to J. Anderson	1,251		
3	freight To Thomas Story & Co., re-	179	10	0	-	Thomas & Co. for him By Charges paid packet postage	131	10	
5	ceived from James Hender- son per their account	210	3	0	9	of letters received this day By Interest paid discount to Smith, Payne, & Smiths, at	ن ا	19	U
	drawback on tobacco export- ed by the Three Friends	16	10	0	_	5 per cent	10	6	0
9	To Bill's Receivable, discounted by Smith, Payne, & Smiths,					of parcels	152 97	0 10	
	No. 321, on Baring, Brothers,					By John Jackson do	131	10	0
_	& Co., due 26th February To Profit and Loss, received $2\frac{1}{2}$	1,567	0		10	By Charles Norton do By Bills Payable, paid No. 221,	87	5	0
	per cent. discount on paying the accounts per contra, not due for four months—				12	James Morrison By Interest, paid discount to Smith, Payne, & Smiths,	135	10	0
	John WilsonL.3 16 0 James Henderson2 8 9					e contra	4	12	7
	John Jackson3 5 9 Charles Norton2 3 6					Johnson for his account By Charges, paid postage and	145	3	0
12	To Bills Receivable, discounted	11	14	0	19	petty disburse this week By Bills payable, paid No. 227,	4	7	O
	by Smith, Payne, & Smiths, No. 330, Williams & Co.,				23	J. Simpson,	146	10	0
	20th March	513	10	0		them farther for linen	164 3,111	15	
-	To Ship Hector, received for freight, of J. Johnson	215	7	0		By balance to next month	0,111	·	•
-	To Debenture Account, received drawback on paper and print- ed books, exported by the					. /	i I		
18	Fingal	12	16	0			i		
	dends received on L.1200, 3 per cent. consols, of Jacob								
19	Van Neck of Amsterdam To Thomas Story & Co., re-	3	0	0					
1	ceived from John Maxwell on their account	143	16	0					
		L.5,734	16	0		/	L.5,734	16	C

Bookkeeping.

These entries, when transferred to the Journal, are arranged as follows:-

Folio in Ledger.	Date.	CASH Dr. to SUNDRIES.			-
	1001	Received during this Month.			
6	1831. Jan. 2	To Bills Receivable. Received payment of No. 320, James JacobsL.351 10 0			
Ĭ	5 in 2	Discounted by Smith, Payne, & Smiths, No. 321, on Baring &			
1		Co. 26th February			
1	12	Do. by do. No. 330, on Williams & Co. 20th March 513 10 0			
		m c II	L.2,432	0	(
8	2	To Ship Hector.			
1	ا ق	Received for freight from James WilliamsonL.179 10 0 Do. do. from J. Johnson			
			394	17	0
12	_	To Thomas Story & Co.			
	3	Received from James HendersonL.210 3 0			
	19	Do. from John Maxwell	353	10	Δ
5		To Debenture Account.	333	19	U
	5	Received drawback on Tobacco by the Two Friends L.16 10 0			
	9	Do. do. on Paper and Printed Books by the Fingal 12 16 0			
40		To Doored the I	29	G	0
40	9	To Profit and Loss. Received discount from—			
1		John WilsonL.3 16 0			
		James Henderson			
1	1	John Jackson 3 5 9			
1		Charles Norton 2 3 6			
1	18	Commission 1 per cent on I 60 a week's divided den I 1800			
l	1	Commission ½ per cent. on L.60, a year's dividend on L.1200, 3 per cent. consols, of Jacob Van Neck, Amsterdam			
1	1	The second of the second secon	14	14	0
1					
	1		L.3,224	16	0

Folio in Ledger.	Date.	SUNDRIES DES. to CASH.						
40	1001	Paid during this Month.						
42	1831. Jan. 1	JAMES DAVIS & Co.						
1	23	Paid them for linen per bill of parcels	L.157	10	0			1
1	ادم	Paid them further for do. per do	164	19	0	7 900	5	^
26		BILLS PAYABLE.				L.322	Ð	0
	2	Paid No. 250 to J. Anderson	. 1 951	5	۸			
1	9	Paid No. 221 to J. Morrison	135	10	ŏ			
1	19	Paid No. 227 to J. Simpson	146	ĩŏ	ŏ			
1						1,533	5	0
10	_	James Anderson.			- 1	•		
	3	Paid J. Thomas & Co. for their account	L.131	10	0			
	12	Paid J. Johnson for his ditto	145	3	0			-
44		Q				276	13	0
44	3	Charges.	T 0					
1	12	Paid packet postage of letters received this day	1.3	13				-
1	1~	Paid postage and petty disburse this week	4	7	0	8	0	_
46		Interest.				8	U	0
	9	Paid discount to Smith, Payne, & Smiths	T. 10	6	ا م			
1	12	Do. to do	4.10	12	7			
1						14	18	77
47		John Wilson, 9th, paid his bill of parcels				152		ò
48		James Henderson, do				97		ŏ
49	1	John Jackson, do	• • • • • • • •			131	10	Ō
50		Charles Norton, do	• • • • • • • •			87	5	0
I	ł							
	1					L.2,623	6	7

Book-

These entries, few as they are in number, suffice to conkeeping. vey an idea of the advantage of putting them in the journal form. There are, in most of the preceding, two transactions belonging to each account, and these two are merged in the journal in one entry, which abridges and simplifies the posting in the ledger. But in houses of extensive business the cash transactions for a month are as ten, or rather as twenty to one compared to the preceding specimen, and the number of entries collected under one title, such as bills receivable or bills payable for the month, is consequently large. The result is to facilitate greatly the posting in the ledger, and of course the balancing of the books at the end of six or twelve months.

What, it may be asked, is the rule for making cash debtor in Booksome cases and creditor in others? The rule is clear and uni- keeping. form. For all monies received cash is made debtor, or accountable, as these sums are to be accounted for under the head of cash; while for all monies paid, cash is made creditor, the parties who have to account for the sum being made debtors.

BILL BOOKS.—Next in importance to the cash are the bill transactions of a mercantile house, whether bills receivable or drafts on other merchants, or bills payable, meaning by the latter the acceptances or bills which the house are bound to pay. For each is appropriated a separate book, in which the respective bills are entered, with a minute notice of particulars, thus:

	BILLS RECEIVABLE. Form of Entry.									
No.	Received.	From whom.	Drawn by	Date.	Term.	Drawn on	To order of	Due.	Sum	How disposed of
152	12 do.	T. Story & Co.	Jas. Wilson	Dublin, 20 Jan. Liverpool, 2 Feb. Jamaica, 8 Feb.	l do. 60 days' sight.	T. Gray J. Allan	John Smith	5 do. 14 May	232 0 0	Smith, Payne, & Smiths Overend & Co. Kept till due

The preceding bills are to be entered in the Journal as follows:

Ledger Folio.	BILLS RECEIVABLE Dr. to SUNDRIES.			
	For the following bills remitted.			1
10	To James Anderson.	L. 173	s.	d.
	No. 151, on J. Greig, due 23d March	173	10	0
12	To T. Story & Co.	1		
	No. 152, on T. Gray, due 5th March	232	0	0
14	To George Fox.	ļ		i
1	No. 153, on J. Allan, due 14th May	197	10	0
	•			
		L.603	0	0

BILLS PAYABLE are acceptances of the house payable to other parties, and may be termed the reverse of Bills Receivable. The following is an example of the mode of entering them in the bill book.

To order of	No.	Drawn by	Date.	On account of	Term.	When accepted.	Due.	Sum.	Held by
His own order	271	T. Hughes	Liverpool, 2 Mar. Jamaica, 20 Jan. St. Kitts, 30 Jan.	Thos. Hughes	I month's date 90 days' sight 60 days' sight	7 do.	8 April 8 June 12 May	320	Atkins & Co. J. Miller & Co. T.Watson&Co.

When brought into the Journal, these bills stand thus:

Ledger Folio.	SUNDRIES DRS. to BILLS PAYABLE.			
	For the following Bills drawn and accepted.	1		
30	Gregg & Lindsay.	L. 215	s.	d.
1 1	No. 170, J. Robertson's draft on their account, due 8th April	215	0	a
10	JAMES ANDERSON.			
	No. 272, J. Williams' draft on their account, due 12th May	185	0	0
32	THOMAS HUGHES.	j		1
	No. 271, his draft at 90 days' sight, to his own order, due 8th June	320	0	σ
		L.720	0	0

Bills of Exchange were introduced several centuries ago to enable merchants to make payments to each other without the risk and delay attendant on transmitting the precious metals to a distance. A, a merchant in Liverpool, Dublin, or in Jamaica, having a payment to make in London, instead of collecting and forwarding specie, looks out on his own exchange until he find another merchant, B, who having money to receive in London, is inclined to give him an order to obtain it in his stead. They discuss the terms or rate of exchange; and when these are agreed on, the bill is drawn by B and delivered to A, who then, or soon after, pays the amount to B. The result is, that the one acquits his debt in London, and the other draws

his funds from it, without quitting their place of residence or incurring any expense of consequence.

Bills of Exchange first became general in the middle ages, and were used chiefly by Jews. In the case of this, as of many other discoveries, the time and manner of their introduction is uncertain; but the accommodation from them must have been so great, and the mode of obtaining it so obvious, that we may safely take it for granted that they were adopted as soon as merchants accounted each other trust-worthy, or the transactions of towns at a distance from each other became such as to supply sums of any considerable amount to be drawn for.

Town Notes are bills drawn by persons residing in the

Bookkeeping.

India merchant in London on a sugar refiner, for sugar sold by the former to the latter; or by a wholesale warehouseman on a West India merchant for linen or cottons supplied to the merchant. It is evident that bills between parties residing in the same town are not strictly en regle, as in their case there can be no expense or risk in forwarding money. Still they can hardly be objected to in transactions like the preceding, which are evidently bona fide from the respective lines of business of the parties. The Bank of England sanctions town notes as regards the metropolis, by appropriating a day in each week (Wednesday) for discounting them, and by often carrying such discounts to a very large amount. During the war, when monied capital was comparatively scarce, town notes were extremely common. They are still very frequent, but not in so great a degree, first-rate houses being unwilling to give their acceptances where a payment in cash is the regular mode of settling an account. This feeling differs according to the line of business of the parties. Thus, London houses in the East India trade being generally large establishments, confine their acceptances to bills from abroad, and decline giving them to persons in London, such as the wholesale dealers in cloth or hardware, from whom they purchase goods for shipment. They prefer paying such persons in cash, even when not altogether convenient, to the animadversions that might attend their affixing their acceptance to a town note. On the other hand, London booksellers, though often possessed of considerable capital, are obliged, by the nature of their business, to give such long credits, that the postponement of a payment during several months, obtained by giving their acceptance, is an accommodation they readily en.brace. Besides, the custom of the trade, in this as in various other lines of business, prevents such acceptances from being an object of much animadversion.

THE INVOICE BOOK. A mercantile house connected, as we have supposed, with North America and the West Indies, receives from time to time requisitions, or, as they are commonly termed, orders, from their correspondents abroad for manufactured goods, whether woollens, linens, cottons, or hardware. An order of only moderate amount is generally of the length of several pages, embracing both

same town with the acceptors, generally by the seller of goods on the purchaser, who, instead of paying for them in cash, gives his acceptance, payable in two, three, or more months after date. Take, for example, the draft of a West India merchant in London on a sugar refiner, for sugar sold by the former to the latter; or by a wholesale ware-houseman on a West India merchant for linen or cottons supplied to the merchant. It is evident that bills between parties residing in the same town are not strictly en regle,

London, 1st February 1831.

Me	ssrs Baring, Hall, & Co.			
A. D.	Bought of ALEXANDER	BALM	AN	NO.
& Co.				
No. 1.	10 Pieces best Lint Osnaburghs, 152	L.	8.	d.
	yards each, at 6d. per yard	38	0	0
	Inside Wrappers, 14 yards, at 3d	0	3	6
	Cord, bale, and press packing	0	10	0
		L.38	13	6

(From another dealer.)

Messis Baring, Hall, & Co.						
A. D. Bought	of .	Јон:	v C	AKEY	& (Co.
& Co.						
No. 2. 1 Case containing 2 dozen						
Youth's Hats and Bands,			ď.	L.	s.	d.
a 14s. each	16	16	0			
Jase	. 0	6	0			
				17	2	0
3. 1 Case 6 dozen Felt						
(coarse) Hats for Ne-						
groes, at 24s. each	. 7	4	0			
Case	. 0	12	0			
				7	16	0
				l		
				L.24	18	0

These are specimens of the simplest class of accounts—of those accounts which form the groundwork of the "Invoice," or general statement of the shipment. The form of that statement is as follows:

INVOICE of goods shipped by Baring, Hall, & Co. in the Hector, James Robertson, from London to New York, on account and risk of Messrs Archibald Dixon & Co. there.

A. D. and Co. No. 1. 2, 3. 4, 5. 6, 7. 8, 9. 10, 11.	1 Bale Best Lint Osnaburghs, by A. Balmanno's bill of parcels. 2 Cases Hats, by J. Oakey & Co. do. 1 Case White Platillas, Spitta & Co. 2 Cases Linen Tick, J. Jobson & Co. 2 Trunks French Calf-Skin Shoes, J. Jackson & Co. 2 Puncheons strong do. W. Skipwith	38 24 78 69 49	10 12	6
	Entry, Bond, and Debenture	L.421	8	6
	Commission 5 per cent. on L.451		18	
	Errors excepted. At nine months' credit; due 10th December 1831. London, 10th February 1831. BARING, HALL, & Co.	25 L.476		6

Book- Invoices are in general much longer and larger in amount voice to the articles supplied by each dealer, and to send Book- keeping. than the preceding, but they are almost always drawn in out duplicate bills of parcels by the vessel. The house Keeping. the same form, containing many particulars in short compass; viz. the mark, numbers, and value of each package, also the nature of the goods contained in it, as far as can be expressed by a short general notice. It was formerly the practice to make invoices very long, and to copy into them each bill of parcels literally; but the to pay two per cent. commission for recovering it from the usage is now to assign only one or two lines in the in- underwriters.

abroad has thus the satisfaction of seeing the different bills of parcels exactly as furnished by the dealer or tradesman.

The sum insured is somewhat more than the amount of the Invoice, that, in the event of a loss, there may be enough

JOURNAL ENTRIES from the preceding Invoice.

Ledger Folio.				
51 53 54 55 56 57 58 59 28 44 40	ARCHIBALD DIXON & Co. Drs. to SUNDRIES. For Goods shipped to them per Hector, Robertson, as per invoice. To Alexander Balmanno; Lint Osnaburghs, per account	38 24 78 69 49 160 14	10 12 5 7 15 16	d. 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1		L.476	7	6

ACCOUNT OF SALES.—Having seen in the invoice a specimen of the mode of conducting our exports, we are now to show the manner of disposing of our imports. While our exports are generally in manufactures, our imports are commonly in raw produce, because, except in silks, and a few petty articles of manufacture, foreigners are quite unequal to a competition with the capital and

machinery of this country. Cotton, sugar, coffee, rice, idigo, form the main articles of import to England from tropical latitudes; while wine, brandy, olives, drugs, are sent to us from temperate climates; and corn, timber, hemp, flax, tallow, hides, reach us in large quantities from the Baltic. We shall take, as an example, an account sale of the staple article of our West India colonies.

	by the Andromeda, James Wilson, from Antigua to London, per account nes Robertson, Esq. merchant there.
Insurance on L.700 at 60s. per L.100	per hogshead 0 1 12 22 15 0 58 11 3 1 3 3 281 2 0 0 6 0 5 10 0 0 19 0 2 19 0 0 6 0 0 9 6 0 9 6 0 9 6 13 10 2 13 10 2 3 10 0 L.397 16 3
London, 2d October 1831.	Errors excepted. Baring, Hall, & Co.

In former times the form of an account sale was some- were subjoined; but the plan of putting the goods on one what different from the above. It began with a statement side, and the charges on another, on the principle of of the contents of the packages sold, and the charges debtor and creditor, is evidently an improvement. Seve-

keeping tion of a commercial student. The freight is charged, not, of the package. as might naturally be expected, on the total weight brought home, but on the weight of the goods exclusive of the packages. Of the allownces for weight, the larger, tare, tare, the larger tare tare tare the larger tare tare target tare the larger tare.

Book- ral other entries in this account are entitled to the atten- fixed by custom, and bearing no reference to the weight

is the exact weight of the cask; the lesser, draft, is a de- explicitly stated in the account sale. The same holds in reduction made by the seller to the buyer, its rate being gard to coffee, of which we shall now exhibit an account sale.

keeping.

Account of Sale of 40 Tierces Coffee, by the <i>Hector</i> , Robertson, from Jamaica to London, per account of Simon Taylor, Esq. Jamaica.												
Charges. Insurance on 40 Tierces at L.20 a Tierce, L.800, at 50sL.20 0 0 Policy		s. 0		Ì	Gross Weight. Tare. Cwt. qr. lb. 'Cwt. qr. lb. 190 1 12 21 1 4 Here specify the gross weight and tare of each terec.) Together 23 0 20							
Freight on 167 cwt. 0 qr. 20 lb. at 9s. per cwt		4	6		tierce.) 1 ogether 25 0 20 Deduct 23 0 20							
Primage, Pierage, and Trade Landwaiters, Entry, and Bond Dock Dues	2 11	11 1 3	0	1	Net 167 0 20 at 76s. per cwt 635 5 6							
Insurance from Fire	1	15 10 12	0 0 0	I	Cwt. qr. lb. Cwt. qr. lb. covertaker 6 1 2 0 3 12 ditto 5 2 4 0 3 4							
Commission on Sale 2½ per cent. on L.660		10 10	0		11 3 6 1 2 16 Deduct 1 2 26 Trett 0 0 10							
Net Proceeds, due 2d November	L.140 520		0		1 2 26 10 0 8 at 64s. per cwt 32 4 7							
	L.660	17	0		Discount 1 per cent L.667 10 1 6 13 1							
					Gross Proceeds L.660 17 0							
London, 2d October 1831.				Errors ex	cepted. BARING, HALL, & Co.							

JOURNAL ENTRIES resulting from the preceding Account Sales.

Folio Ledger	October 1831.			
60	TRUEMAN & COOK, DRS. to SUNDRIES.	1		
61 61	To Sugar per Andromeda. Proceeds of 20 Hhds., J. R. Nos. 1 to 20, sold by them at one month from 2d inst To Coffee per Hector, Robertson.	<i>L.</i> 679	s. 6	<i>d</i> . 6
	40 Tierces, S. T. Nos. 1 to 40, at one month from 2d instant	660	17	0
		L.1340	3	6
61	SUGAR per Andromeda, Dr. to SUNDRIES.			
59	To Freight Account; for Freight, Primage, and Pierage	59	14	6
28	To Insurance Account; Premium and Policy	22	15	0
62	To Customs Inward; Duty and Entry	281	8	0
44	To CHARGES; Dock Dues, Landwaiters, Fire Insurance, Warehouse Rent, Sampling	10		6
60	To TRUEMAN & COOK; Brokerage, 1 per cent	6		1
40	To Profit and Loss; for Commissions	17	0	2
63	To James Robertson; Proceeds due 2d November 1831	281	10	3
		L679	6	6
61	COFFEE per Hector, Dr. to SUNDRIES.			
28	To Insurance; for Premium and Policy	99	0	0
5 9	10 Freight Account; Freight, Primage, and Pierage	76	16	ŏ
44	To Charges; Dock Dues, Landwaiters, Fire Insurance	15	9	ŏ
60	To Trueman & Cook; for Brokerage	6	12	ŭ
40	10 Profit and Loss; Commissions	20	0	0
64	To Simon Taylon; Net Proceeds due 2d November	520	0	0
		L.660	17	U

Book. keeping.

We have now given examples of journal entries from the parties, to put them away in bundles. But the prethe principal books in a counting-house; from the cash- ferable plan, wherever such accounts are numerous, is, keeping. book, the invoice and account sales book, as well as from after arranging them alphabetically, to have them pasted the bills payable and receivable. After these comes the in a large quarto or folio volume of blue or sugar-loaf petty journal or record of such occasional entries as do not belong to the preceding, or any other subsidiary books. Such entries are in general very few, because, in every regular counting-house, the subsidiary books contain almost every transaction that takes place.

Insurances.—It is customary to have an insurance policy book, a folio book of the length and breadth of a printed policy, and containing a quantity of such policies bound up, unstamped. In these are filled in, by a clerk, literal copies of the insurances effected by the house, with the names of the underwriters, and the amount of their respective subscriptions. From this is posted the insurance ledger, containing the accounts of the underwriters for and other small matters; the amount is entered weekly premiums and returns.

Bought Book, or Book of Bills of Parcels.—In former times, when mercantile transactions were on a limited scale, the practice of a merchant, as of private individuals at present, was merely to fold up the bills of parcels, or accounts delivered to him by dealers, in a uniform size, and, after writing on the back the names of spective heads in the ledger.

paper. A surprising number of accounts may be contained in one of these books; and its pages being numbered, any account may, by the aid of an alphabetical index, be referred to with the same ease as an entry in a

Drawbacks payable at the custom-house on goods exported, and for which the merchant holds a debenture or acknowledgment of debt on the part of the custom-house. Of these a list or register should be kept, either in a small separate book, called the debenture book, or in a specific part of one of the larger books.

The petty cash-book contains the disburse for postages

or monthly in the regular cash-books.

We have now recapitulated the various subsidiary books which form the groundwork or authorities for the journal. The ledger comes next, and by way of affording a specimen of this, the finale of book-keeping labour, we shall exhibit the preceding journal entries, carried to their re-

LEDGER.

Dr	•	STOCK.								Cr.			
1831.	Folio Journal		L.	s.	d.	1831.	Folio Journal.		L.	s.	d.		
Jan. 1.	2	To Sundries	19,660	0	0	Jan. 1.	1	By Sundries	67,792	0	0		
Dr	Dr. Casii.								Cr.				
Jan. I.	1 2	To Stock To Sundries	3,775 3,224	10 16	0	Jan. 31.	4	By Sundries	2,623	6	7		
Dr	•		Exchequer Bills.										
Jan. 1.	1	To Stock	10,750	0	0			·					
Di	:		Cr.										
Jan. 1.	; 1	To Stock	12,300	0	0								
Di	:•		Di	EBEN	TUF	E Accoun	T.		Cr.	·····			
Jan. 1.	1	To Stock				Jan. 1.	3	By Cash	29	6	0		
D	r. ,	•	I	BILL	s Ri	ECEIVABLE	·		Cr.				
Jan. 1. —31.	1 5	To Stock To Sundries	14,715 603		0	Jan. 9.	ટ	By Cash	2,432	0	0		
D	r.			SE	ne J	Нестов.		·	Cr.				
Jan. 1.	1	To Stock	4,500	0	0	Jan. 9.	3	By Cash	394	17	0		
D	r.	A	DVENTU	JRE :	in S	T Doming	ю Сов	FEE.	Cr				
,			7		1	11	1		1				

BOOK-KEEPING.

Book-keeping.

Book-keeping

$\mathbf{D_{r}}$		AD	VENTUR	E IN	Lı	nt Osnab	urghs.		Cr.		
1831.	Folio Journal.		L.	8.	d.	1831.	Folio Journal		L.	s.	d.
Jan. 1.	1	To Stock	540	0	0						
Dr	Dr. James Anderson, Dublin.								Cr.		
Jan. 1. —— 12. —— 31.	1 4 5	To Stock	1,561 276 185	0 13 0	0 0 0	Jan. 31.	5	By Bills Receivable	173	10	0
Drs	·	<u> </u>	Тнома	s Sī	ory	7 & Co. Liv	verpool	•	Crs.		
Jan. I.	1	To Stock	1,382	10	0	Jan. 19. — 31.	3 5	By Cash	353 232	19 0	0
Dr.			Georgi	s Fo	x, I	Kingston, J	amaica	i.e	Cr	•	
Jan. 1	1	To Stock	3,350	0	0	Jan. 31.	5	By Bills Receivable	197	10	c
Drs	ı .		James A	Ann	ANI	& Co. Ne	w Yorl	٢.	Crs	•	
Jan. 1.	1	To Stock	3,138	0	0					-	
Drs	9.	•	Allan,	DE	WA)	R, & Co. N	ew Yor	k.	Crs		
Jan. 1.	1	To Stock	2,890	0	0						
Dr		H	enry St	TEPH	IENS	, Kingston	, Jamai	ica.	Cr.		
Jan. 1.	1	To Stock	2,243	0	0						
. Dr	•		DAVID	RE	YNO	LDS, Philac	delphia	•	Cr	•	
Jan. 1.	I	To Stock	2,673	0	0				,		
Dr	•		,	Br	LLS	PAYABLE.			Cr		
Jan. 19.	4	To Cash	1,533	5	0	Jan. 1. —— 31.	2 5	By Stock	5,785 720		0
Dr	•			Cr	•						
						Jan. 1. Feb. 10. Oct.		By Stock	2,915 8 22 22	15 15	0 0 0 0
, D;	rs.		Gre	GG .	Lin	dsay, Live	rpool.		Cra	3.	
Jan. 31.	3	To Bills Payable	. 21	5 () (Jan. 1.	2	By Stock	713	10	0
Dr. Thomas Hughes, Jamaica.									Cı	r.	

D

BOOK-KEEPING.

Bookkeeping.

VOL. V.

Book-Dr. John Ravenshaw, New York. Cr. keeping. Folio Journal 1831. Folio Journal L. s. d.1831. L. s. d.Jan. 1. 2 By Stock..... 831 10 0 Drs. JOHN CAMPBELL, Senior, & Co. Glasgow. Crs. Jan. 1. 2,351 15 By Stock..... Drs. HENRY TRITTON & Co. London. Crs. Jan. 1. 3,153 0 By Stock..... Drs. ROBERT DIMSDALE, & Co. London. Crs. Jan. 1. By Stock..... 2,673 0 Dr. PROFIT AND LOSS. Cr. Jan. 19. By Cash..... 14 14 By A. Dixon & Co..... 6 16 Feb. 10. 5 0 47 0 0 7 By Sugar per Andromeda Oct. By Coffee per Hector 20 0 0 Dr. CHARGES. Cr. To Cash..... 8 0 0 Jan. 12. Feb. 10. By A. Dixon & Co..... **25** 1 0 By Sugar per Andromeda 10 3 Oct. 7 15 9 By Coffee per Hector Dr. INTEREST. Cr. Jan. 12. To Cash..... 14 8 7 Dr. JOHN WILSON, London. Cr. To Cash..... Jan. 9. 152 0 0 Dr. JAMES HENDERSON, London. Cr. 97 10 0 Jan. 9. To Cash..... Dr. JOHN JACKSON, London. Çr. To Cash..... 131 10 0 Jan. 9. Cr. Dr. CHARLES NORTON, London. 87 5 0 Jan. 9. To Cash..... Crs. JAMES DAVIS & Co. London. Drs. Jan. 23. To Cash..... 322 5 0 ARCHIBALD DIXON & Co. Crs. Drs. 476 7 6 Feb. 10. To Sundries

BOOK-KEEPING.

Bookkeeping.

	ъ	<i>)</i> () 1:	Z - T	У. Л		• - '	~ •				Boo
		ALEX	AND	Cr.		1	keep				
olio arnal		L.	s.	d.	1831.	Folio Journal.		L.	s.	d.	
					Feb. 1.	5	By A. Dixon & Co	38	13	6	
		Jo	HN (OAF	KEY & Co.			Crs.			
T					Feb. 1.	5	By A. Dixon & Co	24	18	0	
			Spi	TTA	& Co.	<u> </u>		Crs.			
\neg					Feb. 1.	5	By A. Dixon & Co	78	10	0	
		J.	as. J	овя	son & Co.	<u>'</u>		Crs	•		
$\overline{}$					Feb. 1.	5	By A. Dixon & Co	69	10	0	
		Тн	os. i	JAC1	rson & C	0.		Crs	•		•
T					Feb. 1.	5	By A. Dixon & Co	49	12	0	
	I		WM		CIPWITH.	<u> </u>		Cr			,1
$\overline{}$	<u> </u>			1	Feb. 1.	5	By A. Dixon & Co	160	5	0	1
		F	REIG	ייינו	Account	. <u> </u> 			······		.1
							By A. Dixon & Co	14	7	0	1
					Oct.	7	By Sugar per Andromeda By Coffee per Hector			6 0	
		r	ana.	MA	n & Cook	<u>.</u> [,		Cr	s.		ل
6	To Sundries			6	Oct.	7	By Sugars per Andro-				-
						7	meda By Coffee per Hector	6 6	15 12	0	
		Su	GAR	per	Androme	eda.		c	r.		_1
6	To Sundries			_	Oct.	6	By Trueman & Cook	281	10	3	_
		(Cofi	FEE	per <i>Hecto</i>	r.		c	r.		~'
7	To Sundries	660	17	0	Oct.	6	By Sundries	520	0	0	7
		<u></u>	Cus	TOL	us Inwar	.D.			r.		_
					Oct.	7	By Sugar per Andromeda.			0	-
	de communicación de la com	James	Ro	BER	rson, St	Vincer	:t.		r.		t
• •		T			Oct.	7	By Sugar per Andromeda.) 3	7
•		Sn	MON	TA	YLOR, Jan	naica.	_1				_
		T			Oct.	7	By Coffee per <i>Hector</i>		0 () (7
	6	6 To Sundries	ALEX John James James	ALEXAND L. s. JOHN 6 JOHN 6 JAS. J THOS TRUE 6 To Sundries	ALEXANDER L. s. d. JOHN OAD SPITTA JAS. JOBS THOS. JAC: WM. ST FREIGHT TRUEMA 6 To Sundries		ALEXANDER BALMANNO.	Alexander Balmanno.	Alexander Balmanno. Cr.	ALEXANDER BALMANNO. Cr.	ALEXANDER BALMANNO. Cr.

Bookkeeping.

The entries in the ledger are very concise, containing ference is sometimes very small; a few pounds, a few shilgenerally nothing more than the head or title of the entry in the journal to which they refer. It was formerly the practice of book-keepers to insert some explanatory words in almost every line: thus under profit and loss, instead of such short notices as

January. By Cash......L.14 14 0

October. By Sugar per Andromeda...17 0 0 a book-keeper in a former age would have thought it necessary to write

Jan. By Cash received for sundry discounts...L.14 14 0 Feb. By A. Dixon & Co. commission on goods

Oct. By Sugar per Andromeda, commission

on insurance and sale.......17 0 Such explanations are not without their use, as by means of them a person looking over the account is quickly informed of the nature of the different entries. They may therefore be inserted wherever the business is on a small scale, because in such a case they do not add much to the labour of the book-keeper; but wherever the business is extensive, all detail in the ledger ought to be avoided, and the entries made in the most concise form possible, for the following reasons.

tial as to supersede the necessity of an account-current

2. Nor can they supersede a reference to the journal in what may be called collective entries, such, we mean, as the bills payable discharged, or the bills receivable encashed, in a particular month; entries in which a number of particulars are collected in the journal, and carried to the ledger in one sum. And,

3. It is desirable to have as many of such collective entries as possible, limiting thereby the number of postings in the ledger, and lessening the difficulty of balancing it at the end of the year. Such was the recommendation of Mr Benjamin Booth, in his printed work, more than half a century ago; and such had long before been the practice of our best merchants.

It follows therefore that the ledger ought to be merely an index to the journal, exactly as the journal is an index to the various subsidiary books of the house. To aim at more, and to repeat in any one of these books statements or particulars already contained in the other, would be quite a work of supererogation.

Balancing the Ledger.—At the end of each year, and, in some houses, of each half year, the ledger is balanced; that is, the debtor and creditor side of each account in the ledger is added up, and the balance or difference entered in a general list or balance-sheet. Thus a few accounts taken from the preceding fragment of a ledger exhibit the following balances:-

Debtors. Creditors. J. Anderson & Co. L. 1849 3 0 Bills Payable.....L. 4972 5 0 Thos. Story & Co. 796 11 0 Gregg & Lindsay 498 10 0

The balance-sheet is generally very long, comprising on one side or the other every open or unclosed account in the ledger. The rule in all regular counting houses is to make the sum of the debtors in the balance-sheet correspond with the sum of the creditors, and to spare no pains to accomplish such agreement, because until it be done there must evidently be an error in some part or other of the journal or ledger. Unluckily, the amount of the difference gives almost no clue towards tracing either how it has taken place, or the part of the journal or ledger where it is to be looked for: it may be in any day of the year, or in any of the entries (1000, 2000, or perhaps 3000) which the ledger for the year contains. The dif-

lings, or a few pence; but the fractional errors are often as difficult to detect as a large sum; and in fact it is not unfrequent, in the process of examining, to discover new errors, which, instead of diminishing, add to the amount of the existing difference, carrying it from L.10 to L.100, or even to L.1000. Hence the necessity of experience and habitual accuracy in a book-keeper. To one deficient in these respects balancing a ledger of length is generally a most laborious and tedious task, requiring week after week to be passed in the dry labour of collating, adding, and subtracting. Mr Jones' method will, it is to be hoped, be the means of preventing the continuance of these unprofitable searches; for we are satisfied that the labour given to the precautionary arrangements recommended by him will be saved, and doubly saved, in the final winding up of the books.

We have already adverted to Mr Jones's first publication on book-keeping; his second, in 1821, was intended to counteract the inconvenience attendant on the form of his ledger, which required that the accounts should be opened anew each year. His third and most important work, published in 1831, is of a much more comprehensive character, and may be said to exhibit the result of more than thirty years' experience as a public accountant. It is printed in the quarto form, and consists of a number 1. The explanations never can be so full and circumstan- of distinct parts; first, explanatory statements of his mode of book-keeping by single as well as double entry, with a number of formulæ, in which the same transactions are exhibited by the Italian and by his method, so as to bring into view the various advantages of the latter. These are followed by a series of instruction to persons in different branches of business, viz. bankers, manufacturers, brokers, wholesale and retail dealers, in regard to the books of account best fitted to their respective occupations; the whole followed by a treatise in the form best adapted to the government offices. Such are the contents of the first or printed half of Mr Jones's book; the other half is lithographed, and exhibits two sets of books, each for a year, one kept by single, the other by double entry. Along with these are given a balance-book and an abstract-book, devised for the purpose of leading promptly to the detection of errors or false entries. This they will fully accomplish if the plan laid down by Mr Jones is carried into effect; and they seem to us also well calculated to save the perplexity and loss of time at present so often incurred in efforts to find the general balance. The Italian method, ingenious as it was, and a surprising improvement at the time on the primitive system of single entry, is not an effectual preventive of erroneous or fraudulent insertions in the books; nor does it present any ready method to facilitate the laborious task of balancing the ledger. It is consequently the practice of Messrs Barings, and several mercantile houses of the first rank, to keep two sets of books as a check on each other; but the object of Mr Jones is to attain correctness in the first instance, by submitting to some extra trouble as the posting of the books proceed. Thus, his abstract-book is a classed epitome of his journal, and forms the first check against posting entries to wrong accounts; while his balance-book is an epitome of the ledger, and forms another check, both against carrying entries to a wrong head, and making a mistake in the figures so carried. In many counting-houses the uncertainty of the Italian method is counteracted by habitual accuracy in the book-keeper; but Mr Jones's auxiliary books are devised with the view of enabling even a mediocre book-keeper to avoid mistakes, or to detect them soon after they are made. By means of these books he may prove his ledger not only in any month, but in any week, or even in any day, of the year.

Nothing is more desirable than frequent balancing of

counts to his connections. A year is evidently too long dered to persons in trade.1 for accounts-current to remain open; to settle every six described have the effect of lessening the difficulty of ge- accounts; thus,-

the books of a merchant, and frequent transmission of ac-neral balances, an important service will thereby be ren-

An index is indispensable to a ledger, but it ought to be months is more suitable; and if the improvements we have very short and plain, containing merely the titles of the

keeping.

Index to the preceding portion of a Ledger.

	Folio.		Folio.
Anderson, James, Annand & Co. James Allan, Dewar, & Co	10 16	Jackson, John	49 57 28
Balmanno, Alexander Bills receivable Bills payable	6	Interest do	46 59 9 50
Campbell, Senior, & Co. John	2 44 52 61	Oakey & Co., John	54 40 33 21
Davis & Co. James Debenture account Dimsdale & Co., Robert Dixon & Co., Archibald Exchequer Bills	42 5 39 51	Skipworth, William Spitta & Co Stock Story, Thomas, & Co Stephens, Henry.	58 55 1 12 20
Fox, George, Freight account Gregg & Lindsay	14 59 30	Sugar per Andromeda Taylor, Simon Three per cent. Consols Tritton and Co., Henry Trueman and Cook	64 4 37
Henderson, James	8	Wilson & Co., John	

remaining in use. The latter has the advantage of showing the transactions of a long period in succession, as well as of saving the repeated opening of the same accounts.

The stock account has no entries during the currency of the year, but at its close (on 31st December) the balances of profit and loss, bad and doubtful debts, and a few such accounts, are carried, as the case may be, to its debit

Collective Entries in the Journal.—It may be proper to explain what is meant by such entries in the journal. While in the bill-books every bill is entered the day it comes to hand, and in the cash-book every payment or receipt is entered on the day it takes place, the journal entries are made to comprise in one amount a number of transactions occurring at different dates in the course of the month. Thus the entry of "Sundries Drs. to Bills Payable" exhibit in succession all the bills accepted during the month; they are then added in one sum, which sum alone is carried to the ledger. In like manner, in the entry of "Bills Receivable Drs. to Sundries," the aggregate alone is posted in the ledger; and the same in a variety of cases, the effect of which is to lessen greatly the difficulty of agreeing the books at the end of the year. We cannot, therefore, approve of the practice of those book-keepers who, to save themselves the trouble of re-writing the cash-

Size of the Ledger .- In some houses of very extensive book in the journal form, are content to post each separate business the rule is to have a new ledger for every year; sum directly from the cash-book to the ledger. They thus but three or four years are the more usual time of a ledger avoid, it is true, the copying of eight or ten folio pages a month; but by giving up the advantage of joining in one sum the different payments made under such heads as bills payable, charges, house expenses, they have to carry to the ledger during the month above 100 entries instead of perhaps only thirty or forty.

The Waste-Book.—This book has long been disused by regular merchants, and the name itself would have been forgotten, had it not been reprinted from one work on bookkeeping to another, the authors of which, being generally teachers, were unacquainted with the improvements introduced into the practice of merchants. The wastebook of former times consisted of a series of memoranda, so miscellaneous as to comprehend every transaction of the house, whether a sale, a purchase, a payment, or a receipt. From this general receptacle the book-keeper composed the journal, which was then, as at present, a narrative or record, in regular form, of the transactions of the house. As mercantile establishments acquired extension, separate books became necessary, as well for the cash and bills as for goods exported and imported. These books were found the fittest authorities for the journal, and the waste-book or diary fell altogether into disuse.

Single Entry.—A wholesale dealer occupying a warehouse, and whose business consists in supplying such articles as woollen, cotton, linen, or hardware, to exporting

merchants, is generally satisfied with few books. He is a large sum may be vested in machinery, shipping, or Bookaccustomed to enter each delivery of goods in his day parcels made out for his customers, of which examples have been given above in the names of Balmanno and Oakey & Company. He seldom keeps a journal, but a ledger is indispensable, though not kept by double entry. It consists on one part of the names of his customers (the exporting merchants), and, on the other, of those of the manufacturers from whom he makes his purchases. From the latter he receives credit, and to the former he gives it; hence the necessity of opening accounts for both. At the end of the year, a person in such a line of business is accustomed to form an estimate of the state of his affairs by adding up on one side the sums due by him to the manufacturers, and on the other those due to him by the merchants. He takes, moreover, an account of his stock, or goods in hand, which being valued, and the amount added to the sums due to him, the difference between their conjunct amount and the total of his debts affords a tolerably correct idea of the state of his property. It would, however, be much more clear and satisfactory were his books kept by double entry, that is, were every debtor to have a creditor, or, in other words, were every entry to have its counterpart. Suppose him, for example, to make a purchase from Messrs Greenup of Halifax, for L.1250 of the coarse woollens called penistones, he merely enters in his ledger that sum to the credit of Messrs Greenup; but the proper course would be to find a debtor for the same amount by such an entry as "Penistones Dr. to Messrs Greenup, L1250." Subsequently, on effecting sales of the article to exporting merchants, the proper course would be to make entries such as " Baring, Hall, & Co. Drs. to Penistones for L.225;" and by continuing such entries, that is, by crediting the account of Penistones for the sales as successively made, until the whole was disposed of, the ultimate result would be that the creditor side would exhibit a total equal to the L.1250 paid to Messrs Greenup, and to the profit accruing from the transaction.

Double Entry has farther and more important advantages to a merchant than to a tradesman, because his dealings are much more varied and complicated. It forms the connecting link of his accounts, and shows in what manner in his books has a creditor, no part of his property is unaccounted for; and when in doubt as to any specific portion, he will find a solution of the difficulty in his own journal. Those who know how soon money becomes absorbed, or at least appropriated in business, and in how few years twelve months; thus-

other fixed capital, are aware that merchants would often keeping. book, and to get copied into his invoice-book the bills of consider themselves deceived, if they had not in double entry an unfailing clue to the appropriation of their capital.

> Next, as to the degree of intricacy in double entry. In the case of a shipment of goods, the merchant abroad who receives the goods is made debtor to the several dealers at home who have supplied them; e. g. A. Dixon & Co. of New York are Drs. to Spitta & Co., Jobson & Co., &c. In like manner, in the case of produce imported, the brokers, Trueman & Cook, who sell it and receive the amount, are made debtors to Simon Fraser, for whose account the produce was shipped. All this is clear and free from intricacy, as also such farther entries as Cash Dr. to Trueman & Cook, on their paying over the proceeds of the sale, or Bills Receivable Drs. to A. Dixon & Co., on their remitting or sending home a bill for the amount of the goods forwarded to them. It is true that a young merchant beginning to study book-keeping will not all at once comprehend such an account as Bills Receivable, nor its counterpart Bills Payable, nor a few other accounts, such as Charges and Merchandise; but practice will convey a distinct conception of them, and render them in time as clear as personal accounts.

> The advantages of double entry may fortunately be imparted to almost any account-books, without sacrificing much time and labour. Persons engaged in such business as that of wholesale warehousemen, manufacturers, or retailers, may keep the chief part of their books by single entry, making use of double entry to the extent of a few pages at the end of the month or quarter, to obtain a clear and summary view of their transactions.

> As to the money or currency in which the books of a merchant should be kept, it is evident, first, that it can be money of one kind only; and, next, that it must be the money of the country in which the merchant resides. Thus, an English house in Bordeaux must keep its accounts in French money, although its chief business may be the export of wines to London and Dublin.

We come, in the last place, to Accounts-current, which, though a most important portion of the accounts of a merchant, are rather the result than a constituent part of his system of book-keeping, being in general written out from his funds have been successively invested. As every debtor the ledger and journal, with very slight variation or addi-Accounts-current are prepared for transmission to the correspondents whose names they respectively bear, and contain the various receipts, payments, and other transactions on their account during the proceeding six or

M	Messrs Archibald Dixon & Co. of New York, in Account-current with Baring, Hall, & Co. London.													
1830.	Drs.	L.	8.		Days to 31st Dec.	Inte- rest	1830.	Crs.	L.	s .		Days to 51st Dec.	Inte- rest.	
Mar. 1.	To Balance from last Account. Invoice of Goods per Commerce.	950 762	10 0	0	365 306	2332	Feb. 28.	By your Remittance on Schneider, due 30th June	T. 150			184	276	
Sept. 3.	Your Draft to Edward Jones. Paid J. Jones on your account Postage and Petty Charges du-	173		9		206	_	Proceeds of 20 hhds. Sugar, pe Hector, due 31st May Cash received on your account	. 473	0	0	214	1012	
	ring the year	7	18					from J. BransbyBalance of Interest carried t	. 180	0	0	174	261	
	L.325, paid for your account Do. on L.330 received Balance of Interest 4765, di-	1	12 13	6 0				Balance of Account carried t	0	10	Λ		4765	
	vided by 73		5	6				your Dr. in new Account	. 1310	19	·			
_	•	L.2113	19	0	•	6314	"		L.2113			•	6314	
Lon	don, 31st December 1830.	,			Er	rors ex	ccepted.	;	Baring,	ΗÝ	LL	, & C	0.	

Bookcelling. It is a rule in the best managed counting-houses to despatch the accounts-current to the different correspondents as soon as possible after the day to which they are made up. To effect that, they ought to be copied out, in part at least, before the 31st December or 30th June, the dates at which they generally close, particularly as the interest and commission cannot be calculated until they are written out; and the whole has then to be copied into the account-current book.

Mode of computing Interest.—To do this correctly on the different sums in an account-current, it is requisite to take the number of days between each transaction, and the state at which the account-current is closed. Take, for example, a sum of L.531 paid on 5th October, and bearing interest consequently during eighty-seven days, until 31st December. On ascertaining the number of days, compute the interest, either by referring to a book of interest tables, or by the following operation.

Multiply the pounds, 531, by 87, the number of days, and the product will be 46,197; divide that sum by 7300, and the quotient, L.6, 6s. 7d., will be the interest required. The reasons for this process are as follows: interest at 5 per cent for one year forms a twentieth part of the principal, there being a shilling of interest for every pound of principal. On multiplying the number of pounds by the number of days, the product, 46,197, is so many 365th parts of a shilling; divide it by 365, and the quotient, L.126, 0s. 7d., will be the interest. But as it is desirable to have the quotient in pounds, alter your divisor so as to obtain it in that form; that is, multiply 365 by 20, and make the product 7300 your divisor, or, preferably, 73 by striking off two figures from it, and the same from the dividend: the quotient is the interest in pounds, shillings, and pence.

As to the comparative ease of the two processes, where the entries are few the interest tables may be used with advantage; but whenever they are numerous, as they very often are in accounts-current, it will save time to multiply and divide as above.

The product by that process gives the rate of interest at

And the remainder is the interest at 4 per

When accounts-current are made out, as in general they ought to be, every six months, the 30th June is the concluding date for the earlier half year. West-India houses are accustomed to balance their books and close their ac-

counts-current once a year, viz. on 30th April.

There are two modes of preparing accounts-current in a counting-house. The more usual course is to write them out from the ledger and journal, and afterwards to copy them into the account-current book. The other plan is to make no reference, in the first instance, to the ledger or journal, but to post the account-current book from the cashbook, bill-books, account-sales, invoices, and other authorities in the counting-house, so as to render it (the account-current book) a check on the ledger. This, however, is of less importance than may at first be thought, because, from the plan of the journal and ledger, omissions are not so likely to occur in them as in the account-current book; and the chief advantage of a separately posted account-current book consists in having it brought up to a day, as it may easily be at a time that the journal and ledger are in arrear.

Books of Account required by a Merchant.—Journal; ledger; cash-book; bills payable, or book of his acceptances; bills receivable, or book of bills on other merchants, to be paid to his order; order-book; bought-book, or book for bills of parcels delivered in; letter-book; invoice-book; account of sales book; insurance policy book; petty journal, or book for such occasional entries as are not inserted in the other books; petty cash-book, or book of petty disburse.

(J. L—E.)

BOOKSELLING. Among the Greeks the trade of the bookseller (βιβλιοκάπηλος) was unknown. It arose towards the end of the republican age at Rome, when the literary taste of the nobles demanded an increased supply of books. The Roman booksellers were called bibliopolæ, and sometimes librarii, though this term properly belonged to the slaves who were employed in the transcription of MSS., &c. The bookseller's shop was called libraria or taberna libraria. In Rome, the principal marts for books were the Argiletum, and the Vicus Sandalarius, as St Paul's Churchyard, Fleet Street, and Paternoster Row, have been in London. The great booksellers of the time of Augustus were the Sosii. (Cic. De Leg. iii. 20, Phil. ii. 9; Mart. iv. 71, xiii. 3, i. 4; Aul. Gell. xviii. 4; Hor. Ep. i. 20, 2; Ars. Poet. 345, &c.)

Booksellers are in many places ranked among the members of universities, and entitled to the privileges of students; as at Tübingen, Salzburg, and Paris, where they have always been distinguished from the vulgar and mechanical traders, and exempted from various taxes and impositions laid on other companies. An acquaintance with booksellers' marks or signs, as expressed on the title-pages of their books, is of some use, because many books, especially in the last century, have no other designation. The anchor is the mark of Raphelengius at Leyden; and the anchor, with a dolphin twisted round it, is that of the Manutii at Venice and Rome. The Arion denotes a book printed by Oporinus at Basle; the Caduceus or Pegasus, one printed by the Wecheliuses at Paris and Frankfort; the cranes, by Cramoisy; the compass, by Plantin at Antwerp; the fountain, by Vascosan at Paris, the sphere in a bal-

ance, by Janson or Blaew at Amsterdam; the lily, by the juntas at Venice, Florence, Lyons, and Rome; the mulberry tree, by Morel at Paris; the olive tree, by the Stephens at Paris and Geneva, and the Elzevirs at Amsterdam and Leyden; the bird between two serpents, by the Frobeniuses at Basle; the Truth, by the Commelins at Heidelberg and Paris; the Saturn, by Colinæus; the printing-press, by Badius Ascenius; and so of the rest. See BIBLIOGRAPHY.

The traffic in books was in ancient times very inconsiderable, so that the book merchants of England, France, Spain, and other countries, were distinguished by the appellation of stationers, as having no shops, but only stalls or "stands" in the streets. During this state the civil magistrates took little notice of the booksellers, leaving the control of them to the universities, of which they were supposed to be the more immediate retainers, and which accordingly gave them laws and regulations, examined the correctness and fixed the prices of their books, and punished them at discretion. But when, by the invention of printing, books and booksellers began to multiply, it became a matter of more consequence to regulate their proceedings; and hence sovereigns took the direction of the bibliopoles into their own hands.

As despotism and a free press are incompatible, wherever the power of the sovereign has been unlimited, or ecclesiastical authority has prevailed, the trade of bookselling has been put under rigorous restraints. It is only under free and constitutional governments that it is open and unrestricted.

In Britain the business of bookselling is carried on by three classes of tradesmen: 1st, Those who are chiefly en-

selling.

Bookselling. gaged in the publication of books, who may be considered as the manufacturers. 2d, The wholesale booksellers or middle-men, who purchase large numbers from the publishers, with the view of supplying from their extensive stocks the demands of the retail dealers. 3d, The retail booksellers, through whom the public are more directly supplied. The terms on which books are published vary according to the agreement made by the author with the publisher. Sometimes the bookseller purchases the copyright for a fixed sum, and takes the whole responsibility upon himself; sometimes the author and bookseller agree to divide the risk and the profit, or only the profit that may be realized on an edition or editions; or the author may publish on his own account, taking the chance of profit or loss upon himself, paying a commission to the bookseller on the amount of sales.

paying a commission to the bookseller on the amount of sales.

London is the great seat of the publishing trade in Great
Britain; the only other towns where it is prosecuted to any
considerable extent are Oxford, Cambridge, Edinburgh,
Glasgow, and Dublin. The following is the number of persons returned as booksellers and publishers in England and
Scotland at the census of 1851:—

England and Wales Scotland		Females. 858	Persons. 6905 1486
Total	7481	910	8391

In Ireland, from the calculation of an extensive bookseller in Dublin, the numbers are as follow:— Booksellers and publishers in Dublin 40 Shops for small periodicals in do. 20

In the other towns of Ireland 108

The editor of the *Publishers' Circular* says, that after careful calculation he finds that "the issues of new publications and new editions are now averaging together 4380 volumes per annum, which, after making full allowance for the improvements in our system of registration, shows an annual issue of nearly one-fourth over that of ten years back. This conclusion is drawn from a pretty safe average, that of four years, thus:—

1839 2 1840 2 1841 2 1842 2	091 ,, 011 ,, 193 ,,	New editions. 773 vols. 821 ,, 741 ,, 684 ,,
1839-42, 8	97,	3019—Total, 11,616 vols.
1849 3:	281	1062 vols.
1850 3	025 "	1186 ,,
1851 3	454 ,,	1016 ,,
1852 33	359 "	1140 ,,
1849-52, 13.1	19	4404—Total, 17,523 vols.

"This does not include pamphlets, of which we have only taken the record during the last three years:—In 1850, there were 1198; in 1851, 940; and in 1852, 908; the noticeable excess for the first year arising from the pamphletwriting on the Papal question, upon which there were no less than 180 published during one month."

The book trade of France is carried on much in the same way as in England.

From the last number of the Journal de l'Imprimerie for 1851 we gather the following statistics of the productions of the French printing-houses during the last ten years:

1842 6.445	18487.234
1843 6,009	
18446,477	
1845 6,521	
1846 5,816	
1847 <i>5</i> ,530	In ten years, 64,568

or an average per year of 6436 works. The same presses printed, in 1851, 485 musical works, and in the ten years 3336, or an annual average of 333.

There have also been published 1014 engravings and lithographs, and during the ten years 13,085, or an average of 1308.

Two hundred and fifty-three maps and topographical plans have also been published during the year; during the ten years 1005, or a mean of 100 a year.

Thus it appears that nearly in every department of presswork the year 1851 is in advance of the average of the last ten years. The grand total of works published in France during these ten years, engravings, musical works, maps, and plans, is 81,994.

The bookselling and publishing trade in Germany is differently organized from that of either England or France, and, upon the whole, is carried on by a class of persons of superior intelligence. The principal booksellers of Russia, Holland, Italy, and Hungary, are Germans or their descendants. In Germany there is a much larger number of publishers than in any other country of the same size, and they are not, as in Great Britain or France, confined to a few of the principal towns. but are scattered about over the whole country, though, of course, their chief sales are in the numerous small capitals and university towns. The German publishers generally, owing to the small cost of paper and print compared with the expense in England or France, and the comparatively small remuneration to the author, realize, if they sell the whole of an edition, a much larger per-centage of profits; but owing to the system there prevailing of sending almost all their works in the first year on sale to the different parts of the country, they are generally obliged, in order to give a book a fair chance, to print a much larger edition than there is any immediate prospect of selling. On the other hand, by this means of making known new books, very little is expended in advertising.

There are no wholesale booksellers in Germany, as the term is understood in England and France, the publishers being generally in direct communication with all the principal retail booksellers in every town on the Continent, many of them keeping as many as 1000 to 1500 trade accounts open. But every retail bookseller has his agent or "commissioner" at Leipzig, and sometimes in other towns in the south of Germany, to whom all parcels for him are sent and forwarded in one package once or twice a-week. This agent also acts as his banker with the trade, almost all payments being made at Leipzig from one agent to another, their weekly or bi-weekly settlements being carried on in a small way on the plan of the clearing-house of the Lon-At Easter, however, when the general don bankers. balances of all the booksellers connected with the German trade are made and paid on the booksellers' exchange at Leipzig, the sums are very considerable.

Owing to the facility with which the trade of publishing can be carried on in Germany, the absence of all difficulty in immediate communication with the whole retail trade creates a much larger number of publishers in proportion to the number of books published than elsewhere; in fact, almost every bookseller is a publisher to some extent. Nevertheless, the principal publications are in the hands of a limited number of publishers in the strict sense of the word; and, to some extent, they confine themselves to particular classes of publications.

In the United States of America the business of bookselling is carried on to a large extent, principally in books reprinted from English copyright works. These being produced at the mere cost of paper and printing, the authors deriving no benefit from their writings, the American

¹ In this case authors should keep in mind that they are, as far as the publication in question is concerned, copartners with the book seller, and in case of the bankruptcy of the bookseller they are liable for all debts against the book.

booksellers are enabled to sell at prices greatly below those of the English market. Of late years, however, they have published many valuable original works, chiefly in theology,

law, and natural history.

The publisher of Norton's Literary Gazette estimates the number of volumes published in the United States from July 1850 to July 1851 at 1298, embracing 213,049 pages, and forming 1176 distinct works. The principal towns in which the bookselling business is carried on in the United States are Boston, in which there are 78 booksellers and publishers; New York, in which there are about 130; and Philadelphia, in which there are about 120. In Baltimore, Cincinnati, St Louis, as well as in all the considerable towns throughout the United States, some books are published; and everywhere there are retailers of school and miscellaneous books.

Repeated attempts have been made to induce the American legislature to sanction an international copyright law. Committees of the senate have reported in favour of the measure, but the lower house, composed of the representatives of the people, have constantly resisted it; nor is it likely they will agree to a measure, though just in itself, which would prevent their constituents from appropriating the productions of British authors at a greatly reduced price, and which might at the same time diminish the trade of paper-makers, printers, bookbinders, and all engaged in the manufacture of books. (See COPYRIGHT.) From the low price at which the reprints of popular English books can be produced, the sale is often four or five times greater than in Britain. It is calculated that 125,000 copies of Macaulay's "England" were sold in America, when scarcely a fifth of that number were sold in Britain. The profit of these, at the selling price of 32s. or \$8, would amount to \$1,000,000, but as they were supplied at 80 cents, the profits amounted to only 100,000. In this case there is no remuneration to the author, the type is small, and the paper thin and inferior; and as a large sale can be calculated on with certainty, very large editions are thrown off by machinery, so that the cost is reduced to little more than that of the paper. "But it will be asked," says Mr Carey,1 "is it right that we should read the works of Macaulay, Dickens, and others, without compensation to the authors? In answer it may be said that we give them precisely what their own countrymen have given to their Dalton, Davy, Parry, and the thousands of others who have furnished the bodies of which books are composed, and more than we ourselves give to the men among us engaged in cultivating science—fame." Authors have often had but scanty fare, but if they were confined to Mr Carey's luxuries their condition would hardly be improved. Mr Carey informs us that there have been sold in the United States in five years 80,000 volumes of the 8vo edition of the Modern British Essayists; of Macaulay's . Miscellanies, in 3 vols. 12mo, 60,000 volumes; of Miss Aguilar's writings, 100,000 volumes in two years; of Murray's Encyclopadia of Geography, more than 50,000; M'Culloch's Commercial Dictionary, 10,000; of Alexander Smith's poems, in a few months, 10,000. The sale of Thackeray's works has been quadruple that of England, and that of Dickens' works counts by millions of volumes. Bleak House alone sold to the amount of 250,000 in volumes, magazines, and newspapers. Bulwer's last work reached about two-thirds of that number; Alison's Europe 25,000 copies; of Jane Eyre there have been sold 80,000.

The universality of education in the United States is the main cause of an extensive publication of books. Everybody must learn to read and write, and everybody must have books; hence the great circulation, not only of foreign but of domestic literature. The sale of many of their more popular works, especially of educational publications, is prodigious:

the sale of the works of Peter Parley counts by millions; of Book-Morse's Geography and Atlas (50 cents), not less than 70,000 are sold yearly; of Abbots' histories, 400,000; Emerson's Arithmetic and Reader count almost by millions; of the Boston Academy's collection of sacred music, costing a dollar per volume, the sale has exceeded 600,000: and the aggregate sale of five books by the same author has probably exceeded a million. Of Webster's Dictionary in 4to (price \$6), the sale has reached from 60,000 to 80,000 volumes, and of the royal 8vo (\$3.50), 250,000. Of all American authors, excepting the writers of school-books. Washington Irving has circulated the greatest number of volumes. Prior to the publication of the edition of his works by Mr Putnam, the sale had amounted to some hundreds of thousands, and yet of that edition, selling at 5s. per volume, the sale has already risen to 144,000 volumes. Of Uncle Tom's Cubin the sale has amounted to 295,000 copies. Of the works of Prescott, Bancroft, Kent, Barnes, Hawthorn, Longfellow, Bryant, Willis, Curtis, Sedgwick, Sigourney, and many others, the sale is exceedingly great. The copyright of Judge Story's books is understood to yield above L.1600 a-year, and other American authors have received large sums for their copyrights. The term of the copyright is the same in the United States as in Britain-forty-two years.

The number of semi-monthly, monthly, and quarterly journals, according to the last census, was 175. Every pursuit in life, and almost every shade of opinion, has its periodical. Dental surgery alone has five, while in all Europe there are but two. The proportion which republications of British books bore to original works published in America during the six months ending June 30. 1853, was 169 republica-

tions to 522 original.

"Less than half a century since," says Mr Carey, "the race of literary men was scarcely known in the country, and the amount now paid for literary labour is greater than in Britain and France combined, and will probably be in twenty years greater than in all the world beside." This is certainly an American exaggeration: liberal as the remuneration has been to authors in the United States, it is not to be compared to the sums paid for copyrights in Britain; but looking forward to the next century,—when the English language shall be spoken in the whole of North, and in a great part of South America, when new nations of the Anglo-Saxon race will occupy Australia, and when the English colonies in all quarters of the globe shall have extended their boundaries and increased their inhabitants, and when education shall have been universally spread,—what a glorious prospect opens for the English authors and booksellers of future generations!

The profits allowed to booksellers appear to the superficial observer unreasonably large; but that they are probably smaller than those of other trades is proved by the fact that the same amount of capital, industry, and intelligence employed in other branches of business, is generally found to yield a larger income to those engaged in them.

The selling price of a book, compared with the cost of the paper, printing, and binding, appears extravagant; but let us follow the process by which the individual volume reaches the individual reader. The reader in Edinburgh desires his bookseller to supply him with a volume published in London at 20s.; he writes to his usual correspondent, as it is impossible to keep accounts with every publisher; if his correspondent allows 25 per cent. he will expect 10 or 15 from the publisher for himself; and before the volumes reach their ultimate destination, many of them percolate through three or four different hands, each entitled to a share of profit which is not too much for risk, &c.; so that before the demand reaches the original publisher, in many instances, he does not receive a half of the selling price,

Boom Boorhanpoor.

and is glad at the end of three or four years, if, besides the loss of interest of money, he has not a large proportion of

the edition lying on his hands as waste paper.

In 1852 the booksellers of London formed a kind of trade-union, by which they attempted to exclude from the trade all who would not keep up their prices to what was called the regular rate. This, like all associations of the kind, soon fell to pieces, and various plans were proposed by which the readers might be furnished with books at a smaller deduction from the cost of production. It has not, however, been found possible to dispense with the machinery by which the productions of the press can be distributed through the mass of readers; and this convenient machinery must be paid for till one less costly be discovered which will accomplish its objects as well. (A. B.)

BOOM (Dutch, boom, a beam), in naval language, a long spar for spreading out the clew or corner of particular sails; as the jib-boom, studding-sail boom, main-boom, squaresail boom, &c.

Boom denotes also a strong chain or cable stretched across the mouth of a river or harbour, with spars lashed to it, to prevent the entrance of an enemy's ships.

BOOMERANG, a missile instrument of the Australian aborigines, with which they are said to be very dexterous in hitting birds. It consists of a piece of hard wood, with the curve of a parabola, and is about 2 feet long, $2\frac{1}{2}$ inches broad, \frac{1}{3} inch thick, and rounded at the extremities. One side is flat, the other is rounded, and it is brought to a bluntish edge. It is discharged with the hand by one end, the convex edge being forward and the flat side upwards. After advancing some distance, and ascending slowly in the air with a quick rotatory motion, it begins to retrograde, and finally falls to the ground behind the projecter. The principle of the boomerang has been attempted to be applied to the propulsion of ships. See STEAM NAVIGATION.

BOOMING, among sailors, denotes the application of a boom to the sails, in order to accelerate the speed of the

BOONDEE, a town of Hindustan, in the province of Rajpootana, situated on the southern declivity of a long range of hills which run nearly from east to west. The palace of the rajah is a massive building of stone, and was intended to serve as a fortress, though it would not be long tenable against modern tactics and artillery. The territory of which this town is the principal place contains an area of 2291 square miles, and a population estimated at 230,000; and the revenues of the rajah are returned at L.50,000 per annum. During the progress of the Pindarrie and Mahratta war, this prince had espoused the cause of the British, and shown himself a warm supporter of their views; and upon its termination in 1818, a treaty of alliance was concluded between the two governments, containing the usual stipulations of friendship and protection on the part of the paramount power, and of subordinate co-operation on the part of the allied state. Boondee is distant from Delhi, southwest, 245 miles. Lat. 25. 26. Long. 75. 43.

BOORHANPOOR, a decayed town of Hindustan, in the territory of Gwalior, or possessions of the Mahratta family of Scindia, situated on the north bank of the river Taptee. It was formerly a large and flourishing city, being the seat of government of the kings of Candeish, one of whom, Malik Nasir, founded it in the year 1414. Akbar, emperor of Delhi, annexed it with the adjacent territory to the imperial dominions in 1599; and during the reign of his son Jehangir it was visited by the English ambassador Sir Thomas Roe, on his route from Surat to the Mogul court. In the early part of the last century it was mrested from the empire by the Nizam of Hyderabad, and at a later period became the prize of Madhajee Scindia in his rapid career of conquest. During the Mahratta war of 1803 it was occupied by Colonel Stevenson's army without opposi-

tion, but restored at the conclusion of the peace in December following. Distance from Oojein 132 miles; from Bombay 280. Lat. 21. 18. Long. 76. 20.

BOORO, an island in the Asiatic Archipelago, situated between Lat. 3. and 4. S. and Long. 126. and 127. E. It is of an oval shape, and may be estimated at seventyfive miles in length by thirty-eight in average breadth. This island is fruitful, producing large quantities of rice, sago, oranges, Iemons, citrons, cocoa-nuts, bananas, and pine-apples; also the cajeput tree, from the leaves of which the cajeput oil is procured. Fine timber grows on this island, and many kinds of beautiful wood, fit for inlaying; besides black and wnite ebony, and the palm and the teak trees. Ships may be supplied here with rice, cattle, and other refreshments; and the woods abound with wild boars, goats, and deer, and, among the latter, the babyrussa, or true hog-deer, as its name implies. The natives consist of two races, the aborigines, who live in the interior of the island among inaccessible mountains, and of whom little is known; and the Moors or Mahometans, who inhabit the northern coast, and acknowledge the authority of the Dutch.

BOOROOJIRD, a flourishing city of Persia, in the province of Irak, situated at the foot of a mountain. It is the chief town of a district peopled by a tribe called Lack, who seldom wander far from the spots to which they are partial, but settle in villages, and employ themselves in the improve-ment of their estates. Population, 12,000.

The Chinese trade here for cabinet woods and different species of dye-woods. At Cajelli bay on its north side there is

good anchorage, and at the east end is a Dutch station.

BOOT, a defence of leather for the foot and leg. Boots seem to have derived their name from their resemblance to a sort of jacks or leathern bottles formerly in use, called bottæ in Latin, and in the old French bouts.

Boot, an instrument of torture, by which the leg was squeezed with great violence, for the purpose of extorting confession. (See Wodrow's Hist. of the Sufferings of the Church of Scotland.)

BOOTAN. This extensive region is situated between Bound-Bengal and Tibet, and between the 26th and 29th degrees aries. of north latitude. To the north it is separated from Tibet by the eastern ridges of the Himalaya range; Assam and Goalpara, with the native state of Cooch Behar, form its boundaries to the south; on the east it is bordered by a tract inhabited by uncivilized mountain tribes; and on the west by the native state of Sikkim. Its length from east to west is 230 miles, its breadth 120, and the area contained within its limits falls little short of 20,000 square miles. A slip of land varying from ten to twenty miles in breadth extends along the base of the mountains from east to west, and separates the hill-country of Bootan from the province of Bengal. With the exception of this narrow tract, the Physical whole of Bootan presents a succession of lofty and rugged Aspect. mountains, abounding in the most picturesque and sublime scenery. "The prospects," says Captain Turner, "between abrupt and lofty prominences were inconceivably grand; hills clothed to their very summits with trees, dark and deep glens, and the high tops of mountains lost in the clouds, constituted altogether a scene of extraordinary magnificence and sublimity.

As might be expected from the physical structure and elevation of this alpine region, numerous rivers are sent forth in a southerly direction, which, forcing their passage through narrow defiles, and precipitated in tremendous cataracts over frightful precipices, eventually pour their tributary streams into the Brahmapootra. One torrent is mentioned by Turner as issuing from the high grounds in a collected body, but as descending from so great a height that before it reaches the thick shade below it is nearly dissipated, and appears like the steam arising from boiling water. Of the rivers traversing Bootan, the most considerable is the Monas,

Boore Bootan.

which in its progress to the Brahmapootra flows under the walls of Tassgong, beyond which place it is unfordable. At the foot of Tassgong Hill it is crossed by a suspension bridge. The other principal rivers are the Matchoo, the Tchinchoo, the Toorsha, the Manchee, and the Durla.

The more southern portions of the plains of Bootan bordering upon Bengal are under rice cultivation. Between the cultivated tracts and the mountains occurs an intervening space covered with the most luxuriant vegetation, but pervaded by an atmosphere so deleterious to the human constitution that even those most inured to the climate rarely pass through it with impunity. In the hilly part of the country the climate varies according to the difference of elevation. At the time when the inhabitants of Punakha (the winter residence of the rajah) are afraid of exposing themselves to an almost vertical sun, those of Ghassa experience all the rigour of winter, and are chilled by perpetual snows; yet both these places are within sight of each other. On the elevated mountain heights it is cold and moist, and here the clouds are intercepted and descend in rains. The rains, however, in the vicinity of Tassisudon, the capital, are moderate. There are frequent showers, but nothing that can be compared to the tropical rains of Bengal. Owing to the great elevation and steepness of the mountains, dreadful tempests of winds arise among the hollows, which are often attended with fatal effects. A considerable village, situated on the brow of a lofty hill, was nearly destroyed by one of these tempests. In one night a hurricane swept nine houses with their unfortunate inmates down the steep; and though search was afterwards made, not the slightest trace of them was ever found. Three houses remained; and their tenants, unawed by the dismal fate of their neighbours, still retained their occupation.

The people are industrious, and devote themselves to agriculture, but from the geological structure and physical aspect of the country, the pursuits of husbandry, except in the plains, which are under rice cultivation, are limited to comparatively few spots. In the vicinity of the cottages which are interspersed throughout the mountains, the land is cleared for cultivation, and produces thriving crops of barley, wheat, buckwheat, and others of less importance. Turnips of excellent quality are extensively grown; they are free from fibres, and remarkably sweet. The climate is generally well adapted to the production both of European and Asiatic fruits and vegetables. Potatoes have been introduced, but the cultivation of this valuable root has not been attended with success. The forests abound in a variety of stately trees. Among them are the beech, ash, birch, maple, cypress, and yew; firs and pines cover the mountain heights; and below these, but still at an elevation of eight or nine thousand feet, is a zone of vegetation, consisting principally of oaks and rhododendrons. these mountains, in the vicinity of Murichom, grows the cinnamon tree. Some of the roots and branches were examined by Turner in the course of his journey to Tibet; but the plant being neither in blossom nor bearing fruit, it was impossible to decide whether it was the true cinnamon or an inferior kind of cassia. The leaf, however, corresponded with the description given of the true cinnamon by Linnaus.

Notwithstanding the great diversity of climate, the uninclosed character of the country, and the difficult fastnesses in which it abounds, there is no great variety nor large number of wild animals. Thickets of dense vegetation extend along the base of the mountains, and afford shelter to the elephant. tiger, buffalo, and deer. But in the hills of Bootan wild animals are extremely rare; and Turner mentions, as an extraordinary circumstance, that he one day saw a multitude of monkeys playing their gambols by the road side. They are of a large and handsome kind, with black faces surrounded by a streak of white hair, and have very long slender limbs. They are held sacred by the Booteans as well as by the Hindus. The horse, a certain species of which is indigenous to Bootan, and is used as a domestic animal, is called tangun, from Tangustan, the general appellation of that assemblage of mountains which constitutes the territory of Bootan. It is peculiar to this tract, not being found in any of the neighbour-

ing countries of Assam, Nepaul, Tibet, or Bengal, and unites Bootan. in an eminent degree the two qualities of strength and beauty, being remarkable for symmetry and just proportions. The Tangun horse is usually about thirteen hands high, shortbodied, clean-limbed, and deep in the chest, yet extremely active. Being constantly accustomed to struggle against acclivities, there is a surprising energy and vigour in all his movements; and this indomitable spirit is supposed by Europeans to proceed from a headstrong and ungovernable temper, while in reality it is only an excess of eagerness in the performance of any allotted task. The colour of this horse usually inclines to piebald, and those of one colour are rarely to be found.

The Booteans are not a warlike people, and the military re- Military sources of the country are altogether on an insignificant scale. resources. Beyond the guards necessary for the defence of the various castles, there is nothing like a standing military force in the country. An insuperable difficulty to the maintenance of such a force would, indeed, be presented in the inadequacy of supplies, and the great distance from which they must be drawn.

In so barren and rude a country the manufacturing industry Manufacof its people must necessarily be at a low ebb, and the few tures. articles produced are all destined for home consumption. These consist of coarse blankets and cotton cloths, made by the villagers inhabiting the southern tract bordering upon British territory. Leather, from the hide of the buffalo, imperfectly tanned, is principally used for the soles of snow-boots. Circular bowls are neatly turned from various woods. A small quantity of paper is made from the plant described as the Daphne papyrifera; and, if to these be added the straight sword worn by the men, iron spear and arrowheads, and a few copper caldrons fabricated from the metal obtained in the country, the list of the manufactures of Bootan may be considered nearly complete.

The inhabitants of this elevated tract are of active habits Inhabitand of a herculean make, many of them being six feet high, ants. and are entirely different from the feeble and timid natives of Bengal. A general resemblance of features pervades the whole race of these hardy mountaineers. They are fairer than their Bengal neighbours, and have generally broader faces, with high cheek-bones. They have invariably black hair, which it is their fashion to cut close to the head. The eye, which is a remarkable feature in their face, is small and black, with long pointed corners, as if stretched and extended by artificial Their eye-lashes are so thin as to be scarcely percep-Their face is rather flat, narrowing from the checkbones to the chin, and broadest below the eyes,—a physiognomy which somewhat resembles that of the Tartars, though it is far more strongly marked among the Chinese. They have very small beards, and generally reach an advanced age before they have the appearance of any; in this also resembling the Tartars. They are social and cheerful in their manners. The women and the men mix freely together; and they are frequently seen sitting under the cavities of the rocks or other sheltered places, chatting together in great good humour, and occasionally indulging in obstreperous laughter. They generally exhibit a picture of rosy health; the women in particular, with their jet black hair, and clear, brisk, black eyes, possess a ruddiness which, according to Turner, the most florid English rustic would in vain attempt to rival. Yet they are far from being cleanly in their habits; nor are their manners and amusements of a refined cast. Their mode of living is simple; their food consisting of fruits, vegetables, and roots. Tea is as common a refreshment as in China, but the mode of preparation is by an admixture of water, flour, butter, and salt. A spirit is extracted from rice, wheat, barley, and other

The supreme ruler of Bootan is called the Deb Raja. Govern-He resides at Tassisudon, and possesses unlimited sway ment; over his subjects. The people follow the religion of Religion; Buddha; and the priests form a distinct class, and are bound by the most rigid vows of celibacy. They are dispersed throughout the country in monasteries, and other buildings appropriated to their use. The Deb Raja has always manifested the strongest inclination to extend his territories by incroaching on those of his neighbours. In 1772 he suddenly invaded the principality of Cooch Behar, a dependency of Bengal; but its rajah having applied to

Animals.

Acid.

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Bootes
Booton.

the British for aid, a force under Captain Jones was despatched to Cooch Behar, by means of which the invaders were expelled and pursued into their own territories. Upon meeting with these reverses, the Booteans implored the assistance of the Tibetan authorities: in compliance with the request of the Teshoo Lama, then regent of Tibet, a cessation of hostilities ensued, and in 1774 a treaty of peace was concluded between the East India Company and the ruler of Bootan. In 1783 Captain Turner was deputed to Bootan, with a view of promoting commercial intercourse, but his mission was not regarded as successful. From this period little intercourse took place with Bootan, until the occupation of Assam by the British in 1826. It was then discovered that the Booteans had usurped several tracts of low land lying at the foot of the mountains, called. dooars or passes, and for these they then agreed to pay a small tribute; but failing in their obligations, and availing themselves of the command of the passes to commit depredations in the British territories, Captain Pemberton arrived in Bootan in 1837, commissioned to adjust the points of difference. His negotiation was productive of no definite result; and every other means of obtaining redress and security proving unsuccessful, the dooars were wrested from the Booteans, and placed under British management. (E. T.)

BOOTES, a constellation of the northern hemisphere. It contains Arcturus, a star of the first magnitude.

BOOTH, BARTON, a celebrated English tragedian, born of an ancient family in Lancashire, in 1681. He was educated in Westminster school under the celebrated Dr Bushby, where his success in the Latin plays customarily performed by the scholars gave him an inclination for the stage. He was intended for the church; but at seventcen years of age he ran away from school, and joined a theatrical company at Dublin. His first appearance was hailed with applause; and from this time he continued daily improving. After two successful campaigns in Ireland he returned to his native country, having first reconciled himself to his friends. Betterton, to whom he had an introduction, received him with great cordiality, and gave him all the assistance in his power. His success at London was complete, and he established his reputation as only second to his great instructor. He was indebted to a happy coincidence of merit and chance for that height of fame which he at length attained in the character of Cato. The Whigs, in favour of whose principles this tragedy was apparently written, thought it their duty to support it strongly; while the Tories, at every passage susceptible of a popular turn, were no less vehement in their approbation. Booth was twice married; first to a daughter of Sir William Barkham, Bart., and afterwards to Miss Hester Santlow, an actress of great merit. During the twenty years of his management, the theatre was in the greatest credit; and his death, which happened on the 10th of May 1733, contributed not a little to its decline. Booth was a man of excellent character, and greatly esteemed for his amiability and goodness of heart.

BOOTHIA FELIX, an extensive peninsula of British North America, between Lat. 69. and 75. N. and Long. 92. and 97. W. It was discovered by Captain, now Sir J. Ross, in 1830, and named after Sir Felix Booth. It forms the western side of the gulf of the same name, into which Prince Regent's Inlet leads from Baffin's Bay. It is almost separated from the American shores by a chain of lakes; and is perhaps joined to North Somerset, discovered by Sir E. Parry in 1819.

BOOTON, an island in the Eastern Archipelago, situated off the south-eastern extremity of Celebes, about the 5th degree of south latitude. It is estimated at eighty-five miles in length by twenty miles in average breadth. It is separated from the island of Angaosani by a narrow strait; and is productive, yielding rice, maize, yams, and a variety

of tropical fruits. The inhabitants are of a short stature and tawny complexion. They speak the Malay language, and are Mahometans. The Dutch had formerly a settlement here in the bay of Booton; and used systematically to destroy the clove-trees of the island.

BOPAL, an extensive town of Hindustan, in the province of Malwah, surrounded with a stone wall, on the outside of which is a large gunge or mart, with wide and straight streets. On a rising ground to the S.W. of the town is a fort called Futtehgur, built on a solid rock, and surrounded with square towers. Under the walls of the fort is a tank or lake four miles and a half in length.

The territory of which this town is the principal place contains an area of 6764 square miles, and belongs to a native chief, whose revenues amount to L.220,000 per annum. The political relations of the British government with this state commenced in 1818, when a treaty was concluded, the leading articles of which are of the usual character—protection by the British government, and acknowledgment of its supremacy by that of Bopal, with a stipulation for subordinate co-operation.

The state of Bopal boasts of no great antiquity. Its founder, Dost Mahomed Khan, exercised subordinate authority within its limits, under the Emperor Aurungzebe, at the commencement of the eighteenth century; and, upon the death of that prince he assumed the title of Nawaub. Subsequently Bopal attracted some notice; first, in 1778, from the circumstance of its ruler rendering assistance to a British force under General Goddard, which traversed a large part of India through states then, with the exception of Bopal, all unfriendly; and again, in 1813, when the city of Bopal sustained a nine months' siege from a combined Mahratta force amounting to at least six times the number of the garrison, by whom the assailants were ultimately compelled to abandon their attempt. The Nawaub, with whom the British treaty of 1818 was concluded, died shortly afterwards from the effect of an accidental pistol shot, and was succeeded by an infant nephew, between whom and the daughter of the deceased prince, also of tender age, a marriage was negotiated. When, however, the age of the young prince entitled him to look for admission to actual power, his claim was opposed by the Begum, widow of the deceased Nawaub, a woman of some ability, and who had enjoyed since the death of her husband a large share of influence and authority. She disputed not only his right to the throne, but also the claim founded on his betrothal to the infant heiress, and he was obliged to relinquish both in favour of a younger brother, who, however, when the time came for asserting his rights, received similar treatment from the Begum, who was resolved to retain her position at the head of the state as long as possible The prince's marriage at length took place, but sovereignty was still withheld, and would have been withheld so long as the Begum lived, had not arms achieved what negotiation was unable to accomplish. The new ruler did not long survive his recognition, and as his daughter, a child only six years old, was his successor, the necessity of the case enforced the re-establishment of a regency, in which the Begum managed finally to gratify her ambition and love of intrigue by attaining a chief part. Such is the present state of affairs in Bopal, where he who shall be so fortunate as to secure the person of the youthful princess in marriage will hereafter wield the sceptre of authority

BORACIC ACID (Sassoline or native boracic acid; boraxsaure), in Mineralogy, the only known compound of boron and oxygen, occurs in white pearly scales, which are soft and greasy to the touch, and have an acidulous taste. It fuses easily in the flame of a candle, and yields a glossy globule, which on cooling becomes opaque if any gypsum be in combination. When dissolved in alcohol it communicates to the flame a fine green tinge; a test which affords the

specific gravity is equal to 1.48; and, according to Berzelius, art of war. it consists of boron 25.83, and oxygen 74.17. The most celebrated deposit of this substance is the Solfatara, within the sublimated in the form of a thin filament or cake on the surface of the sulphur and around the fumaroles, whence it arises. These incrustations are usually about an inch in thickness, have sometimes a fibrous structure, and are always more or less tinged with sulphur. It occurs both massive and pulverulent; in which last case the particles form merely acid is likewise deposited by several of the lagunes in Tuscany, and at the hot springs of Sasso, a locality which has procured it the trivial name of Sassoline. The mineral from these deposits, however, differs materially in appearance from that of Volcano. It is grayer in colour, considerably harder, and shows traces of indistinct crystallization. Klaproth found that the Tuscan variety contains cleven per cent. sulphate of magnesia, an ingredient totally foreign to that from Volcano.

BORAK, a fabulous animal, on which Mahomet was supposed to have been carried in his nocturnal flight from Jeru-

salem to heaven.

BORASSUS, a genus of the natural order of Palmæ. The best known is B. flabelliformis or Toddy-palm, which in India yields a vinous juice and much sugar. This palm is 20 feet high, the leaves 4 feet long on foot-stalks of the same length. The juice is obtained by crushing the inflorescence, cutting off the upper part, and fastening the lower part to a vessel of bamboo, into which it drains. The fruit has the bigness of a small human head.

BORAX, in Mineralogy; borate of soda, tinkal, soude boratée. This salt is usually of a white or gray colour, translucent, feebly alkaline to the taste, soluble in water, and consists, according to Klaproth, of soda 14.5, boracic acid 37.0, and water 47.0. It intumesces before the blow-pipe, and then melts into a transparent globule: when in solution it changes the blue colour of litmus into green. Its chief locality is Tibet, where it is found on the surface of the soil, in the vicinity and at the bottom of certain lakes. It is there collected and sent to Europe in the form of a brownish-gray impure salt, from which the artificial borax is obtained by the addition of a greater quantity of soda. It is made use of as a flux, in forming imitation gems, and in the process of soldering. It is also of great utility in analysis by the blowpipe, and in some cases in glass manufactories. See CHE-MISTRY and MINERALOGY.

tical astronomer, celebrated for his improvements in the theory of hydraulics and pneumatics, and in the construction of instruments for observation. He was born at Drax, on the 4th of May 1733, and was originally destined for the bar; but abandoned the pursuit of the law in favour of a afford him opportunities for the cultivation of his mathematical talents, and for the application of the results of his studies to practice. His acquirements in science had very early attracted the attention of D'Alembert, who his turning his thoughts to the occupation of a place in the academy. He obtained a commission in the light cacorps; and, in 1756, he presented to the Academy of Sciences (A) A Memoir on the Paths of Bombs, which was ordered to be printed in the collection of the Savans Etranin the capacity of aid-de-camp to the celebrated General by methods before in use

Boracite best possible indication of the presence of boracic acid. Its Maillebois, to whom he looked up as a great master in the Borda.

He was afterwards admitted into the corps of engineers, without the usual form of examination into his qualificaancient crater of Volcano, one of the Lipari isles, where it is tions; and being stationed at a sea-port, the occurrences of the place naturally directed his attention anew to the phenomena of the resistance of fluids. He published, in 1763, a detailed memoir on this subject (B. Mém. Ac. Par. 1763, p. 358), in which he relates a variety of experiments, showing that the resistance of the air is actually proportional to the square of the velocity, as had coma filament or loose covering on the surface of the sulphur, monly been supposed from theoretical considerations. He without any attachment or adhesion to each other. Boracic also determines, by other experiments, the magnitude of the resistance to the motion of a sphere, and proves that nothing can be more erroneous than the supposition that the resistance to an oblique surface decreases as the square of the sine of the angle of incidence. He also finds, that the resistance to the motion of a cube, in the directions of the diagonal of its base and of one of the sides, are as 21 to 16, while the calculations of former theorists had made the resistance greatest in the direction of the side.

In 1766 he published an Essay on the discharge of fluids through the orifices of vessels (C. Mém. Ac. Par. 1766, p. 579), in which he first states the objections to considering the different strata of a fluid as descending in all cases very nearly in parallel directions; he examines the contraction of the jet after its escape from the orifice, and determines some of the effects of abrupt changes in the velocity of the fluid passing through pipes or apertures

of different forms.

He contributed, in 1767, to the publications of the academy, an important Memoir on Water Wheels (D. p. 270), which has escaped the notice of his able biographer M. Lacroix. He observes, in this paper, that the simple hypothesis of a resistance varying as the square of the velocity, which is so near the truth in common cases, where a number of particles, proportional to the velocity, strikes, in a given time, upon a small exposed surface with a force also proportional to the velocity, is totally inapplicable to the action of a confined stream upon the floatboards of a wheel, since in this instance the number of particles concerned cannot vary materially with the velocity, the whole stream being supposed to operate in all cases upon the successive floatboards; so that the analogy would require us to suppose the force in this case nearly proportional to the simple relative velocity; a conclusion which agrees remarkably well with the experiments of some practical authors.

The same volume contains a continuation of M. Borda's BORDA, John Charles, a mathematician and nau-researches relating to the resistance of oblique surfaces (E. Mém. Ac. Par. 1767, p. 495), with a statement of experiments still more conclusively confuting the received hypothesis respecting oblique impulse than his former investigations had done. We also find in it an Essay on isoperimetrical problems (F. p. 551), in which it is shown military life, which he considered as better calculated to that Euler's method of treating them, which had been in great measure abandoned by its equally profound and candid author, in favour of the more general and more elegant calculations of Lagrange, was still capable of affording all the results that had been derived from the mepredicted his future eminence, and warmly recommended `thod of variations; and he even pointed out some deficiencies in the first memoir of Lagrange, which contained the detail of his ingenious invention. These investigations of valry, and was appointed teacher of mathematics to the M. Borda afford collateral evidence of the strict truth of the demonstrations of both his great predecessors; and though they have been little employed by later mathematicians, yet it must be admitted to be of some importance, gers, but which has not excited much attention. He was in enabling us to appreciate the value of a new mode of elected in the same year a member of the academy; and calculation, to determine whether its results are or are not in the next he was present at the battle of Hastinbeck, such as might be obtained with almost equal convenience

Borda.

His memoir, inserted in the collection of the Academy for 1768 (G. Mém. Ac. Par. 1768, p. 18), is devoted exclusively to the theory of pumps; and he considers especially the effect of the passage of the fluid through valves and other contracted parts in diminishing the quantity of the discharge. His results are derived from the principle of the preservation of the living force or energy of a system of bodies, throughout all the vicissitudes of its motions, which had before been employed with success by Daniel Bernoulli in problems of a similar nature; but it was not until the experiments of Buat had afforded sufficient grounds for the determination of the friction of fluids, that cases of this kind could be submitted to exact

In his Essay on the curve described by cannon-balls, published among the Memoirs for 1769 (H. Mém. Ac. Par. 1769, p. 247), he has greatly simplified the practical theory of projectiles, which had been treated in a satisfactory though very general manner by John Bernoulli, and had been reduced into a much more convenient form by Euler. M. Borda has substituted some approximate expressions for the true value of the density of the air, and has thus been enabled to integrate equations which, in their more strictly correct form, had resisted the powers of Euler himself; and he has justified the adoption of the formulas thus obtained by a comparison with experiment.

In the mean time his talents were very actively employed in the naval service of his country, which he entered in 1767, by the nomination of M. Praslin. time-keepers of Le Roy and Berthoud were beginning to rival those of the English artists, and the French government ordered several vessels to be fitted out for cruises, in order to examine the accuracy of these time-keepers. M. Borda was appointed a lieutenant on board of the Flore, and acted jointly with M. Pingré as a delegate of the Academy of Sciences for the purposes of the expedi-The voyage occupied about a year, and extended to the Canaries, the West Indies, Newfoundland, Iceland, and Denmark. M. Borda had a considerable share in the account which was published of the observations; and the formula which he has here given for the correction of the effects of refraction and parallax is considered as equally elegant and convenient. He also presented to the academy a separate memoir on the results of the expedition. (I. Voyage pour éprouver les Montres de Le Roy. 4. Paris. K. Mém. Ac. Par. 1773, p. 258.) After an interval of six weeks, these watches were found capable of determining the longitude within about fifteen minutes of the truth.

In order to supply some deficiencies in the observations made at the Canaries, Borda was sent out a second time, with the Boussole and the Espiègle; and he published, after his return (L.), a very correct and highly finished map of these islands. He was soon afterwards promoted to the rank of captain, and served under the Count d'Estaing as a major-general, an appointment nearly similar to that of our captains of the fleet. In this capacity he observed the inconvenience of too great a variety in the sizes of the vessels constituting a fleet, and proposed to abolish the class of fifty and of sixty-four gun ships, as too small for the line of battle, and to build ships of three rates only, the lowest carrying seventy-four guns, so that a smaller quantity of stores should require to be kept ready for use in the dock-yards, than when ships of more various dimensions were to be refitted. In 1780 he had the command of the Guerrier, and in 1781 of the Solitaire,

adopted by that body. Its peculiarity consisted in hav- Borda. ing the names of the candidates arranged by each voter in a certain order, and collecting the numbers expressing the degrees of preference into separate results, so that the simple majority of voters did not necessarily establish the claim of any individual, if he was placed very low in the list by any considerable number of those who voted against him. But it must be allowed that this mode of election is by no means wholly unobjectionable.

M. Borda appears to have rendered an essential service to the cultivators of practical astronomy by the introduction and improvement of the repeating circle, although this instrument has probably been less employed in Great Britain than elsewhere, on account of the greater perfec tion of those which were previously in common use. It had been suggested by Mayer in 1767, that a circle with two movable sights would enable us to observe a given angle a great number of times in succession, and to add together the results, without any error in reading them off, and thus to obtain a degree of precision equal to that of much larger and better instruments of a different construction; but the proposal had been little noticed until ten years afterwards, when Borda pursued the path pointed out by Mayer, and trained Lenoir, then a young and unlicensed artist, to the execution of the improved instrument, notwithstanding the opposition of the rival opticians, and the want of encouragement from the opulent public. He published in 1787 (N.) his Description and Use of the Reflecting Circle, with different Methods for Calculating the Principal Observations of Nautical Astronomy; but the officers of the French navy, for whom this work was intended, appear to have profited but little by his instructions. His instrument was, however, much employed in the operations for determining the length of the terrestrial meridian; and he himself took charge of the experiments required for ascertaining the length of the pendulum, and for the comparison of the different standards with each other. He invented some very ingenious methods of overcoming the difficulties which present themselves in the pursuit of these objects; but he was interrupted in his researches by the horrors of the Revolution, nor did he live to see the whole of the operations completed. He endeavoured, also, to promote the introduction of the new mode of subdividing the circle, by the laborious computation of Tables of Logarithms (O. 4to, Par. 1801) adapted to decimal parts of the quadrant; a work in which he was assisted by M. Delambre. From the increasing indisposition of M. Callet, who had undertaken to correct the proofs of these tables, some very material errors had been committed in the first half of the tables, and M. Borda thought it necessary to cancel a great number of the pages; and in order to meet the expense thus entailed on him, he was obliged to dispose of an estate which he had lately acquired in his native place. He was also engaged, towards the close of his life, in the measurement of the force of magnetism, and in the calculations of astronomical refraction. His health had been threatened for several successive winters, and he died the 10th of March 1799.

In his manners he was animated and unaffected. He avoided those who sought his acquaintance merely from the vanity of being intimate with a man of talents, whatever pretensions to importance they might derive from their casual relations to general society. He never married; and he was too much absorbed in the pursuit of science to associate with a very extensive circle even of which was taken after a gallant resistance by an English private friends. Though not a man of learning, he was squadron. He was thus compelled to pay a visit to Great not deficient in literary taste; and he was, in particular, a Britain, but was immediately set at liberty upon his parole. passionate admirer of Homer. He seems to have posses-He proposed to the academy in this year (M. Mêm. Ac. sed a considerable share of that natural tact and sagacity Par. 1781), a mode of regulating elections, which was which was so remarkable in Newton, and which we also

Borde discover in the works of Daniel Bernoulli; enabling them, like a sort of instinct, to elude the insurmountable difficulties Bordeaux. with which direct investigations are often encumbered; while Euler, on the contrary, as M. Lacroix most truly observes, seems to have taken pleasure in searching for matter which would give scope to his analytical ingenuity, although wholly foreign to the physical investigations which had first led him to the difficulties in question. It would have been fortunate for the progress of science if some of the most celebrated of M. Borda's countrymen had profited by his example, in studying to attain that unostentatious simplicity which is the last result of the highest cultivation. (Lacroix, in Rapport des Travaux de la Société Philomathique, vol. iv. 8. Par. 1800).

BORDE, Andrew, a physician, jocularly styled by himself Andreas Perforatus, was born at Pevensey in Sussex, about A.D. 1500, and educated at Oxford. After travelling through various parts of Europe and Africa, he settled first at Pevensey, afterwards at Winchester, and finally in London, where he is said to have become a fellow of the College of Physicians, and to have acted in the capacity of physician to Henry VIII. But notwithstanding his success in his profession, he died insolvent in the Fleet prison in 1549. He was the author of several small jocular histories and cheap books, such as formed the light reading of those times. He descended to the arts of a mountebank, making humorous speeches at fairs to attract the people; and from him the term "Merry Andrew" is said to be derived. Wood says that "he was esteemed a noted poet, a witty and ingenious

person, and an excellent physician."

BORDEAUX (the ancient Burdigala), an important commercial city and seaport town of France, capital of an arrondissement of the same name, and also of the department of Gironde. It is situated in the centre of an extensive plain on the left bank of the Garonne, 60 miles from its mouth, in Lat. 44. 50. N. Long. 0. 35. W. Large vessels come up to the town by means of the river, which at its narrowest part here has a breadth of upwards of 2000 feet, with a depth of 16 feet at low, and of 30 at high water. A magnificent bridge of 17 arches, 1534 feet in length, crosses the river. In the old part of the city the streets are narrow and crooked, and the houses ill built; but in the new part the streets are well laid out and handsome, containing many elegant buildings. Among the public edifices of Bordeaux are the theatre, one of the finest in Europe, and seated to hold 4000 persons; the cathedral, a fine Gothic structure, with two elegant spires 150 feet high; the remains of the Palais Gallien, supposed to have been built in the time of the emperor Gallienus; the churches of Ste Croix, St Michael, &c. Bordeaux is the seat of an archbishop, of a national court and court of assize, tribunals of primary instance and commerce, and has a museum, a public library of about 110,000 volumes, picture gallery, botanic garden, exchange bank, public baths, &c. It has also several hospitals and other charitable institutions; several literary societies; a university academy; academy of arts, sciences, and belleslettres; a royal college, school of medicine, normal school, and a school of navigation. The river here describes a semicircle, and is lined by quays for about three miles. The trade of Bordeaux is very extensive, particularly in wines, brandy, plums, almonds, and other fruits. It is greatly promoted by the Languedoc canal, which communicates with the Mediterranean. The wine trade, though still large, has been greatly reduced by the prohibitive system of commercial policy pursued in France. Previous to 1790 the department of the Gironde exported annually above 100,000 tuns of wine to the north of Europe: the export at present is not above 25,000 tuns. In 1842, 497 foreign vessels of 103,461 tons, and 3293 French vessels, of 226,694 tons, entered the port; and 491 foreign vessels of 101,719 tons, and 3038 French vessels of 204.611

tons, departed. There are numerous docks and building yards for vessels of every size, even ships of the line. Its manufactures are numerous, especially tobacco and smuff, brandy, sugar, vinegar, iron and steel goods, chemicals, leather, liqueurs, cottons, woollens, kid gloves, &c. Pop.

(1851) 123,935; of arrondissement, 296,632. The origin of this city dates prior to the conquest of Gaul by the Romans, at which time it was the capital of the Bituriges Vivisci, a powerful Gallic tribe. It is first mentioned by Strabo, who describes it as being a celebrated commercial city. Hadrian made it the metropolis of Aquitania Secunda. In 415 it was taken by the Visigoths, and retaken by Clovis in 509. In 729 it was pillaged by the Saracens, and afterwards suffered much from the ravages of the Normans about the time of the fall of the Carlovingian empire. It was rebuilt by the dukes of Guyenne about the beginning of the tenth century. By the marriage of Eleanora,—daughter of William X., last Duke of Guyenne, to Henry, Duke of Normandy, afterwards king of England,

it came into the hands of the English; in whose possession

it remained till 1452, when it was again united to the French

BOREAS (Bopéas or Boppas), the Greek name of the north wind blowing from the Hyperborean mountains. In mythology, Boreas was the son of Astræus and Eos (Aurora), or of the river god Strymon. He dwelt in a cave on Mount Hæmus, whence he issued and carried off Orithyia, the daughter of Erectheus, king of Attica, by whom he begot Zetes, Calais, and Cleopatra the wife of Phineus, who are therefore called Boreades. During the Persian war the Athenians invoked Boreas, who destroyed the enemy's fleet. In gratitude they dedicated a temple to him; and a festival, called Boreasmus or Boreasmi, was celebrated with banquets in his honour. By the mares of Ericthonius he begot twelve horses of such fleetness, that in passing over the sea they scarce touched the waves. Boreas was represented with wings, white hair, and the tails of serpents instead of feet.

BOREL, PIERRE, a learned physician and antiquary, born at Castres in Languedoc, about 1620. He took his doctor's degree at Montpellier in 1640, and practised with great success in his native city. In 1653 he settled in Paris, having been named counsellor and physician in ordinary to the king; and in 1674 was admitted into the Academy of Sciences. He died in 1689. His works, chiefly on medical subjects, are numerous. The principal are, Historiarum et Observationum medico-physicarum Centuriæ quinque, Castres, 1653, 12mo; Bibliotheca Chimica, Paris, 1654, 12mo; De vero Telescopii inventore, cum brevi omnivm conspiscillorum historia, Hague, 1655, 4to; Hortus, seu Armamentarum Simplicium, plantarum, et animalium ad Artem medicam spectantium, Castres, 1666, 8vo; Observationum Microscopicarum Centuria, Hague, 1656, 4to. He was also the author of several works in French, particularly two treatises on Antiquities, and a discourse on the Plurality of Worlds.

BORELLI, GIOVANNI ALFONSO, the head of what has been called the iatro-mathematical sect,—or that which, misled by the great progress that the application of the mathematics had produced in the physical sciences, attempted to secure the same advantage for medicine, by subjecting to calculation the phenomena of the living economy,—was born at Naples, January 28.1608. He professed his system of iatromathematical philosophy in some of the most celebrated universities of Italy, particularly at Florence and Pisa, where he rose into high favour with the princes of the house of Medicis; but having been engaged in the revolt of Messina. he was obliged to retire to Rome, where he spent the remainder of his life under the protection of Christina queen of Sweden, who honoured him with her friendship, and by her liberality softened the rigour of his fortune. He died of a pleurisy, December 31. 1679. Borelli, more judicious than Bellini, restricted the application of his system chiefly to

Boreas Borelli.

Borgia

Borgog-

Borga Borgia. muscular motions, or to those phenomena of the animal economy which are in certain points subject to the laws of mechanics; and it cannot be denied that it conducted him to the discovery of some principles new in themselves, and directly opposed to the received belief of his time. But his followers, less cautious, wished to generalize the application he had made; and in framing hypotheses, on which time and the return to a sound medical philosophy have done justice, they greatly retarded the restoration of the science. The works of Borelli are, 1. Della Causa delle Febri maligne, Pisa, 1658, 4to; 2. De Renum usu judicium, Strasburg, 1664, 8vo; 3. Euclides Restitutus, 1628, 4to; 4. Apolonii Pergæi Conicorum, libri v. vi. et vii., Florence, 1661; 5. Theoriæ Mediceorum Planetarum ex causis Physicis deductæ, Florence, 1666, 4to; 6. Tractatus di vi Percussionis, Bologna, 1667, 4to; 7. Historia et Meteorologia incendii Æthnei, Reggio, 1669, 4to; 8. De Motionibus naturalibus a gravitate pendentibus, Bologna, 1670, 4to; and, 9. De Motu Animalium, opus posthumum, Rome, 1680, 1681, 4to.

BORGA, or Borgo, a seaport town in Russian Finland, in the laen of Nyland, 28 miles E.N.E. of Helsingfors. It is the seat of a bishop, contains 2138 inhabitants, and carries on trade in linen and in timber.

BORGHESE, a noble Sienese family, one of whom, being elected pope in 1605, assumed the name of Paulo V., after which the family became among the most powerful of the Roman nobility by their union with the Aldobrandini. The late prince in 1803 married Pauline, sister of the Emperor Napoleon, and widow of General Leclerc. This prince sold to his imperial brother-in-law the noble Borghese collection

of antiquities for 13,000,000 francs.

BORGIA, ALEXANDER. See ALEXANDER VI., Pope. Borgia, Casar, a man distinguished both for his talents and his crimes, was the illegitimate son of Rodriguez Lenzuoli, afterwards Pope Alexander VI., and of a Roman lady named Vanozza. At a time when the court of Rome was a school of falsehood and licentiousness; when the frequency of political iniquities had utterly effaced all shame; when treaties afforded no guarantee, and oaths inspired no confidence, Borgia may be said to have systematized crime, and to have carried utter disregard of all ties, human or divine, to an extent previously unknown. He had scarcely completed his studies when he obtained the archbishopric of Pampeluna; and in 1492 his father, who was now pope, made him archbishop of Valentia, and soon afterwards gave him a cardinal's hat. When Charles VIII. of France appeared before the walls of Rome, the pontiff was obliged to treat with him for the preservation of his capital from invasion. The king, who knew the character of the pope, demanded that his son Cæsar should accompany him as a hostage; but scarcely had the French army quitted Rome when Borgia contrived to escape from the camp. In 1497 Alexander bestowed the duchy of Benevento, together with the counties of Terracina and Pontecorvo, on his eldest son, who had already received from the king of Spain the duchy of Gandia. His brother's elevation excited Cæsar's jealousy; and when the duke was murdered about a week after his investiture, public opinion ascribed the deed to the cardinal. By his father's permission he now laid aside the purple, and devoted himself to the profession of arms. He was invested with the honours of his brother, and employed to carry to Louis XII. the papal bull of divorce which that monarch had long desired to obtain. In return for this favour Louis made Borgia Duke of Valentinois, and gave him a pension of 20,000 crowns, with a body-guard of 100 men. In 1499 Borgia married a daughter of King John of Navarre, and accompanied Louis XII. to Italy. He first undertook the conquest of Romagna, and caused the lawful possessors of the land to be treacherously murdered. He was appointed Duke of Romagna by his father in 1501; and he then wrested from Jacopo d'Apiano the principality of Piombino.

In his endeavours to make himself Duke of Bologna and Florence he was unsuccessful. For the conquest of Camerino he demanded soldiers and artillery from Guidobaldo of Montefeltro, Duke of Urbino. Camerino was taken by storm, and Julius of Barona the lord of the city, and his two sons, were strangled. This fate Borgia reserved for all whom he had pillaged. He scrupled not to attain his ends by the vilest treachery; and, by fallacious promises to spare life on the condition of surrender, he ensuared many in his toils. His violence at length aroused the powers of Italy to form a league against him; but he found means to dissolve this alliance by assembling a body of 3000 Swiss, and winning over their troops to his interest by advantageous offers. There now seemed no obstacle to his being proclaimed king of Romagna, of the March, and of Umbria, when Alexander VI. was suddenly cut off on the 17th August 1503, by partaking accidentally of the poison which he and Borgia had prepared for nine newly-elected cardinals, in order to seize upon their possessions. Rorgia likewise suffered severely from the same poison, but by the use of antidotes he recovered. Having obtained possession of his father's treasures, he assembled his troops in Rome, but found himself deserted by his officers, and surrounded on every side by enemies, one of the most bitter of whom was the new pope, Julius II. Borgia was arrested, and sent to Spain, where he was imprisoned by the Spanish court for two years, but at length made his escape through a window, and fled to his brother-in-law the king of Navarre. He accompanied that prince in his expedition against the Castilians, and fell fighting under the walls of Pampeluna, the

seat of his first diocese, March 12. 1507. Borgia may be regarded as an incarnation of whatever is most detestable and infamous among men. Many princes have shed more blood, many have inflicted more terrible vengeance, but the name of Cæsar Borgia is attainted with a surpassing infamy. Others have been hurried on by their passions; but with Borgia everything was the result of cool deliberation. His manners were as dissolute as those of his celebrated sister Lucrezia; yet, like that princess, he was a patron of letters, even produced specimens of poetic talents, and found panegyrists to celebrate his genius and taste. His situation imposed upon him the necessity of temperance, but in this is included everything that can be said in his favour, unless credit be given him for that seductive eloquence of which he was an undoubted master, and which he employed for the purpose of inveigling his intended victims into his toils. It is not without reason, therefore, that Machiavelli, in his Prince, has taken Cæsar Borgia as a model: he could not among men have chosen a hero better qualified to inspire unmitigated horror and detestation.

Borgia, Lucrezia. See Alexander VI., Pope.

BORGO, SAN DONINO, a walled town in the duchy of Parma, fourteen miles N.W. of the city of Parma. It has a fine cathedral and town-hall, and manufactures of silk and linen goods. Pop. 4200.

Borgo, San Sepolero, a town of Tuscany, province of Florence, on the Tiber, fifteen miles N.E. of Arezzo. It has a strong citadel, a cathedral, and numerous churches.

Pop. 4500.

BORGOGNONE, JACOPO CORTESE, so called from Burgundy, the place of his birth, was born at St Hippolite in 1621. He studied at Bologna, where Guido was in full reputation, and was befriended by that great artist, whose mode of colouring he studied with advantage. Cortese was chiefly remarkable for the life and spirit which he imparted to his battle pieces, which he always represented as scenes that he had witnessed. He resided long at Florence, where he acquired a handsome independence by his profession, which he assiduously practised till 1655, when some religious scruples induced him to become a Jesuit monk. Yet even then he continued to employ his pencil on his favourite

Borgoo Boring. subjects, until apoplexy put a period to his life in 1676. Many of his spirited pictures are in British collections, particularly four in the Earl of Derby's residence at Knowsley, two of which are battle pieces, another a Turkish march, and the fourth the overthrow of the host of Pharaoh in the Red Sea.

BORGOO, a large kingdom in the interior of Africa, bounded on the east by the Niger, on the south by Eyeo or Yarriba, on the west by Dahomey, and on the south by Gourma. It is about thirty days' journey in length, and eleven in breadth. It has generally a level surface, though crossed by a considerable range of mountains. The soil is mostly fertile, and tolerably cultivated, producing in abundance corn, yams, plantains, and limes. The cattle are not numerous, but there is a copious supply of all the species of game that prevail in Africa. A considerable inland trade between Houssa and the coast passes through this territory. When Clapperton entered it from Eyeo, he was warned to be on his guard, as the people were the greatest robbers and plunderers in all Africa, and he would run the risk of being stripped of everything he possessed. He found this bad report altogether unjust, and declares, on quitting it, that the people had always behaved honestly, and never robbed him of the slightest article. They were cheerful, obliging, good-humoured, and communicative. The acts of robbery, too frequent in that country, were perpetrated by slaves of the chiefs and governors, who were natives, not of Borgoo, but of Houssa. These persons, in virtue of the service in which they are employed, think themselves entitled to pilfer whatever comes within their reach. The kingdom of Borgoo is divided into the four states of Boussa, Wawa, Kiama, and Niki, the three last of which were visited by Clapperton in his journey through interior Africa. Boussa, remarkable as the scene of the disastrous fate of Mungo Park, holds the first rank, and all the others are considered as in a degree of dependence upon it.

Borgoo, another country of the same name in Central Africa, of which little is known, and that little by hearsay, as it has never been explored by Europeans. It lies to the N.E. of Lake Tsad, about midway on the road to Egypt. It forms a connecting link between the basin of that lake and that of the Nile. It is mountainous; the atmosphere is said to be very pure; its numerous valleys are irrigated by perennial rivers, and are extremely fertile in date trees. It is inhabited by the Uelad Soliman, a well-known powerful Arab tribe. In the latter end of 1851 Dr Barth and Dr Overweg, then at Kuka, determined to visit and explore this interesting region, and set out with a large army despatched by the sheikh of Bornu for the invasion of the countries eastward from Lake Tsad. Unfortunately, however, this army was soon met by the enemy, defeated, and put to flight so suddenly, that Barth and Overweg saved their lives and instruments only by a quick retreat. They consequently did not succeed in reaching Borgoo, which is allied to Bornu.

BORING, generally speaking, is the art of perforating a solid body. In the present article it is proposed to give some account of the boring of Cannon, of Cylinders, of Muskets, of Portland Stone, of Rocks, and of Wooden Pipes.

1. Boring of Cannon is performed by placing the cannon on an axis, which is turned by a very strong power, whilst a steel cutter, in form of a drill, is pressed against the metal, and excavates the cylindrical cavity which is required. Boring may be considered as a branch of the art of turning, which, in general, is the formation of cones, cylinders, and other figures that have an axis, by making a straight line or curve revolve round the axis on which the material is fixed, or by making the material revolve whilst the generating line remains at rest. In turning bodies of no great degree of hardness, and where it is required to take

off only a small portion of the surface at once, a small power is sufficient to put the turning machine in motion; and the longer the edge of the cutter which is applied to the metal is, and the harder the metal, the greater force is required to turn the machine.

Cannon, at first, were frequently made of bars of malleable iron, placed longitudinally, and these bars covered with iron hoops, the whole welded or brazed together. Ordnance of this construction was not sufficiently strong to resist the explosion of the powder, and did not admit of the cylindrical cavity being formed with much accuracy. Its use was, therefore, gradually laid aside, and guns of castmetal were employed. And before the casting of cannon became general, guns of castmetal were reserved for the most important situations; thus the ships of the admiral and vice-admiral alone had cast-metal cannon, the other ships of war being armed with wrought-iron guns only.

Copper, without mixture, has been employed to cast guns, as appears from two large cannon made in the time of Henry VIII., and bearing his name, in the armoury of the Tower of London. But the only two materials now used for cannon are bronze, which is a mixture of copper and tin, and cast-iron. In modern times the use of cast-iron cannon has become more general, as that metal has the advantage of not being softened by the heat of the inflammation of the powder; whereas brass guns, when fired many times in rapid succession, become heated so nearly to the melting temperature of the metal, that the muzzle of the gun droops, and the touch-hole is much enlarged.

The first cannon made of cast-metal were cast hollow, with a cavity as nearly cylindrical as could be executed by casting. The surface of this cavity was then smoothed on a boring machine by steel cutters set in a copper head, and disposed so as to describe a cylinder terminated by a half spheroid. These cutters (in French alezoirs, and the operation alezer) are represented in the French Encyclopedic—planches, Fonte. This method of making guns has long been laid aside on account of the holes and inequalities in the cavity thus formed, and the difficulty of casting the cavity so as that its axis shall coincide with the axis of the piece. Cannon are now always cast solid, and the cylindrical cavity is formed by boring in this solid mass.

The power employed for boring cannon ought to be in proportion to the hardness of the metal of which they are composed, and to the size of the pieces. For the boring of guns of brass, as it is called, that is, a metal composed of ten parts of copper, one of tin, and two of brass, or of these metals in other proportions, a metal softer and more easily bored than cast-iron, horses are sometimes employed as a moving power; but the strong moving powers of water or steam must be had recourse to for boring large guns of castiron, which is the material used for making the largest guns now in use, and is also the hardest substance used in their manufacture. Indeed, some kinds of cast-iron are too hard to admit the action of the borer; and for the making of guns it is necessary to melt pig-iron of different qualities together in order to have a metal that shall possess no more than the required degree of hardness.

The quality of pig-iron is known by the appearance of its surface, but more decisively by the appearance which its fracture presents. To obtain this fracture, a man takes one end of a pig in each hand, and lifting it as high above his head as he can, throws it with force, so that the middle of the pig shall fall across another pig placed on the ground. In this way the pig thrown down is broken. Soft or gray pig-iron, which is the most valuable, breaks with difficulty, and the surface of its fracture is of a gray colour, composed of pretty large crystalline grains. Hard or white pig-iron breaks easily; the surface of the fracture is white, and not sensibly granulated, the grains that compose it being small. The pig-iron here

Cannon.

iron smelted with charcoal of wood has a fracture of a different appearance, sometimes lamellar, like the fracture of metallic bismuth. Formerly guns used to be cast from the blast furnace; that is to say, immediately from the ironstone. This was attended with uncertainty in respect to the nature of the metal; for the nature of the metal given by the blast-furnace varies frequently and suddenly, from causes either unknown, or not under the command of the iron-master. For this reason guns are no longer cast from the blast-furnace, but pig-iron already formed is taken, of such qualities and in such proportions as to form a metal neither too soft nor too brittle and hard for guns. The different kinds of pig-iron thus selected are melted together in a furnace, called in iron manufactories an airfurnace, and by some writers a reverberatory furnace, by the flame of pit-coal; the flame being impelled by a strong current of air produced by the rarefaction of the air in a chimney of thirty or forty feet in height. The column of the atmosphere of which the air in the chimney makes a part being lighter than the unrarefied columns of the atmosphere next it, its equilibrium with these columns is destroyed. The neighbouring columns, therefore, rush through the grate of the furnace, which is the only aperture by which they can attain the bottom of the rarefied column; and they carry the flame of the coal against the pig-iron, which is thereby brought into fusion. From the iron thus fused only one large gun is cast at a time, the furnace not being capable of melting more metal than is requisite for that purpose.

The gun is cast with two appendages, which are to come off before it is finished and ready for use. The one is a square piece beyond the cascabel, for fixing the gun so as to revolve with the axis of the boring-mill; and the other

The head in cast-iron cannon is a mass of cast-iron two or three feet long, and somewhat bell-shaped. It is a prolongation of the mass of metal beyond the muzzle ring, and, in the position in which the gun is cast, the head is the top of the whole mass, the square beyond the cascabel being the lowest part. After the metal has cooled, the upper surface of the head is cavernous, as is the case with the surface that is uppermost during the casting and cooling of any large body of cast-iron. The sides of the cavities in the head are frequently formed of cast-iron crystallized in a fern-leaf form. The intention of the head is to prevent these cavities, which are formed most abundantly at the upper surface of the cooling cast-iron, from forming in the gun itself. But, notwithstanding the precaution of casting the gun with a large head, and of mixing proper kinds of cast-iron in the air-furnace, it frequently happens that small cavities occur in the guns.

Vertical boring.

The gun with its head being cast and allowed to cool, it is conveyed to the boring-mill, where the head is to be taken off, the cylindrical cavity or bore is to be formed, and the outside of the gun is to be turned. Formerly the boring of guns was done in an upright position; the gun being placed above the boring-bar, was fixed in a frame sliding vertically in grooves. This frame was suspended on each side by a block and tackle, and the end of each of the two ropes was wound round a windlass. By turning these windlasses the gun might be raised or lowered, and by this means might be allowed either to press with its whole weight on the boring-bit, or with any part of its whole weight. A figure of this apparatus may be seen in the French Encyclopédie-planches, Fonte. Another vertical apparatus for boring cannon is represented in Rinman, Bergwerks Lexicon, Stockholm, 1789, tab. iv.

The practice which has long been followed in this coun-Horizontal try is to place the gun horizontally in the boring-mill; and boring.

Boring. spoken of is that smelted by the coke of pit-coal. Pig- it is fixed on the axis of the mill by means of the square Boring. piece at the cascabel.

> In a boring-mill constructed by Smeaton, one gun is placed on the horizontal axis of the water-wheel itself, and, consequently, revolves with the same velocity. On this same axis is a toothed wheel with seventy-eight teeth, which works two wheels, one placed on each side of it, and each having twenty-nine teeth. On the axis of each of these a gun is placed; their power is $\frac{1}{27}$ the of the power of the centre wheel. (See Smeaton's Reports, vol. i.) On the axis where the power is least, smaller sized guns are bored; on the axis of the greatest power the large guns are bored. A crane, movable on a vertical axis, with a sweep that extends over all the carriages, with a tackle hanging from its beam, and wrought by a windlass, serves to place the gun on the carriage where it is to be bored, or to remove it from one carriage to another if required; and afterwards, when the gun is bored and turned, the crane serves to remove the gun from the boring-mill.

> The gun, when placed on the machine, has the square at the cascabel fixed in a square iron box (G, Plate CIX. fig. 5) on the axis. This box has a screw passing through each of its sides, and by the operation of these screws the square of the gun is adjusted, centred, and fixed; the chace of the gun is also fixed in a collar N, in which it is to revolve. (The collar in the figure is

represented too near the muzzle ring.)

The axis on which each gun is fixed may be set in gear, or put in connection with the revolving axis of the machine, so as to move round with it; or taken out of gear so as to remain at rest, although the other parts of the machine continue in movement. There are various methods of doing this. One is given by Smeaton in the work above cited. After the gun is fixed on the axis, and before beginning the operation of boring, the head, which has been described above, is cut off near the muzzle ring. For this purpose the gun is set in gear so as to revolve on its axis with the moving power; and a bar of steel, in shape and size like the coulter of a plough, is applied at right angles to the axis of the gun. The narrow side of this bar is sharpened to a cutting edge, so that it has the form of one tooth of a very large saw; and this cutting edge is opposed to the direction of the revolving motion of the gun, and held strongly on to the gun by a screw pressing on the bar; the cutter takes off an angular portion at right angles to the axis, till the cylindrical part connecting the head with the gun is so much diminished, that the head is made to fall off by the blow of a hammer applied on it. In brass guns, cast with a core, the head was sawed off by hand with a blade of steel, whose edge was toothed as a saw, while the sides were toothed as files. See the French Encyclopédie—planches, Fonte.

A great degree of heat is generated by the violent friction of the steel-cutter on the cast-iron during the operation of cutting off the heads of guns. The quantity of this heat has been estimated by Rumford in one of his

Essays on Heat.

After the head is taken off, the workmen proceed to bore the gun. This is done by exposing the revolving gun to the action of a steel-cutter, fixed on the end of a bar, which bar is placed on a carriage, and impelled continually towards the gun. The operation of boring is done on the same axis on which the head was cut off, if the power be sufficient; if not, the gun is removed, by means of the crane, to an axis, where it is made to revolve by a stronger power.

The boring-bar is fixed on a carriage sliding in iron grooves, which are truest when made triangular. The carriage, which, in the apparatus represented at fig. 5, consists merely of the bar on which the rack is, is pressed

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BB; and this pinion works into a rack R. The axis of the pinion has mortised holes in it, through which one end of a lever L is passed; and the other end of this lever is loaded with a weight W, which causes the pinion to propel the carriage and boring-bar towards the gun. In many boring-machines there are two pinions on the same axis, acting on two racks; in others, the carriage is propelled by two upright levers, on the end of one of which acts a weight, hanging from a rope, that passes over a pulley; the lower end of the upper lever acts on the upper end of the lower, whilst the lower extremity of the lower lever presses forward the carriage. This method, which is free from any inequalities that may arise from the teeth of the rack, is figured by Smeaton in his Reports, vol. i. p. 396. Another method of propelling the carriage of the boringbar, is by a screw acting on the end of the carriage. See Meyer in the Transactions of the Academy of Stockholm, 1782, tab. ix.

The boring-bar is a very strong piece of wrought iron, of less diameter than the intended calibre of the piece, in order that the boring dust or shavings detached by the cutter may be got out. The boring bar is increased in diameter near the end, for some inches, see fig. 6, B; in this part there is a superficial groove for receiving the sides of the steel-cutter or bit, which is to be firmly fixed in the bar. The bit T, fig. 6, is made from a rectangular piece of a steel bar, in which the two upper angles are cut off obliquely, so as to form two cutting edges like an obtuse-angled drill; the side of the rectangle, opposite to the point of the drill, is then hollowed out in the form of a pigeon hole; and this hollow fits into and embraces the solid part of the boring-bar, whilst the sides of the pigeon hole fit into the grooves of the bar. The point of this obtuseangled bit is pressed against the revolving metal of the gun, by the force which propels the boring-bar; and the edges coming in contact with the revolving metal, a conical cavity is produced; so that, by taking off successively a multitude of similar shells or shavings, the cylindrical bore, with a conical termination, is formed. The diameter of the pointed bit first used must be less than the intended calibre of the piece, as the boring is to be repeated again at least once, in order to make the internal cylindrical surface as smooth as possible, by taking off any inequalities that have been left by the first cutter. In finishing the bore, a cross bit may be employed. It is a rectangular piece of steel, ground to a cutting edge at each end, and put through a hole in the boring-bar, in which it is fixed. The edges of this cutter, in revolving, describe a cylindrical surface. After the cylindrical surface of the bore is made sufficiently true, and of the required calibre, a bit without a point, and rounded off to the desired curve, is used to form the bottom of the

Some recommend that the boring-bit for cast-iron should have its cutting edges brought to an acute angle, by being filed hollow; but in this case the two edges cannot be brought into one point; for the obtuse-angled edge formed by the thickness of the metal of the bit joins the two cutting edges crossways, and forces itself forwards by being near the centre, requiring, however, a considerable pressure. These hollow-edged bits are not so well adapted to continuance of grinding as the plain ones, but they make amends by their much less frequently wanting sharpening. It does not appear, however, that these hollowedged bits have been found advantageous in gun-boring.

The howitzer appears to have had its origin in Germany. This piece of ordnance, the mortar, and the carronade, in all of which the diameter of the chamber for

Boring forward by a pinion P, whose gudgeons are on a fixed frame the bore, are first bored all through, nearly to the intend- Boring. ed calibre of the chamber, and then that part of the bore that requires it is enlarged.

The cutters in gun-boring become magnetic, in consequence of being continually rubbed in the same direction, so that the boring dust is seen adhering and hanging from their edges when they are withdrawn from the gun.

It is required that the bore shall be a cylindrical cavity whose axis coincides with the axis of the gun: for this purpose, care must be taken to place the axis of the boring-bar, and that of the gun, both in one horizontal line, and it is requisite that these two lines continue in this position during the whole operation of boring. The centring of the boring-bar for this purpose requires to be done by an experienced workman, and an accurately-constructed boring-machine is necessary for the continuance of the right position.

sculptor of Rome.

Whilst on the axis of the mill, the gun has a smooth outer surface given it by turning tools, which are applied in the way usual in turning metals; a wooden gauge, or cut-out profile, of the gun, with its intended mouldings, being applied to know when the turning has been continued to a proper depth. When this is done the gun is taken out of the boring-mill; the square at the cascabel is cut off by the chisel; and the trunions, and other parts which are not susceptible of being turned, are dressed by The cyphers and arms which had been cast the chisel. on the gun are finished by the chisel.

A cannon is said to constitute the ultima ratio regum, the last argument that governments have recourse to; and even this severe kind of argument has sometimes been embellished. Amongst ornamented cannon, the brass threepounder in the Tower, brought from Malta, is a masterpiece; it is covered with carving in a good taste by a

The touch-hole is drilled by stock and bit, or by drill and bow; the drill being propelled by a lever placed on a carriage, movable on wheels. A figure of this apparatus is given in the Encyclopédie—planches, Fonte. Another apparatus for this purpose is figured in Rinman, Bergwerks Lexicon, table xiv. fig. 9, 10. See also Monge, Description de l'Art de Fabriquer les Canons, in 4to, Paris, 1794. This work was published by order of the revolutionary government, and distributed to the iron-masters and founders in different parts of France, for their instruction. It contains, amongst others, figures and descriptions of two kinds of vertical boring machines, of three kinds of horizontal boring machines, of a machine for turning the trunions, of two different machines for boring the touch-hole, of a machine for putting copper boshes in brass guns, and of various instruments for examining and proving guns.

Before the gun is sent off, it is examined and proved in various ways. And first, to ascertain whether the bore is free from holes, an instrument is employed, consisting of several elastic steel prongs disposed in a circle, and with their sharp points turned outwards. This being fixed on a pole, is introduced into the bore of the gun, and drawn to and fro; the points of the prongs press against the sides of the bore, and the presence of a hole is known by one of the prongs getting into the hole, and preventing the instrument from being drawn out directly, unless by the use of a ring that is pushed over the prongs to unbend them.

There is another instrument, composed of a board twice as long as the bore of the piece. Along the middle of the board is a groove proceeding in a straight line. In this groove a button is movable, and on the button, as a centre, are fixed two radii or arms; the two ends of these arms within the gun describe a line on the inside of the bore when the powder is smaller than the diameter of the rest of the button is pushed inwards, whilst the extremities of the

Boring. arms on the outside describe two similar lines on the part of the board that is situate without the bore. In this way the outline of a longitudinal section of the bore is described, and its sinuosities or deviation from the axis are rendered sensible. This instrument is seldom used; it requires to be made by a workman skilled in the construction of mathematical instruments, or in watchmaking.

> A lighted wax-candle is introduced into the gun for the purpose of seeing any defects there may be in the bore, or the light of the sun is reflected into the bore by a mirror. The strength of the gun is proved by firing it with a large charge of powder; and by forcing water into the bore by a powerful forcing pump, the touch-hole being stopped, and also the mouth of the piece, so that water forced in by the mouth cannot return that way.

Cylinders.

2. Boring of Cylinders for steam-engines, and for blowing machines, and the boring of the working barrels of large pumps, and other hollow cylinders in which pistons are to work, is performed by making the steel-cutters describe a cylindrical surface on the inside of the cylinder, whilst the cylinder remains fixed. The first steamengine cylinders in this country were of brass, or of a mixture of copper and tin. This was the case with the cylinder of the steam-engine erected in the early part of the eighteenth century for lifting water from the colliery of Elphinston in Stirlingshire. But since that period the construction of steam-engines, and the manufacture of cast-iron, have been greatly improved; the uses of both have been much extended; and cast-iron has now for a long time been the only material employed in making cylinders for steam-engines, and other large cylinders in

which pistons are to move.

In the boring of cylinders the steel-cutters are fixed in a cutter-head, which revolves with the boring-bar at the same time that it is impelled along the interior surface of the cylinder by a rack, with a pinion moved by a lever and weight as already described. The axis or boring-bar employed for cylinders is a hollow tube of cast-iron, and has a groove passing through it; the length of this groove being proportioned to the length of the cylinder to be bored. The cutter-head consists of two cast-iron rings, the first of which is accurately fitted on the boring-bar, which is turned truly cylindrical, so that this ring may slide along the boring-bar; the second ring is fixed round the first by wedges, its diameter being proportioned to the diameter of the cylinder to be bored; and on its circumference are eight notches to receive the steel-cutters, which are fixed in by wedges. The first ring is fixed on the boring-bar so as to make the whole cutter-head move round with the boring-bar, by means of two small iron bars, which go through notches in the first ring, and pass through the groove of the boring-bar. These small bars have each a round hole in the part which passes through the geometrical axis of the boring-bar; through these round holes there passes a bolt, which forms the end of the rack; a key is put through the end of the bolt, which prevents the rack from being drawn back by the lever and weight; and by this means the rack, impelled by the lever and weight, pushes forward the cutter-head, which is at the same time revolving with the boring-bar; while the connection of the rack and cutter-head being round, and in the axis of motion, the rack is thereby free from the circular motion of the This mode of constructing the boring-bar was invented in the works of Mr Wilkinson, at the time when accurately-bored cylinders came to be required in consequence of Mr Watt's improvements in the steamengine. In the machines about to be mentioned the cutters are made to advance by a train of wheels deriving their motion from the power that turns the boring-bar.

An apparatus of great merit was contrived and describ- Redruth, for new methods of constructing steam-engines

ed in 1802 by Mr Billingsley, engineer of the Bowling Boring. iron-works, near Bradford. (See Repertory of Arts, second series, vol. ii. p. 322.) According to his method the cy-Billings-linder is placed with its axis perpendicular to the horizon. ley's ma-The object of this is, first, that the boring-dust may fall out, and not remain on one side of the cylinder, wearing the cutters; so that in this way the cylinder may be bored through without changing the cutters, by which means a more regular bore is obtained. Secondly, That the cylinder may not deviate from its cylindrical form by its own weight, a deviation which is found to take place in large and slender cylinders when laid on their side; the vertical diameter being then less than the horizontal diameter. A similar loss of shape may happen to cylinders that are improperly wedged and strapped down for the purpose of being bored. In this method the cylinder is fixed with screws by the flanges, where it is most capable of resistance, and the screws are disposed so as to press the cylinder equally all round. Thirdly, That the operation may be sooner completed, which is effected in consequence of less time being employed to fix the cylinder in this method. In the usual mode of propelling the cutters described above, the attendance of a man is necessary to change the position of the bar on the axis of the pinion, and to raise the weight. This attendance is dispensed with in the machine under consideration, the mechanism for propelling the cutters being as follows: A leather strap passing over the boring-bar communicates the revolving motion of the boring-bar to a wheel, which communicates a slow motion by a train of wheels and pinions to an axis, bearing two pinions which work into two racks; and these racks push the boring-head and cutters slowly forward on the boring-bar, at the same time that the boring-head is revolving with the boring-bar. The velocity with which it is required that the cutters shall advance varies as the diameter of the cylinder varies, the moving power remaining the same. And by altering the train of wheelwork, the cutters may be made to advance with any velocity required.

Figs. 1, 2, 3, and 4, Plate CIX., are different views Murray's of the machine for boring cylinders, invented by Mr Murray of Leeds. Fig. 1 is an elevation, and fig. 2 a plan, of the machine. W, figs. 1 and 2, is the spur wheel, deriving its motion from water or steam, and communicating a revolving motion to the boring-bar. The toothed wheel A, fig. 1, moves round with the boring-bar B on which it is fixed; it gives motion through the wheels D and E, and to the screw S, whose threads act on the two racks, which racks are fixed to the cutter-head H, and revolve with it. The velocity with which the cutter-head is impelled along the cylinder depends upon the number of threads of the screw in a given length, and on the proportions of the wheels A, C, D, and E, to each other. By varying the velocity of the screw, the cutter-head may be made to move in either direction up or down the cylinder. F is a pinion whose axis ends in a square, which may be wrought by a key, so as to bring the cutter-head out of the cylinder, or push it home by the hand when that is required. The cylinder is fixed in its bed by screws passing through two iron rings, as represented at fig. 4; and in this way the cylinder is equally pressed in the different parts of its circumference. Fig. 3 is a transverse elevation of the collar in which the end of the bar at A, fig. 1, turns; X is the gudgeon in which the spindle X, fig. 1, turns. In fig. 3 are also seen the two apertures through which the two racks pass. By this machine also the flanges are turned truly plane, so that the lid of the cylinder may fit on exactly.

The patent granted in 1799 to Mr Murdoch, engineer,

patent.

relative to boring. He employs an endless screw, which Murdoch's is turned by the moving power, and works into a toothed wheel, whose axis carries the cutter-head; and this method, he says, produces a more smooth and steady motion than the usual mode of fixing the boring-bar immediately on the axis turned by the moving power.

Another article in Mr Murdoch's patent that relates to boring, is his method of forming the cylinder and steamcase. He casts them of one solid piece, and then bores a cylindrical interstice, by means of a boring-tool, made or a hollow cylinder of iron, with steel-cutters fixed to its

edge, and acting like a trepan.

The chambers of brass pumps, whose diameter does not exceed a few inches, are fixed within iron rings, by means of screws, in the manner described above when speaking of Mr Murray's apparatus. The rings are made accurately cylindrical by turning, as is also the boring-bar. The boring-bar has four cross arms on its outer extremity, to one of which a handle is fixed, whereby a workman makes the boring-bar revolve. The cutter-head is made

to advance along the boring-bar by a screw.

3. Boring the Barrels of Muskets and other SMALL ARMS. Rectangular pieces of iron are forged of a proper length and breadth; these are heated in the fire, and the two long edges, which had been previously thinned off, are welded together on a mandril. The barrel thus formed is fixed by a screw on a carriage that moves in iron grooves; this carriage is propelled towards the boringbar by a rope which passes over pullies, and has a weight hanging from its end. The boring-bar is turned by the power of the same mill that turns the grinding-stones for polishing the outside of the barrels. (See Encyclopédieplanches, Arquebusier; and Rozier, Introduction aux Observations sur la Physique, tom. i. p. 157.) Water is thrown on the barrels whilst boring from a trough placed underneath. After the barrel is bored, the interior surface of the bore is polished by the action of the boringbar. The barrel is tried during the operation, by an iron gauge of an inch and a half in length, and of a diameter equal to the intended diameter of the musket. When the barrel is bored, it is held to the light and looked through, and if it contains any flaw, the place of that flaw is marked on the outside with chalk, and the barrel is put on the mandril again, and the defective place heated and hammered; the workman also examines with a gauge whether the barrel is crooked. When the bore has no flaws, the barrel then undergoes the operation of the grinding-mill, to the effect of polishing its exterior surface.

Rifled barrels are put on a bench twelve feet long. The boring-bar is guided by a matrix or female-screw, whose spiral curve is similar to the spiral of the rifles intended to be made; the boring-bar being fixed to a male-screw, which passes through the female-screw, and fits it exactly. The female-screw is fixed to the bench, and has four threads and as many furrows; and these threads, in general, return to the point of the circumference from which they set out, or make a revolution in the length of two feet. The male-screw, which fits into the female-screw, has at one end an iron bar attached to it, by which it is put in motion; at the other extremity is fixed the boring-bar, which passes through the barrel to be rifled; and the boring-bar has a cutter fixed in it, which forms a spiral furrow in the barrel when the screw is turned by the handle. The number of spiral threads in rifle-barrels is from three to twelve. Sometimes the threads and furrows of the riflebarrel are required to be in straight lines; in which case a straight-lined matrix is used. In order that the threads may be placed at an equal number of degrees of the circumference from each other, the bench is furnished with

Boring. (See Repertory of Arts, vol. xiii.), contains some articles a brass plate, divided in the same way as the plate of the Boring. machine for cutting the teeth of clock-wheels.

4. Boring of Portland Stone, so as to form pipes. Portland That kind of calcareous stone called by geologists oolite, stone. which is quarried for building at Portland, Bath, in the neighbourhood of the city of Paris, and other places, admits of being cut by means of an iron blade, acting as a saw, with sand and water. The more compact limestones and marbles are also cut in this way, but not so easily. The other kinds of stone that can be squared for building, such as sandstone and granite, do not yield to the saw, but are formed into the desired shape by the chisel and hammer. A modification of this mode of working Portland stone consists in forming it into pipes. The method of Sir George Wright, proposed in 1805, is as follows: A hole is drilled through the block of stone, in which a long iron bolt is inserted for the saw to work round as a centre; this bolt forms the axis of the cylinder which is to be taken out, and projects considerably beyond the block at both ends. Another hole is drilled in the intended circumference; and into this the blade of the saw is introduced. The frame of the saw is so disposed, that when it is wrought to and fro, the blade is guided, by means of the centre bolt, so as to describe the intended cylindrical circumference. In this way a solid cylindrical core of stone is detached, and a cylindrical cavity or pipe left in the block. Or the saw may be made to describe a circle without drilling a hole in the centre, by drilling a hole in the circumference, and fixing on the surface of the stone two metallic concentric rings, so that the hole shall be included in the interstice between the rings. The saw is then introduced into the hole, and being worked, it cuts in the circular path formed by the interstice of the rings. See Repertory of Arts, second series, vol. viii.

Mr Murdoch's method, for which he obtained a patent in 1810, is preferable in practice to the above-mentioned method. He employs a cylindrical saw to form the pipe. A plug of wood is inserted in the centre of the intended pipe; this plug receives the lower end of a vertical spindle, longer than the intended pipe; and this spindle is square, with sockets sliding on it. On the upper part of the spindle is a pulley or toothed-wheel, by which the spindle is made to revolve. Near the lower end of the spindle is a wheel, having a circumference like a hoop, three inches broad. The diameter of this wheel is somewhat less than that of the pipe to be bored. It regulates the motion, and fits in the inside of a tube of metal attached to the spindle. The diameter of the tube is nearly equal to that of the intended pipe; but its length is greater by two feet. On the lower edge of the tube is a rim of metal, so much thicker than the tube that the groove cut in the stone by the rim may admit the tube to move freely in it. This rim has an edge like that of a stone-cutter's saw, and in fact performs the office of a saw. The tube is caused to make a reciprocating circular motion round the spindle. There is a cistern placed above the tube, for the purpose of conveying a mixture of sand and water into the cylindrical groove formed in the stone, whilst the machine is working.

Stone pipes, made in the above described way, have been tried for conveying water in London. They were joined by means of Parker's cement, which consists of clay ironstone, burnt, ground to a fine powder, and mixed with mortar. This was the best material that could be got for forming the joints; but these joints cracked and allowed the water to escape, in consequence of the motion of the carriages on the streets under which the pipes were laid, or of the requisite beating down of the superincumbent

5. Boring of Rocks, for the purpose of blasting, has Rocks. already been treated of under Blasting, and we shall only

Muskets.

Borlase.

Boring. add here a description of Hunter's Stone-boring Machine. This implement consists of two parallel bars of steel, bound together at the ends, supporting a traversing carriage, through the centre of which passes a spiral auger attached to a screwed bar; this bar fits into a female screw-clamp above the carriage, and on the upper end is a winch with four cross handles. When the instrument is to be used, it is fixed down to the stone to be pierced by a moveable screw-cramp at each end, and the auger being made to revolve by means of the winch, scoops out at each revolution as great a depth of stone as is equal to the distance which the screw descends. The chips ascend through the spiral channel of the auger, and are thrown off at the top. The peculiar shape of the point of the auger prevents its being rapidly abraded, as it operates by chipping the stone and not by grinding it away. This implement has been used very successfully at various works. At Arbroath harbour, in particular, upwards of 30,000 linear feet were bored for receiving the oaken trenails which were used for strengthening the masonry against the action of the waves. The Arbroath stone is from a bed which underlies the old red sandstone. It is fissile in one plane like slates, and it is this property which fits it for street pavements. It consists of fine grit and schistose debris. (Vide Minutes of Institution of Civil Engineers, vol. ii., p. 146.)

A Mr Talbot of America is reported to have recently invented a boring machine of immense power, which was applied with success to tunnelling through solid rock. have had no means of ascertaining the accuracy of this report, and any notice of it must be deferred for the

present.

Wooden

pipes.

6. Boring of Wooden Pipes is done by means of a long auger, beginning with one of small diameter, and proceeding to employ successively spoon-formed augers of larger diameter. Elm is the wood generally preferred for pipes to convey water. When a tree is to be bored, it is fixed on a carriage, with a rack on the under part. This rack fits into a pinion, the axis of which passes through gudgeons on a fixed frame. On the axis of the pinion is a ratchet wheel, moved by two catches, which derive their motion from the wind or water power that turns the auger; and the pinion is moved in a direction that brings the tree towards the auger. (See a figure in Belidor, Architecture Hydraulique, i. 1, 341.) This apparatus is the same as the one employed in sawmills. Wooden pipes are frequently bored by an auger having at its outer end a wooden drift or handle, which is put in motion by the workman. The trees are placed on tressels, and there are also tressels of a convenient height that support the auger; there is also a lathe to turn one end of the tree conical, so as to fit into a conical cavity in the end of the adjoining tree, and thus form a water-tight joint. The end of the tree which receives the adjoining pipe within it has a surface at right angles to the axis of the pipe. Into this surface is driven an iron hoop, the diameter of which is some inches greater than the diameter of the aperture of the pipe. This precaution prevents the tree from splitting when the conical end of the next tree is driven home. When the tree is crooked, a bore is driven in from each end, and the two bores meet, forming an angle. An auger whose stalk is formed spirally for some way up is figured in Bailey's Machines of the Society of Arts. The object of this is that the chips may be delivered without taking the auger out of the hole.

A patent was granted in 1796 to Mr Howell, coalmaster,. of Oswestry, for boring wooden pipes by a hollow cylinder made of thin plates of iron, about an inch less in diameter than the hole to be bored. To one end of this cylinder is fixed a flange about a quarter of an inch in breadth, one part of which is divided, so that, being constructed of steel, it forms a cutter. The object of this method is to bore out a solid cylinder of wood, capable of being converted into a

smaller pipe, or of being applied to some other use in car- Borissov pentry. (Repertory of Arts, vol. ix.) This kind of borer is like the trepan, which is a hollow cylinder of steel, sawtoothed on the edge, and, when made to revolve rapidly on its axis in the hand of the surgeon, saws or bores out circular pieces of the flat bones of the head. (w. A. C.)

BORISSOV, a town of European Russia, government, and 40 miles N.E. of the town, of Minsk, on the left bank of the Berezina. It is only memorable for the disastrous passage of the Berezina effected in the neighbourhood by the remains of the French army on its retreat from Moscow.

BORJA, a town of Spain, province of Zaragoza, the

chief place of a partido of the same name, on the confines of Navarre and Castile. Pop. 4239, chiefly engaged in agriculture. BORKUM, an island of Hanover, on the coast of East Friesland, situated between the mouths of the East and West Ems. It is about twelve miles in circumference, and

so low in the middle that it is separated into two parts at high water. A considerable proportion of the inhabitants consists of seafaring people, and the remainder draw their support from the rearing of cattle, or in picking up the fragments of vessels wrecked on their coast. It has a governor, a Calvinistic minister, and a schoolmaster. The spire of the church, which serves as a lighthouse, is in Lat.

53. 35. N. Long. 6. 41. E. Pop. about 500.

BORLACE, DR EDMOND, an eminent physician and English writer, was the son of Sir John Borlace, who was master of the ordnance, and one of the lords justices of Ireland in 1643. He studied in Dublin College, and afterwards at Leyden, where he took the degree of doctor of physic. He practised with success at Chester, and was incorporated doctor of the faculty in the university of Oxford. Among other works he published the following:—The Reduction of Ireland to the crown of England, London, 1675, 8vo; The History of the Irish Rebellion, London, 1680, 8vo; Brief Reflections on the Earl of Castlehaven's Memoirs, London, 1682, folio. He died about 1682.

BORLASE, WILLIAM, a learned antiquary and naturalist, born at Pendeen in Cornwall, of an ancient family, Feb. 2. 1696. He was educated at Exeter College, Oxford, where he took his degree as master of arts. In 1720 he was ordained as priest; instituted in 1722 to the rectory of Ludgvan in Cornwall; and in 1732 was presented to the vicarage of St Just, his native parish. In the parish of Ludgvan are rich copper works, abounding with mineral and metallic fossils, of which he made a collection, and thus was led to study at large the natural history of the county. In 1750 he was admitted a fellow of the Royal Society; and in 1753 he published in folio, at Oxford, his Antiquities of Cornwall, a second edition of which was published at London, 1769, with the title of "Antiquities, Historical and Monumental, of the County of Cornwall; consisting of several essays on the ancient inhabitants, Druid superstition, customs, and remains of the most remote antiquity in Britain and the British isles, exemplified and proved by monuments now extant in Cornwall and the Scilly Islands; with a vocabulary of the Cornu-British language." next publication was Observations on the ancient and present state of the islands of Seilly, and their importance to the trade of Great Britain, Oxford, 1756, 4to. In 1758 appeared his Natural History of Cornwall, Oxford, folio. He presented to the Ashmolean Museum a variety of fossils and antiquities which he had described in his works; for which, and similar benefactions, he received the thanks of the university, and the degree of LL.D. He died Aug. 31. 1772, at the age of seventy-seven, leaving two sons. Besides his other literary connections, he had a particular correspondence with Pope; and there is still extant a large collection of the poet's letters to Dr Borlase. Besides the

Born.

Bormio Born.

to the Philosophical Transactions.

BORMIO, a town of the Austrian kingdom of Lombardy, in the province of Valteline, 29 miles N.E. of Sondrio. It is situated at the foot of a lofty hill of the same name, on the left bank of the Adda, is well built, and contains about 2000 inhabitants. Long. 9. 51. E. Lat. 46. 28. N. In the vicinity are the celebrated Bagni di Bormio,

BORN, IGNATIUS, BARON VON, counsellor in the aulic chamber of the mint and mines at Vienna, an eminent mineralogist and metallurgist, was born of a noble family, at Karlsburg in Transylvania, in 1742. He was educated in a Jesuit college at Vienna, and afterwards entered into that order, which, however, after sixteen months, he quitted. He then studied law at Prague, and afterwards travelled into Germany, Holland, and France. On his return to Prague

he engaged in the study of mineralogy.

The mines in the dominions of the house of Austria support a numerous population. Idria produces mercury; Bohemia, tin and cobalt; and the other metals are obtained in sufficient abundance, not only for the home supply, but also for export. Maria Theresa did much for the regulation of the mines; and, with a view to diffusing the knowledge of mineralogy amongst the nobles, she appointed lecturers on that science in the universities. The administration of the revenue arising to government from this source is conducted by a board of managers, overseers, assayers, and other officers, who are instructed in metallurgy and mineralogy, and reside at the mines. The operations of these functionaries are under the control of the aulic chamber of the mint and mines at Vienna. An administration thus constituted offers a field of some preferment; and Von Born was received into the department of the mines and mint at Prague in 1770.

About this time he met with an accident which nearly proved fatal. In the course of a mineralogical journey through Transylvania, he came to Felso-Banya, where the gangue is rendered brittle and detached from the rock by exposing it to the flames of wood heaped up in the mine and set on fire. Having gone into the mine soon after the combustion had ceased, whilst the air was hot, and charged with arsenical vapour, he was deprived of sensation for fifteen hours, and long afterwards continued to suffer from a cough and general pain. Some time after this accident he was af fected with violent colics, which a large dose of opium removed; this was succeeded by a numbness of the lower extremities, and lameness in the right leg. In the latter part of his life he was deprived of the use of both legs. These calamities, however, did not repress the activity of his mind. One of the chief objects of his exertion was to introduce amalgamation in Hungary, in place of smelting and cupellation, for extracting silver from the ores. At this time he published his book upon the subject, in which he gives the chemical theory of operation, and describes the method he had adopted at Schemnitz. Von Born met with much opposition in his attempts to introduce amalgamation. After he had succeeded in getting silver from the ore publicly at Vienna, his detractors endeavoured to prove that the process was inferior to that already in use: and when at last his process was tried successfully in the great way by orders of Joseph II. at Schemnitz, his opponents shrugged up their shoulders, saying, "It is only the old Spanish process of amalgamation." The emperor ordered that his method should be employed in some of the mines belonging to government, and that he should receive a third part of the savings arising from the improvement during the first ten years, and four per cent. of this third part of the savings for the next twenty years.

Von Born was a satirist, though his attempts in that walk were not particularly successful. The Staats Peruche, a

works above mentioned, he contributed many curious papers tale published without his knowledge in 1772, and an attack on Father Hell, the Jesuit, and king's astronomer at Vienna, are two of his satirical works. The satirical description of the Monastic Orders, written in form of an academic inaugural dissertation, entitled Monachologia, is generally ascribed to Von Born. In this piece the monks are described in the technical language of natural history; but it is supposed that he was assisted by Professor Herman of Strasburg, the author of the very ingenious work on the mutual affinities of animated beings, entitled Tabula Affinitatum Animalium Commentario illustrata. (Of this clever work a new edition, with additions and illustrations, was published in Edinburgh, 8vo, 1852.)

Von Born was well acquainted with Latin, and the principal modern languages of Europe. He also possessed information in many branches of science not immediately connected with metallurgy and mineralogy. He took an active part in the political changes in Hungary. After the death of Joseph, the diet of the states of Hungary passed a great many acts, rescinding the innovations of that scheming ruler; and it conferred the rights of denizen on several persons who had been favourable to the cause of the Hungarians, and, amongst others, on Von Born. At the time of his death in 1791, he was employed in writing a work entitled Fasti Leopoldini, probably relating to the prudent conduct of Leopold II., the successor of Joseph, towards the Hungarians.

Von Born lived in splendour, and his house at Vienna was resorted to by scientific men of all nations. It is likely that his profits from the process of amalgamation were not considerable, as at his death his affairs were in a state of insolvency. His family consisted of a wife and two daughters, who survived him. (See Townson's Travels in Hungary; and Pezzil, Ostreich Biographien, 1792.)

The following is a list of his principal published writings,

and of the works of others which he edited.

Lythophylacium Borneanum, 1775, 8vo. This is a catalogue of his collection of minerals, which he afterwards sold to Mr Greville. It now forms a part of the magnificent Greville collection in the British Museum. Index rerum naturalium Musai Casarei Vindo-bonensis. Pars I. Testacea. Vindob. 1778, fol. maj. This splendid volume contains the description and figures of the shells in the museum at Vienna. On the Amalgamation of Ores containing Gold and Silver, published in German, 4to, 1786. It has been translated into English by Raspe. Catalogue méthodique et raisonné de la Collection des Fossiles de Mademoiselle Eleonore de Raab, 8vo, 1790. Poda's Description of the Machines used in the Mines of Schemnitz. edited by Von Born. Ferber's Letters from Italy, written to and edited by Von Born. Ferber, in return, published the lotters addressed to him by Von Born, under the title of Briefe über mineralogische gegenstande auf seiner reise durch das Temeswarer Bannat, Sie-benburgen, Ober und Nieder Hungarn. Frankf. 1774. There is an English version by Raspe, and a French one by Monnet. Some papers in the Abhandlungen der Böhmischer gesellschaft den Wissenchaften. Several papers in the Transactions of a Private Society at Prague, for the improvement of mathematics, natural history, and the civil history of the country. Von Born published an annual periodical work in German, entitled the Philosophical Transactions of the Masons' Lodge of Concord at Vienna, of which institution he was the founder and patron. He was also a zealous member of the Society of Illuminati; and when the Elector Palatine of Bavaria suppressed the masonic societies in his dominions, Von Born who was a member of the Academy of Sciences at Munich, on being required to declare whether he would withdraw from the masonic societies, resigned his place in the academy. He wrote some articles in the German work published by Trebra, mine-director at Zellerfeld in the Hartz, entitled A System of Instruction in the Art of Working Mines, 4to; also Observations in support of the Metallization of the Alkalies, in Crell's Annals, 1790, 1791. Ruprecht and Tondi thought at that time that they had reduced the alkalis and barytes to a metallic state, by the heat of a furnace urged by bellows; but it was afterwards found that the metallic substance thus obtained was phosphate of iron, proceeding from their crucibles and fluxes. The honour of obtaining this result was reserved for Sir Humphry Davy. Relatio de Aurilegio Dacia Transalpina, 1789, in the Nova Acta Academice Natura Curiosorum, tom. viii. p. 97. This is an account of the method employed in Transylvania in collecting gold from the sand of the rivers. (W. A. C.)

Borneo.

BORNEO, or, as it is called by the natives Bruné, an island forming part of the great East Indian Archipelago, and, next to New Holland, which may be considered as a species of continent, the largest in the known world. It reaches from about 7° north to 4° south latitude, and from 109° to 118° east longitude. Its length may be estimated at 750 miles, its greatest breadth at 600, and its average breadth at 350. Its area has been calculated by Baron Melville of Carnbee at 12,745 geographical square leagues. It exhibits the usual insular structure, a mass of lofty mountains in the centre, sloping gradually down to level and alluvial tracts along the sea shore. It is in every part intersected by fine rivers, many of them navigable to a considerable distance from the sea. The interior of Borneo is covered with immense forests, filled with wild animals, particularly orang-utans. A great part of the coast is marshy, so that it is in portions only that it displays the exuberance of tropical fertility. Of all the East Indian islands, Borneo ranks lowest as to civilization and improvement. Nothing, perhaps, has tended so powerfully to check its progress as the solid and unbroken form of its coasts, destitute of those large bays or inland seas which have always proved the nursery of commerce.

The Portuguese discovered Borneo in 1526, though, from the superior wealth promised by the Spice Islands, it attracted comparatively little attention. Yet they, as well as the Spaniards, the Dutch, and the English, formed establishments on different parts of the coast; but the small force defending them, and the fierce animosity of the natives, made their tenure generally of very short duration. The physical structure of Borneo, the vast forests, mountains, and jungles of the interior, obstruct communication between the different parts of its coast, as completely as if an extent of sea had intervened. It is thus split into a number of petty districts, entirely detached from each other, and which cannot be satisfactorily described, unless in detail.

Borneo Proper occupies the northern coast, and is reckoned a state of great antiquity. The soil is comparatively fertile, supplying rice sufficient for the consumption of the inhabitants, as well as most of the camphor for which the island is celebrated. The city, called also Borneo, is built upon alluvial ground, about ten miles above the mouth of the river of the same name. It is compared to Venice; canals are conducted through every street, and all business is conducted in boats, usually rowed by women. The houses are built upon posts, and ascended to by ladders. The river is navigable for large vessels considerably above the town; but there is a bar at its entrance, over which there is scarcely a depth of seventeen feet at high water. The sultan is treated with those marks of peculiar respect which in this part of the world usually indicate an ancient dynasty; but the chiefs or pangerans exercise great power in the state. The commerce of this city and district is almost entirely engrossed by the Chinese, who bring annually from Amou four or five junks, of about 500 tons burden. As the neighbourhood abounds in excellent timber, they frequently build their junks here, and carry them away loaded with the commodities of the country. Since the settlement of Sarawak by Sir James Brooke, in the neighbourhood of this state, it has some communication with the English.

On the eastern coast of Borneo, Mangedava and Pappal are populous, fertile. and well-watered districts. Malloodoo possesses these advantages in a still superior degree, and grows also a large quantity of rattans. Tiroon produces sago in abundance, and birds' nests more copiously than any other part of the Eastern Archipelago. None of these states, however, are much frequented by or known to Europeans. The chief state on the eastern coast is Passir, situated about fifty miles up a river of the same name. This district is very low and flat; and, were it not cooled by the sea breezes, would be intensely hot. Being marshy and filled with woods, it is extremely unhealthy. The town is said not to contain above 300 wooden houses, which are built along the river. The sultan has a palace and wooden fort along the northern bank. The people of Passir have an extremely bad reputation as to their conduct in mercantile transactions. They use false weights

and measures, manufacture counterfeit articles, and embrace, in short, every opportunity of cheating that offers. The English East India Company made an attempt, in 1772, to establish a factory here, but it did not succeed.

Banjar Massin is the principal state on the southern coast of Borneo; and, like the others, it owes its prosperity to a large river, on the banks of which it is situated. This river is five or six fathoms deep; but, unfortunately, the bar does not allow above twelve or thirteen feet of water, and requires the aid of the tide to produce even that depth. Ships, however, may anchor in the port of Tombangou or Tombornio. near the mouth of the river, where they are well supplied with water and provisions. See Banjanmassin. The sultan resides at Martapura, about three days' journey up the river, to which place he is attached by the circumstance of its being an uncommonly fine hunting station. The district of Banjar produces gold and diamonds, both of superior quality to those found in other parts of the island. Pepper is so abundant that, in a commercial view, it may be considered as the staple commodity. The iron is very excellent, and peculiarly fit for steel; though Dr Leyden asserts that the inhabitants do not them

selves understand the art of manufacturing it.

Succadana, or, as Dr Leyden calls it, Sacadina, was once the most powerful state on the western coast of Borneo. The Dutch began to trade there in 1604, but they soon afterwards attached themselves, in preference, to Sambas. In 1623 they abandoned their factory at Succadana. In 1786 they united with the sultan of Pontianak in an expedition against this place, which they took and entirely destroyed. It appears to have been since rebuilt, but is entirely in the hands of the Malays, and scarcely ever visited by Europeans. Pontianak is a state of very recent origin, but it now exceeds in wealth and power all others upon the western coast of Borneo. This distinction it owes to the wisdom of the Arab prince by whom it was founded. He renounced from the first the pernicious policy, almost universal in these petty states, of embarking in trade, and monopolizing its principal articles. He confined himself to his proper functions of dispensing justice and securing protection to all, of whatever country or religion, who resorted to his dominions. Under this salutary policy Pontianak soon rose to be the greatest emporium in those seas. It is situated on a large river, formerly called Laua, and the country behind produces diamonds the most abundantly of any district in Borneo. The Dutch established a factory here in 1776, and maintained ever after a good understanding with the sultan. In 1813, after the British force had taken possession of Batavia, that prince, dreading an attack from Sambas, solicited the protection of a British garrison, which was immediately sent: and he afterwards assisted our troops in the reduction of Sambas. Momparwa, situated a little to the north of Pontianak, is the best market for opium upon this coast. The city lies nineteen miles up the river, the entrance of which is obstructed by a bar and by several small islands. This is probably the same district called Mattan by Dr Leyden, who says that the king possesses the finest diamond in the world, for which a high price was offered by the Dutch, which he refused to accept. Sambas is situated about thirty miles up the river of the same name. Like most other towns in Borneo, it is built of timber and bamboos, and raised by stakes above the swampy foundation. Sambas has always been a powerful state, but for some time past has devoted itself so entirely to piracy as to render its existence scarcely compatible with that of its civilized neighbours. Upon this principle the British, in 1812, undertook an expedition against it; but they were repulsed with great loss in the attack, and suffered still more from the malignant influence of the climate. In the following year, however, a new expedition was undertaken under Colonel Watson, who, on the 3d of July, carried the fort by storm, and obliged the rajah to retire into the interior of his dominions.

Besides Sambas and Pontianak, the Dutch government claims possession of all the coast to the river Roti on the east, including the whole of the southern half of the island. With the exception of a few years, the possession of this extensive country has been in the hands of the Dutch since 1787, but they have done very little either to promote the civilization of the natives, or to develop the resources of the island. They reckon the population of the residences of Sambas and Pontianak, their possessions on the west, at 590,100, and by census made in 1836, 1837, and 1838, they calculate the population

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in their dependencies on the south and the east, including Banjarmassin, Mandawa, Sampet, Roeti, &c., at 736,600; in the islands along the coast at 22,000; making the total population of the states dependent on the Dutch government 1348,700.

On a general view of the state of culture and civilization in Borneo, Mr Hamilton estimates the population at 3,000,000, which we should suppose to be rather above than under the truth. The interior is entirely occupied by a native race, called variously, according to the parts of the island which they inhabit, Dyak, Idaan, and Tiroon. Those who subsist by fishing are commonly called Biajoos. The appellations of Horaforas and Maroots have also been applied to these races. The whole may be considered as one, almost savage race, and nearly similar to that which occupies the interior of Sumatra. Some, indeed, cultivate the ground, some display considerable industry in fishing, and a few employ themselves in collecting gold; but their institutions in general indicate the very rudest state of human society. It has been strongly asserted that they devour the flesh of their enemies; an assertion not noticed by Dr Leyden, and which has in many instances been made without foundation. All accounts agree, however, as to the existence of another truly savage custom, by which every man is debarred from the privilege of matrimony till he has, with his own hand, cut off the head of an enemy. Those, therefore, who are desirous of entering into that state form themselves into what they call head-hunting expeditions. They make an inroad into the territories of a neighbouring tribe, and, if their strength appear sufficient, endeavour to effect their object by force; if otherwise, they conceal themselves behind thickets, till an unfortunate individual passes, whom they can make their prey. Some are also said to immolate human victims on the altars of their divinities.

The inhabitants of the towns along the coast consist chiefly of that race so universally diffused throughout the Indian islands under the name of Malays. This name, to a European ear, has usually suggested every extreme of perfidy and atrocity. We have perused, however, a very different estimate of their character, formed by an intelligent gentleman, who spent several years in this part of India. He describes them as honest, frank, simple, and even gentle in their manners, decidedly superior, in a moral view, to the degenerate Hindus. The sanguinary deeds which have exposed them to so much reproach he ascribes to a proud and almost chivalrous sense of honour, which makes them regard blows, or any similar personal insult, as an offence only to be expiated by blood. The coarse and unfeeling treatment which they often experience from Dutch and Chinese masters drives them to these dreadful extremities. Piracy, however, is a vice of which this race cannot be acquitted; and the western coast of Borneo, situated on the great naval route to China, may be viewed as the grand field for its exercise. To a poor and hardy race, who see half the wealth of Asia passing along their shores, the temptation is almost irresistible. Like the Arabs, they have formed for themselves a code of morality, in which plunder is expunged from the list of vices. Yet, though individually brave, they possess no skill or discipline which could render them formidable to the crew of a European vessel. The cowardice of the Lascars, by whom Indian trading vessels are usually navigated, is the only circumstance which has made our trade suffer so severely from their ravages.

Next to the two classes above enumerated, the most numerous are the Chinese. These are considered as the most valuable subjects whom an uncivilized state can receive into its bosom. The difficulty of finding subsistence in their own country has led them to emigrate in vast numbers into Borneo. Nothing, perhaps, except the law which prohibits females from leaving the empire, could have prevented this almost unoccupied island from being entirely filled with a Chinese population. From this circumstance, however, the Chinese colonists are composed entirely of men in the vigour of life, and of the

most enterprising and industrious character. Their chief settlement is at Sambas, on the western coast, where the numbers cannot be estimated at less than 36,000, composing a sort of independent state. Their almost sole occupation is that of extracting the gold which abounds upon this coast. It is found in alluvial soil, and is purified by the simple process of passing a stream of water over the ore. The processes employed for this purpose are daily improving; and the annual yield is calculated at about half a million sterling.

The commerce of Borneo, though not equal to its extent and natural capacities, is by no means inconsiderable. Gold is its principal export. Mr Milburn estimates the annual quantity exported at 200 peculs, or 26,000 lb. avoirdupois, which would coin into upwards of 900,000 guineas. Like some other commodities, it is divided, by a grotesque scale, into three kinds, called the head, the belly, and the feet; the first being the best, and the two others gradually diminishing in value. Camphire is exported to the extent of thirty peculs (3990 lb.), all to China, where it is more esteemed than that of Sumatra. The singular Chinese luxuries of biche-de-mer or sea-slug, and edible bird-nests, are found in Borneo, as over all the Indian Archipelago. Pepper to a considerable amount, canes and rattans of various descriptions, sago, and a little tin, complete the list of exports. The chief import is opium to a very great extent, with piece-goods, hardware, coarse cutlery, arms, and toys. By far the greater proportion of the trade is in the hands of the Chinese.

The enterprise of one man, James Brooke, has within the last few years directed increased attention to this interesting region.

In 1838 Mr Brooke fitted out with his own funds a schooner of 142 tons, for the purpose of exploring the shores of Borneo. He had previously sailed in the Chinese seas, and was deeply impressed with the importance of the magnificent islands to the S.E. of the Straits of Malacca, and conceived the design of reclaiming them from the piratical tribes whose prahus infest the surrounding waters. His first object was to obtain more accurate knowledge of the geography and condition of the islands. He arrived at Sarawak on the N.W. coast of Borneo, in August 1839, and was well received by Rajah Muda Hassim, the uncle of the then reigning sultan of Borneo, and under him the governor of Sarawak. Hassim was then engaged in a war with his rebellious subjects. After remaining some time at Sarawak, making himself acquainted with the country, Mr Brooke sailed for Singapore, but soon returned. The civil war still raging, Muda Hassim solicited his assistance, offering him the government of Sarawak if he succeeded in putting down the rebellion. Mr Brooke joined the rajah, and having compelled the rebels to surrender, he was then formally instituted rajah of Sarawak, with the usual native ceremonies.

This appointment was ratified by the sultan, and the amount of revenue to be paid by Mr Brooke, as rajah of Sarawak, to the sultan of Borneo, settled at 2500 dollars annually.

The wise and vigorous rule of the new rajah was soon visible in the increasing prosperity of his subjects. They were, however, cruelly harassed by the numerous pirates by whom they were surrounded. At the conclusion of the Chinese war in March 1843, H.M.S. Dido, under Captain Keppel, cruising in the straits of Malacca, inflicted a severe chastisement on the pirates. In February 1845 Captain Bethune arrived at Sarawak with despatches from the British government, appointing Mr Brooke Her Britannic Majesty's regent in Borneo. In 1847 it was resolved by the British government to take possession of the small island of

¹ In 1844 the Hon. Capt. Erskine Murray, with two vessels, entered on a trading expedition to Tanganon, the capital of the Sultan of Coti, which lies on the east coast of Borneo, on the river of the same name. The first large town, Semerindon, near the mouth of the river, is inhabited entirely by Bugis, the most bloodthirsty nation of all the tribes of the Archipelago. Passing this, he reached Tantions for the seizure of the span and making preparations for the seizure of the ships and destruction of the crews. With difficulty the two vessels made their escape from the batteries on bimself was killed.

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Labuan, lying to the north of the town of Borneo, and the N.W. of the island, and which had been ceded by the sultan to Great Britain. This was occupied with the view of forming a convenient naval station between the East Indies and China. Sir James Brooke was appointed governor of this colony, and took possession on the 2d October 1848. Endeavours were made to induce the sultan to co-operate in the suppression of piracy, but he was either insincere or unable to induce his subjects to relinquish their cruel practices. In August 1845 Admiral Sir Thomas Cochrane, with a considerable force, came to demand reparation for the detention of two British subjects. He proceeded against a strong body of pirates who occupied a fortified position at the head of Maludu Bay, and totally destroyed their works and the town. This lesson, however, had no lasting effect on the sultan of Borneo; he resolved to take vengeance on his two uncles, Muda Hassim and Bundureen, who advocated the abandonment of piracy. He treacherously attacked them both during the night in their own houses, and murdered them and their families.

Sir Thomas Cochrane in the Spiteful, accompanied by Sir James Brooke, ascended the river to Borneo to demand an explanation from the sultan, and after destroying the forts and batteries on the river took possession of the town, which was found entirely deserted.

The people, however, soon returned, but the sultan fled into the interior. After remaining eleven days in the city without being able to compel a satisfactory arrangement, Sir T. Cochrane, with the view of procuring at least a temporary security to those who were favourable to the British, left a proclamation to be delivered to the sultan on his return, showing how completely he and his people were at the mercy of the British; offering to live with him at peace, but, at the same time, threatening him with condign punishment should he again evince hostility to Great Britain.

All these lessons seem to have been lost on the piratical Dyaks, but a much more severe chastisement awaited them. When Rear-Admiral Sir F. A. Collier was stationed at Sarawak in August 1849, information was received that a very large piratical flotilla, consisting of upwards of 100 prahus, averaging 35 men each, had passed the entrance of the Raluka from the Sarebas, with the intention of attacking Sareki, a town on the Rejang. The admiral and Sir James Brooke concerted a plan for intercepting them in their progress, which was completely successful; the piratical flotilla was almost entirely destroyed, about 500 men killed, and a larger number are supposed to have perished in the jungle.

Sir James Brooke, while acting as governor of the British colony of Labuan, retains his dignity and rights as rajah of Sarawak, from which he considers himself entitled to draw such revenue as is consistent with the prosperity of his domains. He holds the monopoly of antimony in his own hands, and his income from all sources is about L.6000 a-year; but this, as he says in a letter to his friend J. C. Templer, even in addition to his private fortune, is small when opposed to the numerous calls upon it; and is all laid out to advance the good of the country.

The inhabitants of his province of Sarawak he calculates at 12,000 in the town, and from 12,000 to 15,000 in the country, besides from 3000 to 4000 Malays along the coast.

"Sarawak," says Sir James Brooke, "extends from Tanjong Datu to the entrance of the Samarahan river, a distance along the coast of about sixty miles E.S.E., with an average breadth of about fifty miles. It is bounded to the westward by the Sambas territory—to the southward by a range of mountains which separate it from the Pontianak territory of Sadony. Within this space there are several rivers and islands besides the river of Sarawak. There are two navigable entrances to this river, and numerous smaller branches for boats, both to the westward and eastward; the two principal entrances combine at about twelve miles from the sea, and the river flows for twenty miles into the interior, in a southerly and westerly direction, when it again forms two branches—one running to the right, the other to the left hand, as far as the mountain range. Be-

sides these facilities for water communication, there exist three other branches from the easternmost entrance, called Moratabas, one of which joins the Samarahan river, and the two others flow from different points of the mountain range. The country is diversified by detached mountains, and the mountain range has an elevation of about 3000 feet. The aspect of the territory may be generally described as low and woody at the entrance of the rivers. except a few high mountains; but in the interior, undulating in parts, and presenting fine level plains. The climate may be pronounced healthy and cool, though during the six months from September to March a great quantity of rain falls; the thermometer stands generally about 78°, never above 85°. The more serious maladies of tropical climates are very unfrequent; the only complaints to which we have been subject are rheumatism, colds, and ague. The soil and productions of this country are of the richest description, and it is not too much to say, that within the same given space, there are not to be found the same mineral and vegetable riches in any land in the world. The soil of the plains is moist and rich, and calculated for the growth of rice, for which purpose it was formerly cleared, and used until the distractions of the country commenced. From the known industry of the Dyaks, and their partiality to rice cultivation, there can be little doubt that it would become an article of extensive export, provided security were given to the cultivator, and a proper remuneration for his produce. The lower grounds, besides rice, are admirably cal-culated for the growth of sago, and produce canes, rattans, and forest timber of the finest description for ship-building, and other useful purposes. The Chinese export considerable quantities of timber from Sambas and Pontianak, particularly of the kind called Balean by the natives, or the lion wood of the Europeans; and at Sarawak it is to be had in far greater quantity, and nearer the place of sale. The undulating ground differs in soil, some portions of it being a yellowish clay, while the rest is a rich mould; these grounds, generally speaking, as well as the slopes of the higher mountains, are admirably calculated for the growth of nutmegs, coffee, pepper, or any of the more valuable vegetable productions of the tropics. Besides the above-mentioned articles there are birds'nests, bees' wax, and several kinds of scented wood in demand at Singapore, which are all collected by the Dyaks, and would be collected in far greater quantity, provided the Dyak were allowed to sell them.

"Of the principal riches of the country, there are diamonds, gold, tin, iron, and antimony ore; and when the country is explored by men of science, it may be expected that its mineral wealth will be found more abundant. The quantity of gold yearly procured at Sambas is moderately stated at half a million sterling. The most intelligent Chinese are of opinion that the quantity got here exceeds the quantity at Sambas, and there is no good reason to suppose it would fall short of it, when once a sufficient Chinese population is settled in the country. Antimony ore is a staple commodity, which is to be procured in any quantity. Tin is said to be plentiful, and the Chinese

propose working it. "In describing the inhabitants I feel sure that their sufferings and miseries will command the interest and sympathy of every person of humanity, and that the claims of the virtuous and most unhappy Dyaks will meet the same attention as those of the African. And these claims have this advantage, that much good may be done without the vast expenditure of lives and money which the exertions on the African coast yearly cost, and that the people would readily appreciate the good that was conferred upon them, and rapidly rise in the scale of civilization. The inhabitants may be divided into three different classes, viz., the Malays, the Chinese, and the Dyaks; of the two former little need be said, as they are so well known. The Malays are not numerous, and, generally speaking, with the exception of the Borneo pan-gerans, are well inclined to aid me as far as lies in their power. The Chinese are about four hundred in number, and the only impediment to their immigrating is their poverty, and the present high price of provisions. The Chinese are industrious, but greedy, supple, and oppressive; they are divided into kunsis or companies, and a rival company to the one at present at Sarawak offers to bring three thousand men in a few months, provided they can get permission to do so. The Dyaks, by far the most interesting portion of the inhabitants, are confined almost entirely to the mountainous country, where they have fastnesses to which they fly on the slightest alarm. These people are mild, industrious, and so scrupulously honest, that a single case of theft has not come under my observation, even when surrounded by objects easily appropriated, and tempting from their novelty. In their domestic lives they are amiable, and addicted to none of the glaring vices of a wild state; they marry but one wife, and their women are always quoted amongst the Malays as remarkable for chastity, nor are they degraded as in many communities.

"The head-hunting, or taking the heads of their enemies, is a feature by no means new or extraordinary, and like the scalping of

Bornou.

Borneo.

the North American Indian, is a trophy of victory and prowess. Amongst the hill Dyaks this custom is confined entirely to the heads of enemies, and is the effect, not the cause of war; their wars are by no means bloody, and are never carried on but by small companies, who enter on the enemies' ground, and lie in ambush for parties or individuals of their foes. The exaggerated accounts of some travellers have been drawn from the more savage and predatory tribes of the coast; but these tribes have forsaken their original customs, and have joined piracy to their former practice of taking heads, and they are not different from other pirates who destroy as well as plunder.

"The hill Dyaks, such as I have briefly described them, are a most interesting race, and present more facilities for the amelioration of their condition than any other people. In general, however, they are sunk in misery, and too frequently exposed to famine; but, when only moderately oppressed, I have seen tribes who brought to mind the simplicity, if not the happiness, of primitive society. The number of these people in the country of Sarawak may generally be stated at ten thousand, but, with the slightest protection, numbers who have retired beyond the reach of their cruel oppressors, would return to their former habitations. Their freedom from all prejudice, and their scanty knowledge of religion, would render their conversion to Christianity an easy task, provided they are rescued from their present suffering and degraded state; but, until this be done, it will be vain to preach a faith to them the first precepts of which are daily violated on their own persons. Never, indeed, were people more oppressed, or more wretched; those who are far removed from witnessing their suffering and their patience may consider my sympathy and enthusiasm exag-gerated, but I cannot help expressing it. The Dyaks are always considered an inferior race, and a heavy penalty is imposed on them for committing any offence against a Malay; to kill a Malay under any circumstances of aggression, would subject them to death, or even worse punishment; to strike or scuffle with a Mahometan, though he be caught in the act of stealing their property, would likewise be a grave offence; even an accidental injury by a Dyak could only be explated by the confiscation of all, or nearly all, his property to the Malay. On the other hand, a Malay killing a Dyak is rarely punished, even by the imposition of a small fine, and the only inconvenience he suffers is being unable to visit that particular tribe, from a just fear of retaliation. The direct tax paid by the Dyaks to their local rulers is trifling in amount, but they suffer afterwards from all sorts of exactions, carried on by means of the most flagrant artifice or violence, by which they are often reduced to famine and starvation."

Sir James Brooke, in his generous and romantic enterprize, has had to contend with obstacles of appalling magnitude,—the barbarism of the inhabitants; chiefs whose power was exercised in cruel oppression and extortion over the down-trodden natives; rajahs who dreaded his power and influence; the jealousy of the neighbouring Dutch settlement; the envy of unsuccessful traders; and, above all, the dreadful scourge of extensive piracy. Nothing but an in-domitable courage, and an earnest zeal for the welfare and prosperity of the people and government intrusted to his care, could have sustained him, and carried him forward in his successful career. But in such a contest it was not to be expected that his enemies would refrain from attempts, open or concealed, to counteract his benevolent exertions if they interfered with their selfish designs. Attacks were made upon him in the Straits Times newspaper, and repeated in England, charging him with cruelties perpetrated on the natives; and, on the 10th of July 1851, a motion was brought forward in the House of Commons for a commission of inquiry into the proceedings of Sir James Brooke on the coast of Borneo, which was followed by an elaborate debate. The motion was rejected, and the conduct of Sir James virtually approved by a majority of 230 to 19. These attacks were renewed in the summer of 1853, when the government was persuaded to issue instructions to the governor-general of India, directing him to issue a commission to inquire how far the position which Sir James Brooke holds in Sarawak is advantageous to the commercial interests of Great Britain.

In the island of Labuan, next to the monster evil of piracy which scourges the Eastern Archipelago, one of the greatest difficulties the colony has to contend with is the panic which

arose in consequence of the sickness which prevailed in the Bornholm first year of the settlement. The improved sanitary condition of the island by the removal of a portion of the jungle, and a partial drainage in the vicinity of the habitations, has abated this apprehension, and the climate of Labuan, as compared with other tropical countries, may be considered as salubrious as any other. The population in 1851 was 1385. Of these 800 were a migratory population of Malay labourers: the fixed population was 585. Of these the deaths were 29, being 42 of the mortality of the year. This per-centage is unduly increased by including the Chinese, who, from their gross and dissipated habits, always exhibit a large mortality.

The island possesses considerable coal-fields, which are worked by the Eastern Archipelago Company, but in a way so unscientific—that is, by only quarrying the outcrops—as to prove both dilatory and expensive. In 1851 they exported 5032 tons. The examination that has been made of these coal measures has established their extent and value to be fully equal to the expectation formed of them. The large seam alone cannot contain less than 700,000 tons lying above tide-level.

The local revenue of 1850 only amounted to L.1798, and the total expenditure to L.4140. No public work of any great extent has been carried on; the chief outlay has been made in cutting down the forest, and making drains on the plain and near the site of the town, with the view of improving the sanitary condition of the island. (Leyden's Description of Borneo, in the Asiatic Journal; Hamilton's Gazetteer; Milburn's Oriental Commerce; Temminck's $L'Inde\ Archipèlagique$; $\ Letters\ of\ Sir\ James\ Brooke,\ by$ J. C. Templer; and Reports on the State of H.M. Colonies.)

BORNHOLM, an island in the Baltic, belonging to Denmark, in the Stift of Seeland, between Lat. 54. 59. and 55.18. N. and Long. 14. 42. and 15. 8. E. It is about 20 miles in length, by 14 in breadth, with a generally mountainous surface, and steep and rocky shores. It yields a good freestone, which is largely exported for building; and also limestone, blue marble, coal, and clay. The principal products of the soil are oats, flax, and hemp. The population amounts to about 26,000, chiefly engaged in agriculture, fishing, brewing, distilling, and the manufacture of earthenwares. The capital is Roenne.

BORNOU, an extensive kingdom, situated in Central With the exception of Houssa, now subject to the sultan of the Fellatahs, it is superior in power and influence to any other state in that quarter of the continent. Major Denham, to whom we are indebted for the first full and authentic description of this country, places it between the 12th and 18th degrees of east longitude, and the 10th and 15th of north latitude, which would form an extent of nearly 400 miles in every direction. His own map and description, however, oblige us to restrict these dimensions to little more than one-half. Bornou is bounded on the west by Soudan or Houssa, on the east by the Lake Tchad (or Tsad), on the north by the Great Desert, on the south by the kingdoms of Baghermi (or Begherme), Loggun, and Mandara.

According to the more recent information derived from the expedition under Richardson, Barth, and Overweg, the limits of Bornou have materially changed since the time of Major Denham, by having extended to the west as far as 9. 30. E. Long. The grandest natural feature of this country is Ladre Tchad, an extensive inland water, at least 120 miles in length and 60 miles in breadth. remarkable variation, however, takes place, according as the rivers by which it is fed are swelled by the tropical rains, or their channels reduced by the continuance of the dry season. At this period the waters on every side recede, and leave uncovered a tract of many miles in extent, to be again overflowed when the rains have swelled the The inhabitants, however, derive little advantage from the short and precarious interval during which they

Bornou. have access to this portion of their territory. There is are now unacquainted. D'Anville, however, proceeding Bornou. neither leisure nor opportunity to bring it under regular culture; and the luxuriant fertility derived from the he could not find a positive authority, expunged these inundation is wasted in producing a rank vegetable growth of grass from ten to twelve feet in height, with impenetrable thickets of trees and underwood. Man scarcely dares to penetrate into these gloomy regions, which are filled by numerous and formidable wild animals, elephants, lions, hyenas, and enormous broods of the serpent species. These creatures, when the inundation comes on, seek refuge in the cultivated and inhabited tracts, where their arrival diffuses consternation and dismay.

The rivers by which this great expanse of water is fed are the Yeou and the Shary. The former, which enters it from the west, excited great interest on its first discovery, from being considered, or at least suspected, to be a continuation of the Niger of Park. Further observation has completely disproved this supposition, and shown it to be a river of only secondary magnitude. Rising in a range of hills to the south of Houssa, it flows first north, then eastward through Bornou, till it falls into the Tchad; but it never, unless when swollen by the rains, presents any great body of water. The Shary is a much more considerable river. It rises in the far unknown interior to the south. Dr Barth crossed it on his journey to Baghermi, and traced its course by native informations as far south as 8. 30. N. Lat. At Kusseri, not far from Lake Tchad, it received a large tributary, the River Loggene, which was mistaken by Denham for the Shary itself.

The territory of Bornou, extending along the whole western and part of the southern and northern shores of the great lake, is generally level and fertile. The climate, especially from March to the end of June, is oppressively hot, rising sometimes to 105 and 107, and even during most of the night not falling much below 100. In May the wet season commences, with violent storms of thunder and lightning. In the end of June the rivers and lakes begin to overflow, and for several months the rains are almost incessant, accompanied with damp, cloudy, and sultry weather. The inhabitants at this season are severely afflicted with fever and ague, which carry off great numbers of them. In October the rains abate; cool, fresh winds blow from the west and north-west; and for several months the climate is both healthful and agreeable.

No mention is found of Bornou among the geographers of antiquity, although it may be conjectured that the great lake of Nigritia, placed by Ptolemy in the centre of Africa, was perhaps the Tchad. Edrisi, however, in the twelfth century, describes this country under the appellation of Kuku, which is still borne by its capital. He represents the king as absolute and powerful, with a numerous army and the merchants as carrying on an active trade and possessing great wealth. Leo, who visited it about two centuries after, gives a description nearly similar. The people are represented as Pagans, and extremely rude, though numerous, and the country well cultivated. The merchants from Barbary supplied the king in his expeditions with arms and horses, while he made an annual expedition to procure slaves to be given in payment.

No further relations respecting Bornou were communicated to Europe during a very long period; yet it is remarkable that, in the maps of Sanson, Delisle, and others of the sixteenth and seventeenth centuries, there is found a lake of Bornou, and in some of them a large lake with the name of Guardia, which does not sound very dissimilar to that of Tchad. It is difficult to conjecture the ground upon which these features were delineated; yet their coincidence with those recently discovered seems to show that they were founded upon some information with which we

upon his rigid principle of admitting no object for which names from his map, and has been generally followed by modern geographers.

When the African Association in 1788 commenced their operations, they early received some information, collected by Mr Lucas at Tripoli, with other particulars related by Ben Ali, a Moorish merchant resident in London. From these sources were derived pretty copious notices, both concerning Bornou and Cassina; the former being described as what it then appears to have been, decidedly the ruling power in the interior of Eastern Africa, all the kingdoms of which it had reduced into a state of vassalage. In arranging these accounts, however, a considerable error was committed as to the position of this country. Mr Lucas had been informed that it was fifty journeys, or about six hundred and fifty miles, south from Fezzan; but his informant added that it was only twenty-five journeys west from the Nile. To meet this statement Major Rennell conceived it necessary to extend the route, not due south as it really was, but south-east, so as to place it in the heart of the desert, seven degrees north and eight degrees east of its real position. Kuku, likewise believed, from the statement of Edrisi, to be a separate kingdom, was placed in the same quarter, still nearer to the Nile; and thus the desert tract to the west of Nubia was filled with

countries which, in that quarter, have no existence. The expedition sent out by the British government in 1822, under Denham and Clapperton, completely adjusted the geography of this part of the continent. It was discovered that Bornou, instead of being so far removed, as our maps represented, from Houssa and Cassina, was close on their eastern frontier, and formed a continuation of that extensive, fruitful, and finely watered plain, which extends from the mouth of the Senegal across Central Africa. Its relative political circumstances had also undergone, during this interval, a very complete change. Instead of holding all the surrounding states in vassalage, it had been itself completely subjected to the dominion of the Fellatahs, who, after subjugating all Houssa, had invaded Bornou, and committed the most dreadful ravages, destroying its capital and other large cities, and bringing the whole country into a state of entire bondage. There was still, however, among the people a strong spirit of valour and independence. A mere private individual, in the northern province of Kanem, pretending to, and perhaps himself trusting in, a celestial mission, hoisted the green flag of the Prophet, and, under the title of the servant of God, undertook a series of struggles for the deliverance of his country. The Fellatahs appear to have and many attendants; the people as martial, though rude; been taken very much by surprise, and, being defeated in successive encounters, were in ten months driven completely out of Bornou. They seem to have now given up all attempts at reconquering it, although a hostile spirit still reigns between the two countries.

The conqueror, called, from his native province, El Kanemy, having the army wholly devoted to him, might probably have with little difficulty assumed the sovereign More moderate, and perhaps more prudent, he drew forth the nearest heir of the ancient sultans, and invested him with all the appearance and pomp of sovereignty; reserving only for himself, under the title of scheik, all its reality. The court of the sultan was established at New Bornou, which was made the capital, instead of the old city, which had been entirely destroyed during the Fellatah invasion; while the scheik, in military state, resides at the city of Kuku or Kouka.

The Bornouese throne in former times had been elective, at least among the members of the same family; and at present the scheik possesses a power nearly absolute, which he exercises with salutary vigour. Bands of robbers who desolated the country have been nearly extirpated, and travelling and property rendered secure, at least in the interior. Justice within each city is administered, as in other Mussulman countries, by the cadi, with an appeal to the scheik. Murder is punished, on conviction, by delivering the offender to the relatives of the deceased, who dispatch him with clubs. A young thief is buried in the ground up to the head, which being covered with butter and honey, is exposed under the burning sun to the attack of innumerable flies and mosquitoes. scheik's zeal was peculiarly directed against moral offences, of which conscience and public opinion have been generally considered as the most appropriate guardians. Such were the non-observance of the Mahommedan fasts, upon which severe and relentless penalties were levied. He was also most strict in punishing those failings in the female sex which are elsewhere considered as sufficiently visited by disgrace and exclusion from society. Here not only the most ignominious punishments, but often death itself, awaited them. On one occasion sixty of these unfortunate offenders were brought before him, of whom five were hanged, and four whipt so severely that two afterwards expired; an outrageous virtue, which seems with reason to have been branded as almost diabolical. The most frivolous female offences, as talking too loud, and walking in the street with the face unveiled, were considered as ground of public indictment at this severe bar. Even the spending in courtship or otherwise a larger sum than a man was supposed to be able to afford, gave ground for dragging him before the national tribunal. Denham saw one thrown into prison for presenting to his bride two robes or turkadoes, when his station was considered as not authorizing more than one; although he proved that the lady had refused her consent on any other terms; which, however, drew upon her also a severe animadversion.

The sultan of Bornou is surrounded by a mounted body-guard, who likewise compose his principal nobles and chiefs. Their attire and equipment is the most grotesque and unwieldy, perhaps, to which fashion in any country has given rise. It is indispensable to the chief of rank that he should possess a huge belly, the singular importance attached to which is probably founded on the idea of its being an indication of plenty and luxury; and it is held so essential, that even when high feeding cannot produce the effect, stuffing is employed to give the appearance of it. Again, even in this burning climate, the body is enveloped in successive robes, amounting often to ten or twelve, the number being always considered as indicating the rank of the wearer. The head likewise is inclosed in numerous successive turbans, which are supposed to be rendered more ornamental by leaving only one side of the face uncovered. The sultan studies to be still more protuberant and more loaded with clothing than any of his courtiers. Yet in this attire he and they advance together into the field; but of course they can have no real efficiency in the duties of active warfare. The last sultan had fallen in consequence of the impossibility, caused by his ponderous equipment, of flying with sufficient speed before a victorious enemy.

The military force of Bornou consists almost entirely in cavalry, amounting to about 30,000, who are mounted on small but active steeds, which, as well as their riders, being cased in iron mail, present a very formidable appearance. They also manage their horses with the ut-

Bornou, the nobles possessed this and other high privileges: but rapidly and dexterously. Their only defect is, that when Bornou. placed in the field against an enemy at all formidable, they can by no impulse be induced to fight. They look on as spectators till the contest issues in victory, when they engage eagerly in pursuit and plunder, in both of which they excel; whilst, in case of defeat, they take to flight with the utmost rapidity. As, however, the cavalry of the armies with which they contend are nearly on a level in point of prowess with themselves, the match is tolerably equal. There are usually on each side about a hundred chiefs, raised to distinction by bodily strength and prowess, who engage in single combats, and display often the most desperate valour. Barca Gana, the scheik's general, Insolvent debtors are rather hardly dealt with. But the had obtained the reputation of possessing charms that rendered him invulnerable. The main dependence of that prince is upon a body of 9000 spearmen from his native territory of Kanem, who rally round him with the most enthusiastic attachment. Though almost naked, and equipped only with shield and spear, they display a discipline beyond that of almost any other African army. They march by tribes, and keep in front of their line a regular chain of piquets, with sentinels, who every half hour pass the war-cry along it; precautions very rarely employed in barbarian armies. All the sovereigns of Central Africa likewise consider themselves fortunate if they can engage the services of even a small party of Arab caravan followers, who, being brave and armed with muskets, an instrument yet almost unknown in this region, are objects of something like supernatural dread.

> The territory of Bornou is fertile and well watered, yielding large crops even under very imperfect cultivation. The labour is chiefly performed by female slaves, who, at the commencement of the rainy season, scratch rather than turn the ground, and scatter rather than sow the seed. They are also obliged to watch the growth, in order to guard against numerous animal depredators; a very perilous occupation, in the course of which they are liable to be carried off by the wild beasts, who are roaming about in every direction. The rice and wheat are inferior, and grown in small quantity. The grain which forms the staple food of the people is a species of millet called gussub, which they form, not into bread, an article here entirely unknown, but into a species of paste, that, by the addition of butter and honey, forms the highest boast of Bornou cookery. Cotton and indigo are also valuable productions, affording the material for the cloths finely dyed with blue stripes, which form the staple fabric of the country. All the domestic animals are reared, and very numerous herds of oxen are possessed, chiefly by an Arab tribe called Shouaas. Major Denham reckons 20,000 on the shores of the Tchad, and double that number on the banks of the Shary. The empire, however, is remarkably destitute of the products of horticulture. There is neither a fruit nor a vegetable, except some onions in the vicinity of the large towns, and a very few limes and figs reared with great difficulty in the garden of the scheik.

The wild animals are very numerous, finding both food and cover in the extensive woody and marshy districts. Lions prowl about in considerable numbers, approaching even the walls of the towns. The Bornouese delight in taming and even making a pet of this noble animal. The scheik, as a special favour, sent Major Denham a present of a young lion, which he very prudently returned, lamenting the want of space for his accommodation. Elephants, in herds of fifty to four hundred, wander over the tract inundated by the Tchad, and are hunted and killed both for the flesh and the ivory. Hyenas also, in huge and formidable bands, invade the cultivated most skill, and perform all the manœuvres of the field most fields, and are with difficulty prevented from penetrating

Bornou. into the towns. The tall form of the giraffe is not un- and a complexion of light copper; and they exhibit a Bornou. - frequently seen cropping the leaves of the dense forest. strong though improved resemblance to the European The waters abound with crocodiles and hippopotami, and the flesh of both is valued for food; that of the former, indeed, is described by naturalists as extremely delicate. The country is filled with swarms of bees, which often obstruct the passage of the traveller; and the honey, though only partially collected, forms one of the chief Bornouese delicacies. Antelopes, gazelles, ostriches, and admission into the houses, they not only sell these gifts various other quadrupeds and feathered animals, are pursued as game.

The population of Bornou is calculated by Major Denham at 5,000,000; but by Dr Barth, basing his estimate on the experience and explorations of three years, at no less than from 8,000,000 to 9,000,000. The leading people, called Bornouese or Kanowry, present a complete specimen of the negro form and features; having large mouths, thick lips, broad noses, an unmeaning face, but good teeth and high foreheads. The females heighten their want of beauty by a most extensive and injudicious system of puncturing and tattooing. The people are peaceably disposed, friendly and courteous in their manners, and distinguished by a sort of good-natured heaviness. Though endowed with a slender degree of courage, they are resentful, and addicted to petty larcenies. law allows of polygamy, but the richest have seldom more than two or three wives, and the rest of the community The favourite amusement is wrestling, not performed in person, but viewed as a spectacle while performed by slaves taken in war from the neighbouring nations, particularly the Beghermes and Musgows. The displays of strength made by these men are said to be often very extraordinary. A powerful wrestler sells at a high price, and the masters place extraordinary pride in the performance of their slaves, cheering them during the combat, and, on its successful issue, often presenting them with valuable robes. Even the ladies of Bornou engage occasionally in public contests, where they often throw each other with violence to the ground. Another favourite amusement consists in a rude game bearing some resemblance to chess, played with beans and holes in the sand.

The Mahommedan religion is universally professed in Bornou, and even with violence and bigotry. Through recommendations brought with them, the English travellers secured good treatment; but, as unbelievers, they were viewed with the deepest horror, and almost as a species of monsters. Even from those who showed at first the most friendly disposition, the disclosure of their creed drew forth deep groans, sometimes screams, and usually arrested all progress to intimacy. A man who had served them for two or three weeks, although he pleaded that it was only under the most extreme necessity, was declared unfit on that ground to be received as a witness in a number of fighis (writers or doctors), who have visited Mecca, and are well skilled in Arabic. It is even an employment to write copies of the Koran, which are sent into Barbary, where they bear a considerable price. Its verses are much used as charms or amulets, in the préparation of which the scheik was understood greatly to excel, gaining almost as many victories by his pen as by his sword. The Bornouese, like other negroes, have songs relating to love or war, some of which are said to possess merit; but their intellectual character in general seems to rank extremely low.

tribe called Shouaas, who are accounted Arabs, and speak must not be forgotten that the route from that city, that language, though they have scarcely any resemblance though the nearest of any from the coast, greatly exceeds to those in the north bearing that appellation. They have a thousand miles, through the most dreary and desolate tine open countenances, with aquiline noses, large eyes, tracts, amid the domains of numerous predatory tribes.

gipsies. Their deportment, however, is not very favourably spoken of. They do not want courage, and can furnish the government when necessary with 15,000 horse; but they are arrogant and deceitful, imposing upon the people by the manufacture of charms, and by pretensions to prophecy and fortune-telling. Having thus gained at a high rate, but embrace opportunities of pilfering. Probably they were observed to disadvantage in the heart of the cities. One of their tribes, called Dugganahs, who were visited in their native tents on the Shary, presented a most pleasing picture of patriarchal simplicity. Their countenances were noble and expressive, and the attachments of kindred and domestic affection were displayed in peculiar force. Another tribe, called the La Salas, almost independent of Bornou, inhabit a number of low islands in the Tchad, covered with rich pasture, and separated from the continent by channels so shallow as to be fordable on horseback. A knowledge of the tracts is however requisite; and those troops who without it attempted to penetrate through them have got entangled in mud, sunk into

deep pools, and signally defeated.

The towns in Bornou are of considerable size, surrounded with walls thirty-five or forty feet in height, and twenty feet in thickness, having at each of the four corners a triple gate, composed of strong planks of wood, with bars of iron. The abodes of the principal inhabitants form an inclosed square, in which are separate houses for each of the wives; whilst the chief himself resides in two or more elevated structures resembling turrets, connected together by terraces. These are well built, of a reddish clay, highly polished, so as to resemble stucco; whilst the interior roof, though composed only of branches, is tastefully construct-The horns of the antelope and gazelle are employed to fasten together the different parts, and have suspended from them the quiver, spear, and shield of the owner. The ordinary houses are small, being built partly of mud and thatched, partly only of straw or coarse grass mats. Major Denham was accommodated in one of eight feet diameter, having a hole two and a half feet high, by which he crept in and out; but this deficiency of aperture was rendered almost necessary by the crowds of tormenting insects who would otherwise have made good their entrance. Though New Bornou and Kouka were the residences, the one of the sultan and the other of the scheik, neither is equal in magnitude to Angornou, estimated to contain 30,000 inhabitants, who, on market days, are swelled to 80,000 or 100,000. On the Yeou are seen the ruins of Old Bornou and Gambarou, which appear to have been greater and better built cities than any now in the kingdom; but they had been so entirely destroyed by the Fellatahs in their court of law. There are resident in Bornou a considerable late invasion, that the very site is in a great measure covered with shrubs and vegetation. The vicinity is almost laid waste by the inroads of the Tuaricks; and, indeed, all the kingdoms of Central Africa suffer the disadvantage of having their frontier exposed to the ravages of predatory tribes who occupy the rude and desert borders.

The English travellers have held out favourable hopes of the commerce which might be opened with Bornou. They observed the increased and increasing demand, among a numerous population, for goods which Britain either does or could produce cheaper than any other country; and these goods were found selling at an advance of 300 per The pastoral districts of this country are occupied by a cent. above their price at Tripoli. On the other hand, it Borough.

Borodino The merchant has to encounter, therefore, not only accumulated hardships, but all the perils of famine, battle, and pestilence. It would be vain, therefore, to expect that any one would conduct such a trade without very high It is at present carried on by merchants, or rather chiefs, each with a large body of armed followers, alike prepared for commerce or war. The European who should engage in such a trade would be obliged to follow this example, and might expect to encounter their enmity and rivalry. It seems doubtful, therefore, how far such a trade could now be carried on by any other than its present channel.

Amongst the commodities which find a market in Bornou are mentioned writing paper, beads, coral, silks and cottons of gaudy patterns, turbans, small carpets, brushes, caftans, and shirts ready made; brass basins tinned, small mirrors, pistols, and other arms ornamented, but cheap. The commodities taken in return are almost exclusively slaves, obtained by purchase or capture; and we fear it will be more difficult than Major Denham supposed to divert the trade from this bad channel. Neither gold nor silver are seemingly to be procured in Bornou. Elephants' teeth, ostrich feathers, raw hides, musk, indigo, and senna, are mentioned as commodities suited to the market of

BORODINO, a village in Russia, near the river Moskwa, about ninety miles west of Moscow; remarkable for the terrible battle fought there on the 7th of September 1812, between the French and Russians, in which the latter were defeated.

BORON. See CHEMISTRY.

BOROUGH, BURROUGH, Borow, or Burgh (Saxon beorg), is a term frequently used for a town or corporation which is not a city. A borough is by some supposed to have primarily meant a tithing or company consisting of ten families, who were bound and combined together as sureties for one another. Afterwards, as Verstegan informs us, borough came to signify a town that had something of a wall or inclosure about it: so that all places which amongst our ancestors had the denomination of borough, were one way or other fenced or fortified. But in latter times this appellation was also bestowed on several of the villæ insigniores, or country towns of more than ordinary note, though not walled. The ancient Saxons, according to Spelman, gave the name of burghs to what in other countries were called cities. But different canons being made for removing the episcopal sees from villages and small towns to the chief cities, the term city came to be attributed to episcopal towns, whilst that of borough included all the rest, even although they had the appearance of cities, as being governed by mayors, having bye-laws of their own making, sending representatives to parliament, and being fortified with a wall and castle, and the like.

Royal Boroughs or Burghs, in Scotland, are corporations originally created for the advantage of trade, in virtue of charters granted by several of the kings, and having the privilege of sending commissioners to represent them in parliament, besides other peculiar privileges. royal burghs are not only so many distinct corporations, but also constitute one entire body, governed by, and accountable to, a general court, anciently called the court of four boroughs, which was held yearly, to treat and determine concerning matters relating to the common interest. The four burghs which composed this court were, Edinburgh, Stirling, Roxburgh, and Berwick; but the last two falling into the hands of the English, Linlithgow and Lanark were substituted in their room, with a saving to the former whenever they should return to their allegiance. But this court not being sufficient to answer the necessities of the royal burghs, they were all empowered under James III., in 1487, to send commissioners to a yearly convention of their own,

which was then appointed to be held at Inverkeithing, but Borough is now held at Edinburgh, under the denomination of the Convention of Royal Burghs, which was vested with great Borromean powers, and had for its object the benefit of trade, and the Islands. interest of the burghs generally. See MUNICIPAL CORPO-RATIONS.

Borough-English, a customary descent of lands or tenements, in some ancient boroughs and copyhold manors, by which the youngest son, and not the eldest, succeeded to the burgage tenement on the death of his father.

Boroughs, Representation of. See Parliament.

BOROUGHBRIDGE, a borough and market town of England, in the west riding of Yorkshire, wapentake of Claro, and parish of Aldborough. It is situated on the south bank of the river Ure, which is navigable here, and is crossed by a stone bridge seventeen miles N.W. of York. It is chiefly indebted for its importance to its situation on the great road from York to Edinburgh; and, previous to the passing of the Reform Act, it returned two members to parliament. Many British and Roman antiquities have been found in the town and vicinity, of which the most celebrated are the three obelisks called "The Arrows," about half a mile south of the town. Several fairs are annually held here. Pop. (1851) 1095.

BOROVSK, a town of European Russia, capital of a circle of the same name in the government of Kalouga. It is situated on the Prorva, 55 miles S.W. of Moscow. Pop. 5000. It has considerable manufactures of sailcloth, and in the vicinity is a rich convent, founded in 1444.

BORRELISTS, a sect of Christians in Holland, so called from Borrel, their founder. They reject the use of the sacraments, public prayer, and all external acts of worship.

BORRICHIUS, or Boron, Olaus, one of the most learned men of his age, was born in 1626, at Borchen in Denmark. He studied medicine at Copenhagen, and began to practise during a terrible plague which ravaged that city. He was appointed professor of botany and chemistry; and in 1660 he visited Holland, England, and France; was received as doctor at Angers; and visited Rome in 1665. In the course of his travels he attended the most celebrated schools, and was selected by Queen Christina as her master in chemistry. He returned to Copenhagen in 1666, and discharged the duties of his office with great assiduity, as his works abundantly testify. He was made a member of the supreme council of justice in 1686, and counsellor of the royal chancery in 1689. He died of the operation of lithotomy in 1690.

The following are the principal works of Borrichius:—1. Dokimasia Metallica, Copenhagen, 1660, 8vo; 2. De Ortu et Progressu Chemico Dissertatio, ibid. 1668, 4to; 3. Hermetis, Ægyptiorum, et Chemicorum Sapientia, ibid. 1674, 4to; 4. Lingua Pharmacopæorum, ibid. 1670, 4to; 5. Cogitationes de variis Linguæ Ætatibus, ibid. 1675, 8vo; 6. De Causis diversitatis Linguarum, ibid. 1675, 4to; 7. De Somno et Somniferis, Francfort, 1680, 1683, 4to; 8. De Usu Plantarum Indigenarum in Medicina, Copenhagen, 1688, 1690, 8vo; 9. Dissertationes V. de Poetis Græcis et Latinis, ibid. 1676; 10. Conspectus Chemicorum Scriptorum Illustriorum, ibid. 1696, 4to; 11. De Antiqua Urbis Romæ Facie, ibid. 1697, 8vo; 12. De Urbis Romæ Primordiis, ibid. 1687, 4to; &c., &c.

BORROMEAN ISLANDS, a group of four small islands on the western side of Lago Maggiore, in Continental Sardinia. Up to the middle of the seventeenth century these islands were mere barren rocks. About this time Vitaliano, Count Borromeo, master-general of the ordnance to the king of Spain, directed that they should be covered with earth from the neighbouring banks of the lake; and, at an enormous expense, the islands were converted into pleasure gardens. The most celebrated of these are the Isola Bella, and the Isola Madre. The others are called the Isola S. Giovanni or Isolino, and the Isola Superiore or de' Piscatori, which contains a small fishing village of about four hundred inhabitants, with a parish church. Isola Bella

Borromeo. appears in ten successive terraces, rising one hundred and thirty feet above the level of the water, each regularly decreasing in size from the base to the summit, which is an oblong surface, seventy feet by forty in extent, paved and surrounded by a balustrade. The whole are environed by gigantic marble statues of gods, goddesses, and horses, or other figures; and the walls are clothed with the finest fruittrees and evergreens, many of which belong to the southern climates. There is, besides, a magnificent palace towards the western end of the island, close to the lake, which almost washes its walls. It is built on arches, which are formed into grottos, with a floor of mosaic, representing various objects, and decorated also with shell-work and marble. The palace itself contains a profusion of marbles and paintings; and some flower-pieces executed on marble, have been particularly admired, as also busts and statues. At the angles of the garden, which has a southern exposure, there are two round towers with lofty chambers adorned with red and white marble; and in the vicinity are groves of laurels, orange-trees, lofty cypresses, and other odoriferous plants, rendering it a delightful retreat. Isola Madre, which is the largest of the islands, is between one and two miles from Isola Bella; it consists of a superstructure of seven terraces, apparently lower, but not less beautiful, than the other. It is, however, of equal height in reality, the base being a perpendicular rock, rising considerably out of the water, and on that account not requiring so much covering. Here also there is a palace embellished with paintings and different ornaments; and in the gardens are groves of citrons, cedar, and orange-trees, besides a summer-house close to the lake. All the decorations are necessarily on a limited scale; and it excites the wonder of the spectator, that in a space so small so much has been done. When any foreign prince visited these islands in the night, or resided upon them, they were illuminated with various coloured lights. The expense of keeping them in the same state since 1671, about which time they seem to have been finished, has of course been very great. They are fre-" If anything," quently called the "Enchanted Islands." says Coxe, speaking of the Isola Bella, "justly gives this island the appellation of enchanted, it is the prospect from the terrace. The gradual diminution of the mountains, from the regions of eternal snow to the rich plain; the sinuosity of the lake; its varied banks; the bay of Marzozzo, bounded by vast hills; the neighbouring borough of Palanza, and more distant view of Laveno, the numerous villages, the Isola Madre, and another island sprinkled with fishermen's huts, form a delightful assemblage."

BORROMEO, CARLO, a Romish saint, was the son of Ghiberto Borromeo, Count of Arona, and of Mary of Medicis, and was born at the castle of Arona, upon the Lago Maggiore, in the Milanese, Oct. 2. 1538. When he was about twelve years old, Julius Cæsar Borromeo resigned to him an abbacy, the revenue of which he applied wholly in charity to the poor. He studied the civil and canon law at Pavia under the learned Francis Alciat. In 1554 his father died; and, although he had an elder brother, Count Frederick, he was requested by the family to take the management of their domestic affairs. After a time, however, he resumed his studies, and in 1559 he took his doctor's degree. In the following year his uncle Cardinal de' Medicis was raised to the pontificate, by the name of Pius IV.; and Borromeo was made prothonotary, intrusted with both the public and privy seal of the ecclesiastical state, created cardinal deacon, and soon after archbishop of Milan. In compliance with the pope's desire, he lived in great splendour; yet his own temperance and humility were never brought into question. He established an academy of select and learned persons, each of whom was to write on some chosen subject, either in verse or in prose, and to communicate to the society the fruits of his studies. The works thus produced were pub-

lished in several volumes at Venice in 1748, under the title Borromeo. of Noctes Vaticana. About this time he also founded and endowed a college at Pavia, which he dedicated to Justina, virgin and martyr.

Upon the death of his elder brother Frederick, his friends, and even the pope himself, advised him to quit the church, and marry, that his family might not become extinct. Contrary to expectation, however, he declined the proposal; and from that time became more fervent than ever in the exercises of piety, and more zealous for the advancement

of ecclesiastical knowledge.

On the death of Pius IV., January 7. 1566, the skill and diligence of Borromeo materially contributed to stifle the cabals of the conclave. As soon as tranquillity had been re-established, Borromeo devoted himself wholly to the reformation of his large and important diocese, where the most flagitious irregularities were openly practised. He began by making pastoral visits in his metropolis; and by a variety of wise and necessary regulations, he soon restored proper decency and dignity to divine service. In conformity to the decrees of the council of Trent, he cleared the cathedral of its gorgeous tombs, rich ornaments, banners, arms, &c., sparing not the monuments even of his own relations. Nor did his zeal stop here. He divided the nave of the church throughout its whole length into two compartments, so that the sexes, being separated, might perform their devotions with feelings suitable to the place. He proceeded next to the collegiate churches, and even to the fraternities of penitents, particularly that of St John the Baptist. The reformation of the monasteries followed that of the churches; and the vigilance of the archbishop soon extended itself from the city to the country round it. The great abuses which had overrun the church at this time arose principally from the ignorance of the clergy. In order, therefore, to attack the evil at its root, Borromeo established seminaries, colleges, and communities, for the education of young persons intended for holy orders. He met with much opposition in his endeavours to bring about a reformation of manners; but by an inflexible constancy, tempered with great sweetness of manners, he prevailed against every obstacle, and succeeded in rendering the most important services to the cause of morals as well as religion. The governor of the province, and many of the senators, apprehensive that the cardinal's ordinances and proceedings would incroach upon the civil jurisdiction, addressed many remonstrances and complaints to the courts of Rome and Madrid. These, however, in as far as concerned the king of Spain, Philip II., were referred entirely to the decision of the pope. But Borromeo had more formidable difficulties to struggle with, in the inveterate opposition of several religious orders, particularly that of the Brothers of Humility. Three provosts of the society entered into a conspiracy to cut him off; and one of their confederates, Jerome Donat, surnamed Farina, took upon him to carry the design into execution. For this purpose he mixed with the crowd in the archiepiscopal chapel, where Borromeo spent an hour every evening in prayer with his domestics and other pious persons; and having watched his opportunity, he fired at him with a heavily loaded arquebuss. The shot, strange to say, took no effect, though it was affirmed to have ruffled the rochet of the cardinal. His escape was believed to be miraculous, and was certainly wonderful, considering that the assassin had taken his station within five or six paces of his intended victim. At the moment when the shot was fired the choir were chanting the fine old melody, Non turbetur cor vestrum neque formidet; and it is said that the cardinal continued the service without any apparent emotion.

In the year 1576 the city and diocese of Milan were visited by the plague, which swept away great numbers. On this occasion Borromeo, with a spirit truly Christian and heroic, went about giving directions for accommodating the sick and Borseholder.

Borromeo burying the dead, avoiding no danger, and sparing no expense. Nor did he content himself with establishing proper regulations in the city, but went into all the neighbouring parishes where the contagion raged, distributing money, providing accommodation for the sick, and punishing those, especially the clergy, who were remiss in discharging the duties of their calling. Notwithstanding the fatigue and perplexity which he experienced in thus executing his pastoral charge, he abated nothing of the usual austerity of his life; bread and water constituting his humble daily fare.

But continual labours and austerities combined to shorten his valuable life. He was seized with an intermittent fever, and died at Milan, Nov. 4. 1584. He was immediately worshipped as a saint, but was not canonized till 1610. Besides the Noctes Vaticane, to which he appears to have contributed, the only literary relics of this intrepid and zealous reformer are some homilies, discourses, and sermons, with a collection of letters. Several lives of him have been published, viz., by Godeau; by Touron, a Dominican; by Ribadeneira, a Spanish Jesuit; and by Bimeus, and others. Through all the mist of absurdity and superstition in which the character and actions of Borromeo have been involved, it may safely be affirmed that if the Church of Rome had had many such men, religion might have been spared some grievous wounds, and Europe many afflicting and sanguinary convulsions.

Borromeo, Frederigo, nephew or cousin-german of the preceding, and likewise a cardinal and bishop of Milan, is chiefly known as the founder of the Ambrosian library. See LIBRARIES. He died A.D. 1632. He was the author of Meditamenta Litteraria (published in 1633, 4to), and

some other works.

BORROMINI, Francesco, an Italian architect, born at Bissone in 1599. He was much employed in the middle of the seventeenth century at Rome; but in his style he affected originality and richness, which corrupted the noble simplicity of the older schools, though his compositions are occasionally imposing. His principal works are the church of St Agnese in Piazza Navona, the church of San Carlo alle Fontane, the church of Collegio di Propaganda, and the restoration of San Giovanni in Laterano. He died by his own hand at Rome in 1667.

BORROWSTOWNNESS, by abbreviation Borness, one of the oldest seaport towns of Scotland, is in the county of Linlithgow, on the shore of the Firth of Forth, N. Lat. 56. 2. W. Long. 3.35. Though now decaying, it was formerly a place of considerable traffic, and had many ships engaged in colonial and foreign trade. Its commerce is now for the most part confined to the Baltic, but it still sends a few ships annually to the whaling. The harbour is excellent, but is now no longer able to defray current expenses, especially since Grangemouth began to rise into importance. In the town there are extensive manufactories of salt, of which 30,000 bushels are annually exported. A good many ships were formerly built here, and the patent slip is still frequently used. Besides the salt works, there are two distilleries, a pottery, rope-work, and vitriol and soap works. There are also valuable collieries in the neighbourhood, some of which have been worked for centuries, and extend under water to the distance of a mile. Besides the parish school, there are several private institutions. The most interesting objects in the parish are Graham's Dyke (a part of the Roman wall of Antonine), and Kinniel House, for many years the residence of Dugald Stewart. Pop. (1851) 2645.

BORSEHOLDER (borough's elder), among the Anglo-Saxons, one of the lowest magistrates, whose authority extended only over one free burgh, tithing, or decennary, consisting of ten families. Every freeman who wished to enjoy the protection of the laws, and not to be treated as a vagabond, was under the necessity of being admitted a member of the tithing where he and his family resided; and in order to obtain this admission, it was necessary for him to main-

tain a good reputation, because all the members of each tithing being pledges for one another, and the whole tithing sureties to the king for the good behavour of all its members, they were very cautious in admitting any into their society who were of bad or doubtful character. Each tithing formed a little state or commonwealth within itself, and chose one of its most respectable members for its head, who was sometimes called the alderman of such tithing or free burgh, on account of his age and experience, but most commonly borseholder, from the Saxon words borch, a security, and alder, a head or chief. This magistrate had authority to call together the members of his tithing, to preside in their meetings, and to put their sentences in execution. The members of each tithing, with their tithing-man or borseholder at their head, constituted a court of justice, in which all the little controversies arising within the tithing were determined. Any dispute of great difficulty or importance was referred to the next superior court, which was that of the hundred.

BORYSTHENES, in Ancient Geography, the largest river of Sarmatia Europæa, now called the Dnieper. Its sources were unknown to the ancients. (Herod. iv., Mela, ii.)

BOS. See MAMMALIA, Index.

Bos (βοῦς), a very ancient Attic silver coin or didrachmon: it was sometimes, though rarely, struck of gold. This coin was so called from having on it the impression of an ox; hence the phrase Bos in lingua, applied to one who had taken a bribe to hold his tongue.

BOSA, a city on the western coast of the island of Sardinia, in a fine valley on the northern bank of the Termo. It is well built and paved; is the see of a bishop; and has a cathedral, a diocesan seminary, and several schools. The harbour is safe, being sheltered by the islet of the same name. Pop. 6000. Long. 8. 25. 31. E. Lat. 40. 16. 40. N.

BOSCAGE, a grove or thicket. It is used in old laws for the food of cattle yielded by trees and bushes.

BOSCAN, Almogaver, Juan, a Spanish poet, born of a good family at Barcelona about A.D. 1500. He was the intimate friend of Garcilaso de la Vega, and with him contributed essentially to the improvement of Spanish poetry. He was the first who introduced hendecasyllabic verse into Spanish poetry; and he translated into the Castilian tongue the sonnets and other poetical forms consecrated by the usage of the best Italian authors. His poetry is divided into three books, the first of which contains only redondillas, while the two others are filled with the pieces which he composed after he adopted his new method, namely canciones, sonnets, tercetts, compositions in the ottava rima, and in blank verse. Boscan was tutor to the celebrated Ferdinand of Toledo, Duke of Alva, and appears to have died about the year 1544. His works were printed in conjunction with those of his friend Garcilaso, at Lisbon in 1543; at Leon

in 1549; and at Venice in 1553. (Bouterwek, i. 232.) BOSCAWEN, EDWARD, a brave British admiral, was the third son of Hugh Lord Viscount Falmouth. Having early entered into the navy, he was, in 1740, captain of the Shoreham; and he behaved with great intrepidity as a volunteer under Admiral Vernon, at the taking of Porto-Bello. At the siege of Carthagena, in March 1741, he had the command of a party of seamen who resolutely attacked and took a battery of fifteen 24-pounders, though exposed to the fire of another fort of five guns. In 1744, when in command of the Dreadnought of sixty guns, he captured the Medea, a French man-of-war commanded by M. de Hocquart, the first ship taken in that war. In May 1747 he signalized himself under the admirals Anson and Warren, in an engagement with the French fleet off Cape Finisterre, and was wounded in the shoulder with a musket-ball. Here M. de Hocquart, who then commanded the Diamond of fifty-six guns, again became his prisoner; and all the French ships of war, ten in number, were taken. On the 15th of July

Borysthenes Boscawen. Boscovich.

following, he was made rear-admiral of the blue, and commander-in-chief of the sea and land forces employed on an expedition to the East Indies. On the 4th November he sailed from St Helen's, with six ships of the line, five frigates, and 2000 soldiers; and on the 29th July 1748 he arrived at St David's, and soon after laid siege to Pondicherry. The men, however, growing sickly, and the monsoons being expected, the siege was raised, and Boscawen in his retreat displayed the skill of an able military commander. Soon afterwards he received news of the peace, and Madras was delivered up to him by the French. In April 1750 he arrived at St Helen's in the Exeter, and found that in his absence he had been appointed rear-admiral of the white. He was the next year made one of the lords commissioners of the admiralty, and chosen an elder brother of the Trinityhouse. In February 1755 he was appointed vice-admiral of the blue. On the 19th of April, sailing in order to intercept a French squadron bound to North America, he fell in with the Alcide and Lys of sixty-four guns each, which were both taken. On this occasion M. de Hocquart became his prisoner for the third time, and Boscawen returned to Spithead with his prizes and 1500 prisoners. In 1756 he was appointed vice-admiral of the white, and in 1758 admiral of the blue and commander-in-chief of the expedition to Cape Breton, when, in conjunction with General Amherst, and a body of troops from New England, the important fortress of Louisberg, and the whole island of Cape Breton were taken; services for which he received the thanks of the House of Commons. In 1759, being appointed to command in the Mediterranean, he arrived at Gibraltar, where, hearing that the Toulon fleet, under M. de la Cue, had passed the Straits in order to join that at Brest, he got under sail, and on the 18th of August saw, pursued, and engaged the enemy. His ship, the Namur of ninety guns, losing her mainmast, he shifted his flag to the Newark; and, after a sharp engagement, took three large ships and burnt two, in Lagos Bay, after which he returned to Spithead with his prizes and 2000 prisoners. On the 8th December 1760 he was appointed general of the marines, with a salary of L.3000 per annum, and was also sworn a member of the privy council. He died in 1761, in the fiftieth year

BOSCOI, or Bosci (βόσκοι), the name given to a class or tribe of monks in Palestine, who took no care about provision, but when eating time came, went into the fields and ate what they could find.

BOSCOVICH, ROGER JOSEPH, a celebrated natural philosopher, born May 18. 1711, at Ragusa, a seaport on the Adriatic. His youth appears to have been marked by no precocity of talent while he studied grammar and philosophy in the schools of the Jesuits. Among these shrewd observers, however, his docility and obedience were sufficient to procure him particular attention. In his fifteenth year, after he had gone through the ordinary course of education, he was admitted into the order, and sent to Rome. Here his studies changed their character and direction: the rules and constitutions of the order claimed his attention for two years; after which he was instructed in rhetoric, and became well versed in general literature, particularly Latin poetry.

After completing his noviciate, he was sent to the Roman college to study mathematics and physics; and it was in these sciences that his genius and abilities shone forth so conspicuously. He soon arrived at eminence, and after being exempted from the operation of a law, by which the novices were bound to teach Latin and the belles-lettres for five years before they commenced the study of theology, he was appointed mathematical professor in the Jesuit's college. For this chair he was eminently qualified, as, besides a thorough knowledge of all the modern productions in the science, he had acquired a classical severity of demonstration by studying the works of the ancient geometricians Notwithstanding his

arduous duties as an instructor of youth, it was about this Boscovich. period that he formed some of those refined and original notions which were destined to grow up into the system that afterwards became so celebrated. The animating spirit of discovery and invention led him to consider every portion of physical science; and indeed so versatile and vigorous was his mind, that we should be at a loss to specify any one portion which, within a few years, it did not comprehend, elucidate, and advance. In confirmation of this it will be sufficient to enumerate the principal subjects on which he published dissertations while he continued in the professorship. These were, the transit of Mercury over the sun, the spots in the sun, the aurora borealis, the construction of spherical trigonometry, the figure of the earth, a new telescope to determine celestial objects, the ancient arguments for the rotundity of the earth, oscillating circles; on infinites and infinitely small quantities, the motion of bodies in unresisting spaces, the aberration of the fixed stars, the inequalities in terrestrial gravity; on astronomy, on the limits of certainty in astronomical observations; on the solid of greatest attraction, the cycloid, the logistic curve lines, the vires vivæ, the comets, light, the tides, the rainbow, the calculation of fractions, the centre of gravity, the moon's atmosphere, the law of continuity, lenses and dioptrical telescopes, the objective micrometer, and the divisibility of matter. Some of these are short, but all of them contain curious and valuable matter. It is only by perusing them that we are able to discover the gradual progress of his mind, and to understand the manner in which he arrived at that theory of natural philosophy which is now known by his name.

About this time a taste for philosophical poetry was very prevalent amongst the learned, and some of Boscovich's acquaintances had laboured in it with success. Of these we may mention Father Noceti, who wrote on the rainbow and the aurora borealis, and Benedict Stay, whose poems on the philosophy of Descartes, and on the more modern philosophy, are considered as excellent examples of Latin composition. Boscovich published the works of both with annotations and supplements which display a rich fund of information and learning. By such undertakings his fame soon became widely diffused. The learned societies of many countries in Europe conferred on him unsolicited honours, and several foreign princes invited him to their courts. His opinions on various subjects of civil architecture, topography, and hydrodynamics, were solicited by Pope Benedict XIV., John V. of Portugal, and others. These applications necessarily required his presence in different states of Europe, where he never failed to enhance his reputation, and often terminated disputes which, but for his judicious interference, might have had disagreeable consequences. He was employed to correct the maps of the papal dominions, and to measure a degree of the meridian there. In this operation he was assisted by an English Jesuit named Christopher Maire. An account of their expedition was printed at Rome and Paris, and is interspersed with some curious anecdotes; but it is chiefly valuable for the detail which is given of their observations.

In 1757 he was sent to Vienna by the republic of Lucca, to settle some differences concerning the draining of a lake, in which the grand duke of Tuscany, the emperor Francis I., and that republic, were concerned; and after succeeding in the object of his mission to that city, he published there his Theoria Philosophia Naturalis in 1758. Another occasion for his mediating powers, that more nearly interested him, soon presented itself. The British government having suspected that some ships of war had been fitted out at Ragusa for the service of France, and that its neutrality had thus been infringed, the senate of Ragusa became alarmed at the suspicion, and employed Boscovich, who had often been successful in similar missions for other powers, to proceed to London, where he effected the object of his mission,

Boscovich. with honour to himself, and satisfaction to his native state. In 1760 he visited the Royal Society, which received him with distinguished marks of respect; and he soon afterwards complimented that body with a Latin poem on the solar and lunar eclipses. Boscovich was invited by the Royal Society to be of the party of their members about to procced to America in order to observe the transit of Venus over the sun's disc; but the nature of his embassy, and the necessity of returning home, prevented his accepting the invitation. Soon after his return, he was appointed by the senate of Milan to the mathematical chair in the university of Pavia, with the superintendence of the observatory of the royal college of Brera. He continued in this situation for six years, when the empress queen appointed him professor of astronomy and optics in the Palatine schools of Milan, and also requested that he would continue to superintend the observatory. Admired by the learned, beloved by his friends, and having an adequate income, with a sound and vigorous constitution, he promised to himself much happiness in the tranquil cultivation of the sciences. But a cloud long impending now burst over his head, in the edict for the abolition of his order, which took place in 1773. No exemption from the edict could be procured; all who held offices were dismissed; and Boscovich sought refuge in Paris. Thither indeed he was invited by Turgot, through whose means he was made one of the directors of optics for the sea service, and received a pension; but he never ceased to mourn his exile, and the ruin of his order. He remained there, however, for ten years, on the expiry of which he obtained leave to visit Italy; and he published at Bassano, in five volumes quarto, a collection of the works which he had completed in Paris.

> The following is a pretty accurate enumeration of their contents: A new instrument for determining the refracting and diverging forces of diaphanous bodies; a demonstration of the falsehood of the Newtonian analogy between light and sound; the algebraic formulæ regarding the foci of lenses, and their applications for calculating the sphericity of those which are to be used in achromatic telescopes; the corrections to be made in ocular lenses, and the error of the sphericity of certain glasses; the causes which hinder the exact union of the solar rays by means of the great burning glasses, and the determination of the loss arising from it; the me-thod of determining the different velocities of light passing through different media by means of two dioptric telescopes, one common, the other of a new kind, containing water between the objective glass and the place of the image; a new kind of objective micrometers; the defects and inutility of a dioptric telescope proposed and made at Paris, which gives two images of the same object, the one direct, the other inverse, with two contrary motions of movable objects; masses floating in the atmosphere, as hail of an extraordinary size, seen on the sun with the telescope, and resembling spots; the astronomical refractions, with various methods for determining them; different methods for determining the orbits of comets and of the new planet, with copious applications of these doctrines to other astronomical subjects, and still more generally to geometry and to the science of calculation; the errors, rectifica-tions, and use of quadrants, sextants, astronomical sectors, the meridian line, telescopes called transit instruments, the meridian, and the parallactic machine; the trigonometrical differential for mulæ, which are of so much use in astronomy; the use of the micrometrical rhombus, extended to any oblique position whatsoever; the error arising from refractions in using the astronomical ring for a sun-dial, and the correction to be made; the appearing and the disappearing of Saturn's ring; methods of determining the rotation of the sun by means of the spots; the greatest exactness possible in determining the length of a pendulum oscillating every second of mean time by the comparison of terrestrial and celestial gravity; a compend of astronomy for the use of the marine, containing the elements of the heavenly motions, and of the astronomical instruments, to be explained to a prince in the course of one month; a method for determining the altitudes of the poles with the greatest exactness, by means of a gnomon alone, where other instruments are not to be had; the determination of the illuminated edge of the moon to be observed on the meridian; a method of using the retrograde return of Venus to the same longitude, for determining the less certain elements of her orbit; a method for correcting the elements of a comet, of which the longitude of the node is

given, and the inclination of the orbit has been nearly found; an- Bosjesmans other method for the same purpose, and for finding the elliptical orbit, when the parabolic one does not agree with observation; a method for correcting the elements of a planet by three observations; the projection of an orbit inclined in the plane of the ccliptic; the projection of an orbit inclined in any other plane; the calculation of the aberration of the stars, arising from the successive propagation of light; and some beautiful theorems belonging to triangles, which are of great use in astronomy, reduced to the most simple demonstrations.

After the publication of these works, Boscovich quitted Bassano, and went to Rome to visit the companions of his youth. From Rome he proceeded to Milan, where he revised some of his own works, and prepared for publication the two last volumes of Stay's poems. His death took place on the 13th of February 1787, in the seventy-sixth

vear of his age.

Besides the different works above mentioned, Boscovich wrote several others on various subjects, as on the project of turning the navigation to Rome from Fiumicino to Maccarese; on two torrents in the territory of Perugia; on the embankments of the river Ponaro; on the river Sidone in the territory of Placentia; on the embankments of the Po; on the harbours of Ancona, of Rimini, of Magna Vacca, and Savona; besides some others, almost all of which were printed. For an account of the system developed in the Theoria Philosophiæ Naturalis, see the article Physics.

BOSJESMANS, or BUSHMEN, a race of Hottentots who inhabit the sides and valleys of the Sneewberg, or Snowy Mountains, which form the northern boundary of the colony of the Cape of Good Hope. They are rude and savage in the extreme, and in their persons present a caricature of that form which characterizes the Hottentot, the hollow back, protruding belly, and large buttocks. Destitute of cultivation, and inhabiting the most desolate tracts, they procure with difficulty even a scanty supply of the most wretched aliments. Wild animals, roots, and the larvæ of ants and insects, form their usual resources. To this, indeed, they add frequent predatory excursions to the storefarms in the plains; but this involves them in a severe and unequal contest, since their arrows, though tipt with deadly poison, and shot with surprising dexterity, are no match for The cruelty with which the fire-arms of the colonists. they have been pursued by the colonists still renders them extremely shy of strangers. Mr Barrow met with a young man who had made a journey along part of their territory, and who being asked if he had seen any of them, replied with an air of disappointment, that he had shot only four. Judging from the accounts of travellers who have been among them, and from the individuals of their race exhibited in this country, they appear to be by no means unsusceptible of civilization. They display nothing of that sluggish and gloomy deportment which characterizes the servile Hottentot. They bound with wonderful agility from rock to rock, either in flight or in chase of their prey; and on certain festive occasions, they give way to an extravagant gaiety, dancing whole days and nights, especially by moonlight. Even the pictures of animals which they delineate on the rocks are not altogether destitute of spirit or resemblance. See Burchell's Travels.

BOSNA SERAI, or SERAJEVO (ancient *Tiberiopolis*), a city of European Turkey, capital of the province of Bosnia, is situated on the Migliazza, 246 miles south of Buda, Lat. 43. 54. N. Long. 18. 26. E. The town is well built, occupying the declivities of several small hills, and its numerous turrets and minarets give it a rather imposing aspect. It is defended by a strong citadel, but the walls which formerly surrounded the town are now in ruins. It derives its name from the Serai or palace built by Mohammed II., and contains numerous mosques, and several Greek and Roman Catholic churches. The chief manufactures are fire-arms, jewellery, leather, and cotton and

Bosna Serai.

Bossu

Bossuet.

Bosnia || Bosso. woollen stuffs. In the vicinity are extensive iron mines. Population estimated at from 40,000 to 60,000.

BOSNIA, the most north-westerly province of Turkey in Europe, comprising Bosnia Proper, Turkish Croatia, and Herzegovina. It extends from Lat. 42. 30. to 45. 15. N. and from Long. 15. 40. to 21. 2. E., and is bounded on the north and west by the Austrian dominions, south by Montenegro and Albania, and east by Servia. Area estimated at 18,800 square miles; pop. (1844) 1,100,000. The whole province is mountainous, many of the summits reaching to the height of 6000 feet. From the nature of the soil, it is more appropriate for the breeding of cattle than the operations of the plough. The chief kind of cattle reared, are sheep in large flocks, some good horses and cows, with here and there a few buffaloes and goats. There are a few mines of copper; and formerly some of gold and silver were worked, especially a very celebrated one at Jlatnizza; but they are now neglected. Bosnia has some quarries of good marble; and at Tuzla is a very copious and strong spring of salt water, which is converted into culinary salt. The manufactures are of the domestic kind, and upon a small scale, including leather, cloth, and iron wares. Bosnia is under the government of a pasha of three tails, and is divided into six circles, and forty-eight smaller divi-

BOSPHORUS, or rather Bosporus, the name given by the Greeks to any straits. Bosporus is synonymous with the Italian faro, the Latin fretum, and the French pas or manche. The word is formed of $\beta o \hat{v}_s$, an ox, and $\pi o \rho o \hat{v}_s$, passage, probably from the idea that an ox might swim across. The origin of the name is not disputed; but various mythological legends were invented to account for its first application; as that of its having derived its name from Io, who crossed it under the form of a heifer. The name of Bosporus is chiefly confined to two straits, namely, the Bosporus of Thrace, commonly called the Strait of Constantinople, or Channel of the Black Sea; and the Cimmerian or Scythian Bosporus, now known as the Strait of Yenikalé. See Black Sea.

BOSQUETS, in *Gardening*, groves, so called from boschetto, an Italian word which signifies a little wood.

BOSSCHA, HERMANN, a distinguished scholar and antiquary, born at Leeuwarden in Friesland, March 18. 1755. After having been rector of the Latin schools at Francker and Deventer, in 1795 he was appointed to a chair in the university of Harderwyck. He was subsequently a professor at Groningen; and in 1807 he was appointed to the chair of history in the Athenæum at Amsterdam. Bosscha died on the 12th Aug. 1819. He was an excellent Latin poet, and the author of various works on classical subjects, besides translations, and a history of the revolution in Holland in 1813.

BOSSCHAERT, THOMAS WILLIBRORD, a Flemish painter, born at Bergen-op-Zoom in 1613, and educated at Antwerp under Gerard Seghers. After a residence of four years at Rome he returned to Antwerp, and acquired a high and merited reputation. His works, which are in the style of Vandyck and Reubens, are harmonious and tender in colouring, the drawing is free and spirited, and the finish is frequently exquisite. He died in 1656.

BOSSINEY, a small village in the parish of Tintagel, on the north coast of Cornwall, and consisting of little more than a group of cottages. Previous to the passing of the Reform Act it united with the small neighbouring village of Trevenna in returning two members to parliament. The ruins of a castle near it are said to be those of the palace in which King Arthur was born, and where the ancient dukes of Cornwall resided. Pop. of parish in 1851, including both villages, 1084.

BOSSO, in Latin Bossus, Matteo, distinguished by his virtue and his learning, was born at Verona in 1428. In 1451 he joined the congregation of regular canons of St

John de Lateran; and he afterwards taught divinity at Padua. His orations, sermons, and letters, have often been printed; and he also wrote a sort of apology for Phalaris, and other works. He died at Padua in 1502.

BOSSU, RENÉ LE, an eminent French critic, born at Paris, March 16. 1631. He studied at Nanterre; and in 1649 entered among the regular canons of Sainte-Geneviève. After having professed the humanities in different religious houses for twelve years, he withdrew into retirement. His first publication was Parallèle des Principes de la Physique d'Aristote et de celle de René Descartes, which appeared in 1674. He attempted, says Voltaire, to reconcile Aristotle and Descartes, not aware that it had become necessary to abandon both. His next work, entitled Traité du Poème Epique, was published in 1675, and often reprinted afterwards. Its leading doctrine is that the subject should be chosen before the characters, and that the action should be arranged without reference to the personages who are to figure in the scene. Nevertheless, Boileau, in his Third Reflexion on Longinus, pronounces this work "I'un des meilleurs livres de poétique qui, du consentement de tous les habiles gens, aient été faits en nôtre langue." In abatement of this commendation, however, it may be stated, on the authority of Le Courayer, that Le Bossu had defended Boileau against Saint-Sorlin, by whom he had been attacked; that Boileau expressed himself exceedingly grateful for this service; and that a sense of obligation may perhaps have dictated the commendation he bestowed on the work. Bossu died March 14. 1680.

BOSSUET, JACQUES BÉNIGNE, one of the most illustrious prelates which the church of France—so fruitful in great men—has ever produced, was born at Dijon on the 27th September 1627. He was descended from an ancient and noble family in Burgundy. On the establishment of the parliament of Metz, his father was appointed one of its counsellors. Being destined by his parents for the church, the young Bossuet took the clerical tonsure before he had completed his eighth year. At first he was placed under the care of his uncle, the first president of the parliament of Metz; and he used to relate that while a mere boy under his uncle's roof he read the Old Testament with a relish and delight far exceeding any pleasure he afterwards felt on the perusal of any other work. His uncle afterwards placed him at the college of the Jesuits at Dijon, where he applied himself to his studies with such labour and success that they desired to attach him to themselves; but in 1642 his uncle sent him to Paris to the college of Navarre. Here, under the direction of the celebrated Nicholas Cornet the principal, Bossuet made rapid progress in Greek and philosophy, relieving his studies from time to time by reading the best works of antiquity; but the Scriptures and religious books always occupied a large share of his time. At the age of sixteen he supported his first thesis in a manner which gave indications of his future greatness, and which caused him to be already regarded as a prodigy. An extempore sermon, which he shortly afterwards delivered at the Hotel of Ram bouillet, in presence of an assembly partly composed of the most celebrated men of the time, excited general admiration.

He was admitted into the corporation of the college at the age of twenty, on which occasion he chose for the subject of his thesis a comparison between the glory of this world and that which awaits the just in the next. During the delivery of this discourse, the great Condé, who had just dazzled France by the splendour of his victories, suddenly entered the hall, surrounded by a number of his companions in arms. The orator, without interrupting his harangue, immediately addressed himself to the young conqueror, and, in the name of France, paid him a just and appropriate tribute of admiration and praise; but he told him at the same time how vain and perishable was the glory which he had acquired. Forty years after, Bossuet repeated the same

Bossuet. truths over the bier of the princely warrior. During the whole of that long period he had enjoyed his friendship and

> In 1652 Bossuet took the degree of doctor, and received also the order of priesthood. In thus devoting himself to the cause of religion, he exclaimed, "Under thy auspices, O sacred Truth, I will joyfully approach those altars which are to witness the oath I am about to take; an oath which our ancestors have often heard; that most pleasing and most sacred oath, by which I am to bind myself, even to death, to the holy cause of truth." After passing some time in the retreat at St Lazarus under the discipline of St Vincent de Paul, whose friendship he had obtained, he went to Metz, in the cathedral church of which city he had previously obtained the preferment of a canonicate, and where he was successively raised to the rank of archdeacon and dean. He now applied himself wholly to the duties of his ministry, edifying those who surrounded him by the purity of his life, and astonishing them by the splendour of his talents. His first appearance as an author was in 1655, when he published his Refutation of the Catechism of Paul Ferry, a Protestant minister highly esteemed for his learning and talents. This work advanced his reputation greatly with his own party, and, it is said, gained him even the respect of the Protestants. The affairs of the cathedral rendering his presence necessary in Paris, he often preached there; and his sermons were so universally applauded, that he was appointed to preach in the chapel of the Louvre before Louis XIV. during the Lent of 1663. His Majesty signified the pleasure he derived from his sermons in a letter which his private secretary wrote by his desire to Bossuet's father.

> In 1669 he was nominated to the bishopric of Condom; but being appointed preceptor to the Dauphin the following year, he resigned his see, because he considered his new charge as inconsistent with the duty he owed to his diocese. For the instruction of the Dauphin he composed his work on universal history, which he divided into three parts. The first part is purely chronological; but it has been well observed that it scarcely contains a sentence in which there is not some noun or verb that conveys an image or suggests a sentiment of the noblest kind. The third part, which is historical, contains the most profound reflections on the rise "But in the second part of it," as one and fall of empires. of his biographers observes, "the genius of Bossuet takes its highest flight. He never appears on the stretch of exertion; he is never lost in the mazes of argumentation; but, in a continued strain of sublime eloquence, he displays the truths and proofs of the Christian religion with a grandeur of thought, a magnificence of language, and a force of evidence, which nothing can withstand. A nobler work in support of Christianity has never issued from the press." This work was first published in 1681. Ten years previous, he had published his Exposition of the Doctrine of the Catholic Church in Matters of Controversy, which was speedily translated into all the living languages of Europe. Pope Innocent XI. formally approved of it by two successive briefs on the 22d November 1678 and the 12th July 1679; and the Gallican clergy in their assembly of 1682 gave it also the seal of their approbation. It has therefore, we believe, been regarded as a correct exposition of the tenets of the Roman Catholic Church. The publication of the Exposition gave rise

one of the ablest divines of the Reformed church in France. Having finished the education of the Dauphin in 1681, the king nominated Bossuet to the bishopric of Meaux, and he entered with zeal upon the duties of his new episcopate. He took a very active part in the general assembly of the church of France held the following year, and drew up the celebrated declaration of 1682 against the attempted encroachments of the see of Rome. Bossuet now directed all

to the famous conference between Bossuet and Claude,

all his controversial works, the History of the Variations of Bossuet. the Protestant Churches, which was first published in 1688. Gibbon in his younger years was converted to the Roman Catholic faith by perusing this work, retiring for a while, like Chillingworth, (to use the expression of Dr Johnson in his Life of Dryden,) into the bosom of an infallible church. It has been remarked as a singular coincidence, that although no writers were ever more opposed in sentiment than Bossuet and the author of the Decline and Fall of the Roman Empire, yet the latter (c. 54) adopts and aggravates the charges made by Bossuet, in his History of the Variations, of the alleged Socinian tendency of the principles of the Reformation.

During the last years of his life Bossuet was much occupied in the hopeless scheme of effecting a union between the Roman Catholic and Protestant churches. The negotiation was first carried on with Molanus, who limited his views to a junction between the Roman Catholic and Lutheran churches, a plan which many persons considered by no means impracticable. But Leibnitz, who succeeded Molanus on the part of the Protestants, being desirous of including the whole Protestant churches in the arrangement, the negotiation failed, as might have been expected, after

a correspondence of ten years.

It was the fate of Bossuet to be involved in religious controversy during the greater part of his life. He entered the arena at the age of twenty-eight, and during the fifty years which followed, his pen was in constant requisition. He composed with ease, but, like Burke, he laboured hard to improve his writings, and did not cease to alter them till they issued from the press; yet the style of both is as free as if it had been quite spontaneous. Some of Bossuet's principal writings against the Protestants have been mentioned. He was also engaged in controversies with persons of his own communion. That with the amiable Fenelon is the most conspicuous. The mystical speculations of Madame Guyon of Port Royal having found an abettor in the person of the author of Telemachus, in a work on the maxims of the saints, Bossuet drew up his Rélation du Quiétisme, in which the archbishop was attacked with great severity. Fenelon published a reply, in which meekness, simplicity, and grandeur of mind were admirably blended. The writings in this controversy are amongst the finest in French literature; but Quietism being a perishable topic, these writings are now seldom read. In this contest the eagle of Meaux carried off the palm of victory.

Among the writings of Bossuet, his sermons and funeral orations are particularly to be distinguished. Of the latter, the finest is that on the death of Henrietta-Anne, the daughter of our Charles I. and wife of the Duke of Orleans. As his funeral orations place him in the first class of orators, so his sermons unquestionably rank him in the first line of preachers. It has been observed that Bourdaloue and Massillon alone can dispute his pre-eminence. In the opinion of Voltaire, the eloquence of Bossuet stands unrivalled. This great prelate died on the 12th of April 1704, in the 77th year of his age. Massillon and other French writers have eulogized the talents and virtues of Bossuet in terms of the highest admiration: and he is thus noticed by the Reverend Mr Eustace in his Classical Tour: "Bossuet was indeed a great man, and one of those extraordinary minds which, at distant intervals, seem as if deputed from a superior region to enlighten and astonish mankind. all the originality of genius, he was free from its eccentricity and intemperance. Sublime, without obscurity—bold, yet accurate-splendid, and yet simple at the same time,he awes, elevates, and delights his readers, overpowers all resistance, and leads them willing captives to join and to share his triumph. The defects of his style arise from the imperfection of his dialect. And perhaps he could not the energies of his powerful mind to the most important of have given a stronger proof of the energies of his mind

than in compelling the French language itself to become the vehicle of sublimity. His works, therefore, are superior to all other controversial writings in his own or any other language." His works were collected and published soon after his decease in twelve volumes quarto. The Benedictines of St Maur published another edition; but a more complete edition, in forty-three volumes octavo, was published in 1815–20. Cardinal de Bausset wrote a history of the life of Bossuet, which was published in four

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volumes octavo. (J. B—E.)
BOSSUT, CHARLES, an eminent French mathematician, born at Tarare, near Lyons, August 11. 1730; died January 14. 1814. He was the friend and associate of Condorcet, D'Alembert, Bailly, and Lavoisier. His principal work is entitled Traits Elementaire de Mecanique et de Dynamique.

BOSTON, a parliamentary and municipal borough and seaport town of England, in the county of Lincoln and wapentake of Skirbeck. It is situated in a rich agricultural district on the Witham, six miles from the sea, and 28 miles S.E. of Lincoln. Lat. 52. 59. N. Long. 0. 2. E.

Boston is by some supposed to have been a Roman station in the province of Slavia Cæsariensis, of which Lincolnshire formed a part, but of this sufficient evidence does not seem to exist. According to the Saxon Chronicle, St Botolph, the patron of sailors, founded a monastery at Icanhoe in 654, which was destroyed by the Danes in 870. From this Boston is said to have taken its name (Botolph's town). It became a place of considerable commercial importance after the Norman conquest, and, in 1204, when the quinzieme tax was imposed on the ports of England, that of Boston amounted to L.780, and was exceeded only by that of London, which was L.836. A great annual fair was held at Boston about this time. By 27th Edward III. it was made a staple for wool, woolfells, leather, and lead. Its prosperity about this time induced merchants from the Hanseatic and other Continental commercial cities to settle here, who, however, about a century later, were obliged to leave, in consequence of a quarrel with the townsmen. From this time it rapidly declined. The dissolution of the monasteries by Henry VIII. injured the town, though compensation was in some degree made by granting the town a charter of incorporation, and Philip and Mary endowed it with upwards of 500 acres of land. It afterwards suffered from the plague and from inundations, to which its low situation rendered it particularly liable. During the civil wars it was for some time the headquarters of Cromwell's army.

Boston is well built, paved, and lighted, and contains many good dwelling-houses, shops, and warehouses. It is divided into two nearly equal parts by the Witham, here crossed by an elegant iron bridge of one arch 86 feet in span. Until recently the supply of water was very deficient, but in virtue of an act passed in 1847 it has now a plentiful supply conveyed by pipes from a distance of twelve miles. The principal building is the parish church of St Botolph, founded in 1309. It is one of the largest churches without aisles in the kingdom, being 290 by 98 feet within the walls. The tower, 290 feet in height, resembles that of Antwerp cathedral, and is crowned by a beautiful octagonal lantern, forming a landmark seen forty miles off. There is a chapel of ease, erected in 1822, and chapels of Independents, Methodists, Baptists, &c.; a free grammar-school, founded in 1554, Laughton's charity school for the sons of poor freemen, a bluecoat, national, infant, Sunday, and other schools. There is also a dispensary, a town-hall, market-house, assembly rooms, theatre, borough gaol, house of correction, union poor-house, Vauxhall, mechanics' institution, public baths, two subscription libraries, custom-house, four banks, and a savings-bank. The manufactures consist chiefly of sail-cloth, canvass, sacking, ropes, beer, leather, hats, and bricks. There are also two iron and

brass foundries, and three ship-yards, with patent slips, Boston. where vessels of 200 tons are built.

From neglect to clear the river, it became so obstructed that in 1750 a sloop of forty or fifty tons could with diffi culty come up to the town at spring tides. Since that period great improvements have been made, and vessels of 300 tons are enabled to unload in the town. The foreign imports are chiefly timber, pitch, tar, and hemp from the Baltic, and coal and manufactures coastwise; the exports, wool, wood, corn, and other agricultural produce. In 1849 there belonged to the port 177 sailing vessels of 8377 tons, and two small steamers; 1253 vessels of 60,298 tons entered, and 570 vessels of 24,622 tons cleared; customduty received, L.31,355. By means of the river and the canals connected therewith, Boston has a navigable communication with Lincoln, Gainsborough, Nottingham, and Derby. The East Lincolnshire railway connects it with Louth, Grimsby, and other towns in the north, and the Great Northern with Peterborough and the south; another line extends to Lincoln. Market-day, Wednesday. Boston is divided into two wards, and is governed by a mayor, six aldermen, and eighteen councillors. It has returned two members to parliament since the reign of Edward IV. Registered electors (1851-52), 987. Population (1851) within the parliamentary boundaries, 17,518; within the municipality, 14,733.

Boston, the second commercial city in the United States of North America, and capital of the state of Massachusetts, is situated at the head of Massachusetts bay, near the confluence of the Charles and Mystic rivers, 207 miles N.E. by E. from New York. Lat. 42. 21. 23. N. Long. 71. 4. 9. W. It takes its name from the cognominal town in England, whence many of its original settlers had emigrated. They established themselves, in 1630, on the small peninsula, of about 600 acres in extent, connected with the continent by a narrow isthmus, and now known as Old Boston. As early as 1740, it was a place of some importance, and distinguished for its commercial enterprise, particularly in ship-building and the fisheries. Its population was then 17,000. For more than half a century, its progress was checked by the Indian, French, and English wars, and the restrictive policy of England; so that in 1790 its population amounted to only 18,038. Boston took the lead in opposing those obnoxious duties that resulted in the independence of the States, and suffered severely during the revolution, from the effects of which its recovery was slow: its stores and public buildings had been injured or burned down, and its commerce entirely ruined. Since 1790, however, it has made rapid advances in trade and commerce. The original limits were soon found inadequate for the growing town; and the state in 1804 annexed to it Dorchester Point, another peninsula of about the same extent, and which now constitutes South Boston. At a later period Noddles Island, having an area of 660 acres, was included within the bounds of the city, forming what is now called East Boston. Some hundred acres have also been reclaimed from the sea. Though the chartered extent of the city is thus small, being only about three square miles, its real limits are much more considerable; and, indeed, the population outside its chartered boundaries is at least equal to that within. If we include the numerous towns and villages in the suburbs, where many of the merchants and others of the city reside, and which the numerous omnibuses and railways render easy of access, the population will be much more considerable. The following are the decennial populations since 1790: -in 1800, 24,937; 1810, 33,787; 1820, 43,298; 1830, 61,392; 1840, 93,383; and 1850, 138,788. The population of the district within a circuit of nine miles from the exchange, and of which about one-fourth is occupied by water, marsh, or rocky hills too steep for building, amounted in 1850 to 269,874.

Boston.

The Peninsula of Old Boston was originally called Shawmut, or Trimountain, from its springs and three lofty hills. These last have been to a great extent preserved, and being covered with buildings, give a picturesque appearance to the city. The streets, however, having been originally laid out upon no systematic plan, and accommodated only to the nature of the ground, are in general crooked and narrow. though modern improvements have greatly remedied these inconveniences. The houses are generally of brick, but large and well built. The numerous eminences, rising from 50 to 110 feet above the level of the sea, furnish many admirable sites for building, and many of the private residences are unsurpassed in elegance and taste by those of any other city in the Union. Numerous bridges open communication in various directions for Old Boston. The principal of these are—the Charles river bridge, 1503 feet long, connecting Boston with Charlestown; West Boston bridge, 2758 feet, with a causeway of 3432 feet, leading to Cambridge; South Boston bridge, 1550 feet, from the "neck" or isthmus to South Boston; Canal bridge, 2796 feet, to East Cambridge, from the middle of which an arm extends to States Prison Point in Charlestown; Boston free bridge, 1828 feet, to South Boston; Warren bridge, 1390 feet, to Charlestown. The Western avenue leading to Brookline is a solid structure 7000 feet long, faced with granite on each side, and filled up with earth; and constitutes a tidedam inclosing a pond of 600 acres.

South Boston is united to Old Boston by four bridges, and is regularly laid out into streets and squares. In the centre are the "Dorchester Heights," 130 feet high, famous in the revolutionary war as the site of a fortification which compelled the British to abandon the harbour.

East Boston is connected with the old town by a ferry, and with Chelsea on the mainland by a bridge. This portion of the city has taken its rise since 1833. A wharf 1000 feet long is devoted to the use of the Liverpool steamers.

Boston, with the town of Chelsea, constitutes he country of Suffolk. It is divided into twelve wards; and is governed by a mayor 8 aldermen, and 48 councillors, all chosen annually by the citizens. Besides these, each ward has a warden, an overseer of the poor, a clerk, 5 inspectors, and 2 school committee men. There is a police court of three justices, for the trial of minor offences and the examination of criminal charges; as well as a municipal court, held by a single judge, with jurisdiction in all criminal cases not capital.

Among the public buildings of Boston the principal is the State house, a large and commodious edifice on Beacon Hill. 110 feet above the level of the sea, and fronting the "common." It was erected in 1798, and is 173 feet long, by 61 wide, built of brick, but painted so as to imitate stone. It is ornamented by two iron fountains, and has a fine dome 52 feet in diameter, with a cupola 230 feet above the level of the harbour, from which a magnificent view is obtained. Faneuil Hall, an ancient brick edifice, 100 feet long, by 80 wide, and three stories high, is celebrated as the spot where the revolutionary orators roused the people to resistance. Faneuil Hall market is an elegant granite building 536 feet long, 50 feet wide, and two stories in height. The city hall or old state house is another venerable edifice of revolutionary memory, and now used for public offices. The Massachusetts general hospital is a beautiful granite structure 168 feet long, by 54 wide, surrounded by four acres of ground on the bank of the Charles river. The custom-house is a splendid granite building of Grecian architecture. Among the other public buildings are the Massachusetts eye and ear infirmary; the institute for the blind at South Boston; the orphan asylum; the merchants' exchange; the athenæum; a club-house in the Italian style; three theatres; a museum; two large buildings for concerts and lectures; and a quarantine hospital at Rainsford Island. An extensive jail, and a spacious alms-house have recently been erected. In the vicinity are two large and elegant town houses of Denham and Cambridge; the Quincy market, a granite structure 500 feet

by 38; the Quincy town house; a collegiate building at Newton; the Harvard university buildings, an observatory, and a

lunatic asylum at Cambridge.

The "common" is a beautiful park in Old Boston, encircled by an iron fence; the public garden is well laid out, and contains 14 acres. Several of the squares and areas are embellished by public fountains. Although originally well supplied with water by natural springs, these soon proved insufficient for the wants of the town, and in 1795 pipes were laid by a private company for bringing water from Jamaica pond, 5 miles from the exchange. This source also proving inadequate, a new aquednet was constructed for supplying the city with water from Cochituate lake, 20 miles distant. This was commenced in 1846, and opened for use in October 1848. The water is brought by a brick conduit of an elliptical form, measuring 6 feet 4 inches by 5 feet, to a large reservoir in Brookline, covering an extent of 22 acres, and capable of containing 100,000,000 gallons. From Brookline the water is carried in large iron pipes for 5 miles to two large reservoirs, one on Beacon Hill holding 2,500,000 gallons, and the other on Dorchester Heights, South Boston, holding 6,000,000 of gallons, and each about 120 feet above the level of the sea. From these it is sent through the city by 70 miles of pipes, and is also conducted in pipes to East Boston. In 1831 Mount Auburn, in Cambridge, a spot remarkable for its natural beauties, was selected for a rural cemetery. It extends over 118 acres, and is tastefully laid out, containing a chapel, and many elegant marble monuments. There is another handsome cemetery at Forest Hill, Roxbury, and one or two others are in the course of formation. Few interments are now made within the city. The wharfs of Boston are extensive, and all lined with continuous rows of warehouses. Long Wharf is 1800 feet long and 200 wide; Central Wharf 1379 feet long and 150 wide; India Wharf 980 feet long; Granite, Commercial, and Lewis's Wharfs are of similar size. The warehouses are numerous and large, many of them four or five stories high, and extending backwards from 60 to 100 feet.

The religious and charitable institutions of the city are numerous and well supported. It has nearly 200 churches and places of worship, some of which, as Trinity and St Paul's churches, are elegant edifices. There are also a general hospital, 2 lunatic asylums, a blind asylum, an eye and ear infirmary, a maternity hospital, an orphan asylum for girls,

and a farm school for boys.

Boston has long been celebrated for the number and excellence of its schools and literary institutions. The medical branch of Harvard University has its seat here. The athenaum occupies two large buildings, the one containing a library of about 30,000 volumes; the other a picture gallery, a hall for public lectures, and other rooms for scientific purposes.

In 1850 there were 178 primary schools, with 11,376 scholars, and 22 large grammar-schools, with 9154 scholars, besides other schools with 471 scholars. The teachers of the primary schools receive a salary of \$300, and the masters of the grammar-schools \$1500 per annum. Boston has also a Latin and a high school, in which the higher branches are taught. These schools are open to all classes free of charge. Without the chartered limits are Harvard University, with its law and theological schools, a Baptist college, and many excellent schools and aca-

demies. See Massachusetts.

Among the literary societies are the American Academy of Arts and Sciences, the Massachusetts Historical Society, and the Boston Natural History Society. Deserving of particular notice among the literary institutions of Boston is the Mcrcantile Library Association. There are now several of these in the United States, but Boston has the honour of having taken the initiative in their establishment. As the name indicates, it is chiefly intended for the mercantile classes of the community; but the public generally are admitted as members, although on somewhat different terms. Its object is to prepare those of the rising generation who are to be the future merchants of the city, to assume that position with credit to themselves and honour to their country. It has a library, reading-room, classes, and lectures, with a gymnasium and riding school. The library contains about 16,000 volumes, and the annual addition is upwards of 2000. The annual subscription is only two dollars. In 1852 it had 2215 members; the income was \$7559, and the expenditure \$5806. The present premises have been found inadequate, and a new edifice is about to be erected, at the cost of from \$50,000 to \$60,000. The

Boston

Boswell.

Boston. athenaum library, the Boston and mercantile library, the law library, the state library, and the several libraries of Harvard University, contain together more than 150,000 volumes. There are 80 periodicals and newspapers published in Boston, in almost all departments of literature and science. Among these is the North American Review, which has long had a high reputation.

The harbour of Boston is one of the best in the United States, being spacious, safe, and easily defended. It is landlocked, accessible to ships of the line, and rarely if ever obstructed by ice. At the N. entrance, Lat. 42. 20. N. Long. 70. 54. W., is a lighthouse, with a revolving light 90 feet above the level of the sea. The passage is so obstructed by islands as to be barely sufficient for two large vessels to sail abreast. It is effectually commanded by two large fortresses on George's and Castle Islands, constructed with all the improvements of modern science: a third, the Citadel, on Governor's Island, is in the course of construction. From Point Alderton to Medford, the harbour is 14 miles in length, and from Chelsea to Hingham, 8 miles in width, covering an area of 75 square miles, and capable of containing all the ships of the Union. The bay contains numerous small islands, many of which afford excellent pasture. The United States have expended large sums on their fortresses and arsenal, extensive navy-yard, dry dock, rope-walks, stores of cannon, arms, and other materials, cus tom-house, and hospitals for sick and infirm seamen. All these are situated on Boston harbour, and are valued at eight millions of dollars.

In 1852, 381,088 tons of shipping belonged to the port of Boston. The arrivals from foreign ports in 1850 were 2877 vessels, of the aggregate burden of 478,859 tons, and the clearances for foreign ports, 2839, of 437,760 tons. In 1849-50, 23,480 tons of shipping were built. The foreign arrivals in 1852 amounted to 2864, and the clearances to 2863 vessels. In that year the coastwise arrivals and clearances, so far as known—those laden with wood, stone, and sand not reporting at the custom-house-were, arrivals 6286, clearances 3291. The value of foreign imports for 1849 was \$24,117,175; exports, \$8,843,974; duties, \$5,031,995; for the first half of 1850, imports, \$16,329,501; exports, \$4,426,216; duties, \$3,126,472.

The reports of the trade of Boston for 1852 indicate a considerable and healthy increase. The following list shows the state of trade in some of the principal articles during the years 1851 and 1852. The receipts include goods brought into the town, either by sea or by railway: besides the exports, large quantities of many of the articles are sent out by railway.

damming	Or III	anily or one	ar mores c	me semi our	Dy Latti	ay.
			Receipts.		Exported.	
			1851.	1852.	1851.	1852.
Coffee,		bags,	162,368	177,305	86,469	106,147
Cotton,		bales,	204,232	281,166		
Dry goods	١, .	packages,		•	47,007	62,669
Coal,	•	tons,	369,560	440,613	•	
Coal,		chaldrons	, 32,576	41,084		
Flour,		bushels,	773,512	896,454	177,346	269,771
Corn,			2,175,367	2,118,338	94,161	74,180
Oats,		•••	496,911	849,173		•
Rye and S	Shorts,	•••	169,766	168,225		
Wheat,		•••	405,044	762,939	8,890	25,187
Boots and	Shoes	, cases,	•	-	153,912	195,120
Tce.		tons			99.578	96 482

It has also an extensive trade in iron, tobacco, sugar, molasses, oils, leather, dye-woods, &c. Immense quantities of ice are sent to South America, the East and West Indies, China, and other parts. Although the number of tons exported in 1852 was somewhat less than that of 1851, it much exceeded that of any preceding year; being in 1848, 57,507; 1849, 66,308; 1850, 69,623. The ice is chiefly brought by railway from Wenham, and the other lakes near Boston. Large cattle markets are held weekly at Brighton and Cambridge, in the vicinity. The rapid growth of Boston and its environs during the last ten years, is undoubtedly to be attributed, in a great measure, to the establishment of the numerous lines of railway, affording it facilities of commerce with the interior. In 1839 there were only 167 miles of railway radiating from Boston, while in 1850 it was connected with 1000 miles of railway in Massachusetts, and about 2000 in other states. miles of the exchange, seven railways branch into sixteen; and two hundred and forty trains enter or leave Boston daily.

In Boston there are thirty-two banks, three savings-banks, numerous mutual assurance companies, and several foreign agencies. The assessed valuation of property in 1853 was, real, \$116,090,900, personal, \$30,423,300; and the amount of tax, \$1,569,507. The amount of city debt at 1st January 1853 was \$1,746,510, to meet which there were specially appropriated to that object, bonds, notes, and mortgages, amounting to \$1,007,689, besides the public lands and other disposable property of the city.

Boston was the birthplace of Dr Benjamin Franklin. (Hunt's Merchants' Magazine; De Bow's Industrial Resources of the South and West; Gazetteer of the United

States, &c.)

Boston, Thomas, a popular and learned Scottish divine, born at Dunse, May 17. 1676. He was educated at Edinburgh, and in 1699 became minister of the parish of Simprin, from which he was translated in 1707 to Ettrick. He died May 20. 1732. His writings were numerous; but he is best known by his Fourfold State, the Crook in the Lot, and his Body of Divinity, a work much esteemed by Presbyterians. His treatise on Hebrew accents is a learned production; and, besides many other works, he also left Memoirs of his own Life and Times, published in 1776.

BOSWELL, James, Esq. of Auchinleck, in the county of Ayr, was the eldest son of Alexander Boswell, Lord Auchinleck, one of the judges of the supreme courts of session and justiciary in Scotland. He was born in 1740, and successively prosecuted his studies at the universities of Edinburgh and of Glasgow. He was destined by his father for the bar; and, as the study of civil law at one of the foreign universities was then included in the most liberal plan of education for a Scottish advocate, it was determined that he should repair for that purpose to Utrecht, with a permission, before his return, to make the tour of Europe.

He was very early ambitious of being admitted into the society and friendship of men distinguished by talent and public estimation, more especially those of eminence in the literary world; and his natural urbanity, as well as gaiety of disposition, rendered it no difficult matter to gratify this propensity. While at the university of Glasgow, he had formed a particular intimacy with Mr Temple, the friend of Gray, afterwards vicar of St Gluvias in Cornwall; and he was known to many of the conspicuous characters at that time in Scotland, among others, to Lord Kaimes, Lord Hailes, Dr Robertson, and Dr Beattie. But the most remarkable acquisition which he made of this kind was his acquaintance with Dr Johnson, which commenced in 1763, and proved at once the principal era in his own life, and the means of adding not a little to the fame of that great man.

Boswell had visited London for the first time in 1760, when he accidentally became acquainted with Derrick, afterwards King Derrick, as the master of ceremonies at Bath was then fantastically titled, and by him was initiated into the arcana of London life. In 1763 he proceeded to Utrecht. Having passed a year at that university, he travelled into Germany and Switzerland, was entertained by Voltaire at his castle of Ferney, and conversed with Rousseau in the solitudes of Neufchatel. He continued his route to Italy; but, led by his natural enthusiasm, forsook the common lines of travel, and passed over to Corsica, which, after a contest of more than thirty years, was still struggling for independence with the republic of Genoa. Of his visit to this island he published a narrative on his return to Scotland, entitled An Account of Corsica, with Memoirs of General Pasquale de Paoli, Glasgow, 1768. It was translated into Dutch, German, French, and Italian. He likewise printed, in the following year, a collection of British Essays in favour of the Brave Corsicans; and made such attempts as he could to interest the British government in favour of that people, before they were finally crushed by the pressure of the French arms. His friendship with General Paoli was afterwards renewed in London, when that chief, having escaped with difficulty from his native isle,

Market

Botal.

Boswell. found an asylum in the British dominions. From Corsica he repaired to Paris; and, returning to Scotland in 1766, he was admitted to the bar. Soon after, he published a pamphlet on the Douglas Cause; written while that great suit was depending in the Court of Session, with a view to excite the public interest in favour of Mr Douglas. 1769 he was married to the daughter of David Montgomery, Esq.; an accomplished lady, in whose society he enjoyed every domestic happiness. By her he had two sons and three daughters.

In 1773 Boswell was admitted into the Literary Club, which then met at the Turk's Head in Gerard Street, Soho, and of which Dr Johnson had been an original member. Here he had the pleasure of associating with Burke, Goldsmith, Reynolds, Garrick, and other eminent persons. Dr Johnson had long projected a tour to the Hebrides; and Boswell at last prevailed upon him, in the course of this year, 1773, to put the plan in execution, and became the companion of his journey from Edinburgh. During this excursion they saw whatever was most remarkable in the Western Highlands and Isles; and Boswell, alive to the advantages which he enjoyed, improved every opportunity of knowledge and remark, and has preserved a faithful record of all. Both travellers gave to the world an account of this tour. Boswell's Journal was published in 1785.

In 1786 Boswell removed with his family to London, towards which, as a great centre of literature and life, his inclinations had always tended. He had recently been called to the English bar. He did not, however, prosecute the profession, but gave himself up to his natural bent for society and letters. After Dr Johnson's death, iu 1784, he was occupied for several years in collecting and arranging, with indefatigable diligence, the materials for a narrative, which he had long projected, of that eminent man's life. This most unique and valuable work was published in two vols. 4to, London, 1791.

Besides the works already mentioned, he was the author of two political Letters addressed to the People of Scotland.

Mr Boswell died on the 19th June 1795. In his private character he was loved by his friends, and was a favourite in the circles of social life. His talents would probably have been rated higher if they had not been obscured by certain eccentricities of character; yet his writings bear sufficient testimony to his natural abilities, and to the delicacy as well as aptness of his intellectual touch. To be distinguished was his ruling passion, and he indulged it freely. He sought those whom the world, on whatever account, held in honour; and he was desirous of being known as one who possessed their friendship. He was fond of his pedigree and family connections, and he aspired after literary fame. While some of these propensities have been common to the great and good in every age, others, it must be confessed, are more frequently harboured than avowed. Boswell adopted the latter and more unusual course. He fairly owned his passion, and, if not thus secured from attack, had all those advantages, at least, which are gained by complete ingenuousness. Nor was evidence of a substantial sort wanting to show the independence of his mind. For, however ambitious of exalted patronage, he was neither an instrument of party nor a server of the time. Of Dr Johnson's sincere attachment to him there are many and unequivocal proofs in their correspondence.

But it is not on account of his private character, or of a certain domestic celebrity which he enjoyed during his life, that he is here commemorated, but as an author, and parti-

cularly as a writer of biography. Here he is almost an in- Bosworthventor; he has at least carried this species of composition to a degree of accuracy and detail formerly unattempted. "Homer," says Mr Macaulay (Essays, vol. i.), "is not more decidedly the first of poets, Shakspeare is not more decidedly the first of dramatists, than Boswell is the first of biographers. He has no second. He has distanced all competitors so decidedly that it is not worth while to place them. Eclipse is first, and the rest nowhere." Boswell paints the whole man, presents the incidents of his life in their actual order of succession, and preserves him as it were entire; fulfilling in the history of the moral, what Bacon has assigned to philosophy as her genuine work in that of the natural world, faithfully to return its accents and reflect its image, not to add anything of her own, but to iterate only and repeat. For the task of writing Johnson's life he was peculiarly qualified. He had lived in intimacy with the sage for a period of twenty years, had early conceived the plan of such a work, and received from Johnson himself, to whom his intention was known, many particulars of his early life and personal history. Johnson's conversation is the matter of the book; and, as the philosopher did not, in the midst of his studies, give up the advantages of society, there was in his discourse a range and diversity of subject not often found in combination with classical knowledge and habits of profound thinking. Nor does this work exhibit a series merely of witty and sententious sayings: it is interspersed alike with miscellaneous narrative and criticism; and, what constitutes its principal feature, it contains a mass of opinions on subjects of a more common nature, where the powers of reasoning and illustration are applied to familiar topics, and the ordinary occurrences of life. Valuable as a deposit of literary anecdote, it is still more so as a collection of ethical discourses, to which its popular form gives a singular currency and effect; so that there are few books extant where the religious and social duties, as well the love of science, in its largest acceptation, are impressed more agreeably, or with greater force, upon the mind.

BOSWORTH-MARKET, a market-town and parish of England, county of Leicester, and hundred of Sparkenhoe, 11 miles west of Leicester, and 106 from London, near the North-Western railway and the Ashley canal. The town is neatly built, occupying an eminence in the centre of a fertile district, and has a handsome church surmounted by a spire, several charities, and a well-endowed grammar-school, in which Dr Johnson was once an usher, and which has two fellowships and four scholarships in Emmanuel College, Cambridge. Pop. (1851) 1058; many of whom are employed in the knitting of worsted stockings. Marketday, Wednesday. Near the town was fought (22d August, 1485) the decisive battle in which Richard III. was slain.

BOTAL, or BOTALLI, LIONARDO, a celebrated physician, was a native of Asti in Piedmont, and flourished in the latter part of the sixteenth century. After studying under Fallopius he went to France, where he was appointed chief physician to Charles IX., and also to the Duke of Alençon, whom he accompanied to England. Subsequently he was physician to Henry III. Botalli, relying on the authority of Hippocrates, Galen, and the Arabian physicians, carried the practice of blood-letting to an extent that occasioned much animadversion, and perhaps with justice. He made some valuable contributions, however, to the science. The best editions of his several medical and surgical works is that published by Van Hoorne at Leyden, 1660, 8vo.

^{1 &}quot;Egotism and vanity," says he, in his Letter published in 1785, "are the indigenous plants of my mind: they distinguish it. I may prune their luxuriancy, but I must not entirely clear it of them: for then I should be no longer as I am, and perhaps there might be something not so good."

BOTANY.

THE term Botany is derived from the Greek word Botávy, meaning an herb or grass. As a science it includes everything relating to the vegetable kingdom, whether in a living or in a fossil state. Its object is not, as some have supposed, merely to name and arrange the vegetable productions of the globe. It embraces a consideration of the external forms of plants-of their anatomical structure, however minuteof the functions which they perform—of their arrangement and classification—of their distribution over the globe at the present and at former epochs, and of the uses to which they are subservient. It examines the plant in its earliest state of development, when it appears as a simple cell, and follows it through all its stages of progress until it attains maturity. It takes a comprehensive view of all the plants which cover the earth, from the minutest lichen or moss, only visible by the aid of the microscope, to the most gigantic productions of the tropics. It marks the relations which subsist between all members of the vegetable world, and traces the mode in which the most despised weeds contribute to the growth of the mighty denizens of the forest. It is a science,

then, which demands careful and minute investigations-re- Botany. quires great powers of observation and research, and is well fitted to train the mental powers to vigorous and prompt

Botany may be divided into the following departments:-1. Structural Botany, having reference to the anatomical structure of the various parts of plants, including vegetable Histology, or the microscopic examination of tissues. 2. Morphological Botany, or the study of the form of plants and their organs; these two departments are often included under the general term of Organography. 3. Physiological Botany, by some termed organology, the study of the life of the entire plant and its organs, or the consideration of the func-tions of the living plant. 4. Taxological Botany, or the ar-rangement and classification of plants. 5. Geographical Botany, the consideration of the mode in which plants are distributed over the different quarters of the globe. 6. Palæontological Botany, the study of the forms and structures of the plants found in a fossil state in the various strata of which the earth is composed.

PART I.

STRUCTURAL AND PHYSIOLOGICAL BOTANY:

VEGETABLE ORGANOGRAPHY AND PHYSIOLOGY.

This division includes a consideration of the minute structure of the various parts of plants, of the changes which they undergo during their growth and development, of the forms which they assume, and of the functions which they perform. It is the foundation of the science, and without a thorough knowledge of it there can be no correct ideas in regard to classification.

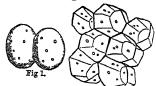
CHAPTER I.

ELEMENTARY TISSUES OF PLANTS.

I.--GENERAL REMARKS ON MICROSCOPIC VEGETABLE STRUCTURE.

The study of the elementary tissues of plants is included under Vegetable Histology (ioros, web or tissue). These tissues are few and simple. They consist of organs to which the names of Cells and Vessels have been given. The for-

mer are minute bladders or vesicles (Fig. 1), varying in size and form, which, when united together, constitute Cellular tissue (Fig. 2); while the latter are closed tubes of an elongated form, frequently tapering to each frequently tapering to each end (Fig. 3), and, when combined, constituting Vas-cular tissue. The distinction the pith of the Elder, the cells are dodecahedral and dotted.



between cells and vessels is founded on their comparative length. Occasionally, however, cells become lengthened, as in the case of some hairs, and the filamentous or thread-like tissue of Fungi, so as not to differ from vessels as regards length. VOL. V.

Such long cells are distinguished chiefly by the thinness and delicateness of their texture.

The primary form of the elementary organs of plants is a closed spherical or elongated vesicle or utricle, having its walls composed of a membrane, and containing a fluid. If it still remain closed after its development is completed, then it receives the name of Cell; but if a row of utricles arranged in lines become united in the course of development so as to form a tube with an uninterrupted cavity by absorption of the cross walls, then a Vessel is produced.

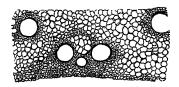
On making a transverse section of a succulent stalk, such as that of Rhubarb, or of a Cucumber or Melon, we perceive, by the aid of a glass, circumscribed angular meshes and rounded openings; and, in a longitudinal section of the same stalk, similar meshes are also seen with long tubes of various kinds. The angular spaces, as seen in Figure 4, are sections of cells, while the rounded openings are the sections of vessels. The membrane forming the walls of both cells and vessels is composed of a substance called Cellulose, in many respects resem-Vascu'ar tissue. bling starch, but differing in giving a yellow in place of a blue colour, with iodine. The membrane has in general no visible pores or

perforations, but fluid matters pass through it other. easily. Some plants, such as Sea-weeds, Mushrooms, and Lichens, consist of cellular tissue alone, and hence are called Cellular plants; while others, such as ordinary flowering plants, consist of cells and vessels combined, and receive the name of Vascular plants.

Botany.

In studying the minute structure of plants, it is necessary to call in the aid of the microscope. A simple microscope is the most useful instrument for a botanical student.

means of it the object is viewed directly through a lens or set of lenses, so arranged as to be capable of being adjusted by means of a screw to the exact focal distance, and of being moved over



different parts of the Section of a Bamboo, showing an angular net-object. In examining work of cells, and rounded tubes or vessels. structures in the fields, Gairdner's portable microscope 1 is the best. In the study of very minute tissues, and especially in physiological researches, the achromatic compound microscope is required, by means of which the object is not viewed directly, but an image of the object is formed by one lens, or set of lenses (the objective), and the picture thus produced is viewed as an original object through another lens or set of lenses (the ocular or eyepiece). By means of this instrument the observer is enabled to approach very close to the object, while the field of vision is greater than with the simple microscope.

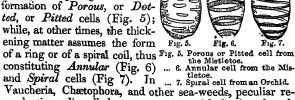
II.—CELLS AND CELLULAR TISSUE.

1. Anatomy of Cells.

Cellular tissue (Fig. 2) is generally called Parenchyma (πορὰ, through, and ἔγχυμα, anything poured in—applied to tissue), and it also receives the names of Areolar, Utricular, and Vesicular tissue. It exists more or less in all plants, and abounds in fleshy roots, stems, and leaves, and in succulent fruits. It constitutes the pith and outer bark of trees, and the central part of rushes. Chinese rice-paper consists of the central cellular tissue of Aralia papyrifera, cut into thin sheets, which show structure under the microscope. By cultivation, the turnip, carrot, cabbage, and other esculent vegetables, acquire much cellular tissue, and become tender and succulent. The bladders or cells of which the tissue is composed, vary in size. In a cubic inch of a leaf of the carnation, there are said to be upwards of three millions of cells. They are frequently seen 1000th, 500th, and 300th of an inch in diameter. In some of the cucumber tribe, and in the pith of aquatic plants, large cells, 30th and 30th of an inch in diameter, occur. Mohl says, that the general average diameter of cells is $\frac{1}{20}$ th to $\frac{1}{100}$ th of a line; that of the cellular spores of Fungi and of the yeast cells, is $\frac{1}{600}$ th of a line; while in succulent plants, and in the pith of the Elder, it rises to to to a line or more.

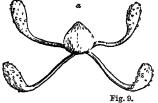
Cells are either surrounded by a simple thin membrane, or by thickened walls. The thickening of the walls of cells takes place by a deposit of woody matter on the inside, as seen in the microscopic structure of the hard shell of the Coco-nut and Piassaba fruit, in the stone of the peach and cherry, and in the seed of the Ivory and Date palms. Occa-

sionally, rounded portions of the cell-wall are left uncovered by deposits, giving rise to the formation of *Porous*, or *Dot*ted, or Pitted cells (Fig. 5); while, at other times, the thickening matter assumes the form Fig. 5.



like filaments (Fig. 8) which exhibit a vibratile motion re- Botany. sembling that of the cilia of animal mucous membranes. In Equisetum or Horsetail, there are reproductive cells, surrounded by two filaments, with thickened clavate or club-shaped extremities (Fig. 9), which are remarkably hygrometric, and exhibit movements when Cell with vibratile filaments from Chetophora.







Spore or reproductive cell of Equisetim, Horsetail, with two clavate hygrometric filaments; α the filaments expanded in a dry state; b, the filaments curled round the spore on the application of moisture.

When formed of cells composed of a homogeneous or uniform membrane, the tissue is called Membranous cellular tissue; when of spiral cells it is denominated Fibrous cellular tissue, or Inenchymu (ives, fibres). Elongated cells or tubes, with pointed extremities, when united together, form the tissue called Prosenchyma. The membranous walls of some elongated cells occasionally unrol in a spiral manner. Spiral cellular tissue exists in many Orchids; also in the cells of Sphagnum, the hairs of Cactaceæ and the seed-coat of Casuarina, in the outer covering of the seed of Collomia linearis, and of the fruit of Salvia verbenaca, or wild Clary. The spiral cells in the last two mentioned cases, when placed in water under the microscope, exhibit interesting movements, owing to the solid spiral fibre rupturing the softened membrane of the cell, and expanding in all directions. The spongy elastic character of the outer cellular covering of the roots of tropical Orchids and Araceæ, of the sepals of Illecebrum verticillatum, of the pericarp of Cachrys Morisoni and C. odontalgica, and of the ribs of the fruit of Æthusa Cynapium, is due to the presence of spiral cells. In the reproductive cells of Liverworts, spiral fibres called Elaters are found. Reticulated or netted cells, caused by fibres forming a sort of mesh or network, occur in the wing of the seed of Swietenia, in the pericarp of Picridium tingitanum, and P. vulgare, in the seed-coat of Cucurbita Pepo, in the parenchyma of the leaf of Sanseviera guineensis, and in isolated cells of the pith of Rubus odoratus, and of Erythrina corallodendron.

Cells differ in form according to the mode in which they are aggregated. They are frequently rounded or spherical, at other times they present angular or elongated forms, such as pentagonal or five-angled, hexagonal or six-angled, prismatic, square, fusiform or spindle-like. When the cells are so placed as to touch each other on every side, the Parenchyma is called complete. This is seen in the dodecahedral or twelve-sided (Fig. 2), and prismatic Parenchyma of pith, and in the flat tabular Parenchyma of the outer corky bark of trees. When the individual cells touch each other only at certain points, the Parenchyma is incomplete. This occurs in the case of the spherical and elliptical cells (merenchyma, μηρύειν, to revolve) of succulent plants, such as the Cactus, and in the stellate or star-like cells (actinenchyma, ἀκτιν, a ray) of the Rush, Callitriche verna, and Bean (Fig 10). In incomplete Parenchyma spaces are left between the cells, which are either large circumscribed cavities called Lacuna, or continuous passages called Intercellular Canals. The spaces between the cells are filled either with fluids of different kinds, or with air. Occasionally the intercellular

productive cells called spores are met with, having thread-

¹ See figure and description in Balfour's Class-Book of Botany, p. 1072.

For the use and construction of the microscope, see article Microscope. See also Quekett on the Microscope. Balfour's Class-Book of Botany. Bennett's Lectures on Clinical Medicins. Schach; on the Microscope.

Fig. 10.

Stellate or star-like cellular tissue of the Bean, with in-tercilular spaces

or Lacunæ.

Botany, substance assumes a thickened or corky consistence, and unites the cells firmly; and it appears to be sometimes prolonged over the surface of the plant in the form of a cuticular covering.

2. Physiology of Cells.

When we consider that cells are of universal occurrence in the Vegetable Kingdom, and that they constitute, in some instances, the entire structure of plants, we can easily understand their importance in a physiolo-

gical point of view. They are capable of carrying on all the functions of plant-life. The life of an individual cell may represent that of the entire plant. In the case of a unicellu-

lar Alga, as Palmella (Fig. 11), we meet with a simple cell which absorbs nutriment from the atmosphere and the soil, and forms certain organizable matters, some of which are employed in building up its texture, while others are secreted or set apart for ulterior purposes in its economy. Those actions are frequently accompanied by an evident movement of fluids and granules. In the progress of time cellules are developed in the interior of the cell, which are discharged as

Fig. 11.
Unicellular Alga
(Palmella cruento).
The cell, a, absorbs, secretes, and forms new cells by a process of fissparous division, first into two, b b, and then into four parts, c. independent cell-plants capable of performing all the function of the parent cell. In other instances, the original cell gives origin to the new cells, either by means of nuclei (Fig. 12), or by a constant process of division (Fig. 13), until at

length a cellular plant is produced consisting of numerous cells variously arranged. In higher plants, cells undergo transformations



orma-Fig. 12. Fig. 12. Fig. 13. Fig. 13. fitting Fig. 12. Cells containing nuclei or cytolasts, from which new cells are produced by intra-cellular cyto-

them for their special functions. Vital operations are carried on in all plants by means of cells, the

constitution and functions of which vary according to the nature of the plants and the position in the scale of organization which they occupy. In the higher classes of plants, certain cells are concerned in the secretion of organizable products, which are elaborated by others into new tissues. The life of plants consists in the regular action of different kinds of cells, which are concerned in the formation of new organs and of new products. In cells there are observed the absorption and movements of fluids, the elaboration of these by exposure to air and light, and the formation of new cells.

In its early state a plant consists of one or more cells. These appear to be produced from a viscid substance of an albuminous nature, to which the names of Protoplasm, Cytoblastema, and Vegetable Mucus have been given. This substance is first homogeneous, then granular; and according to some exhibits minute fibres. It is coagulated by alcohol, and coloured yellowish-brown by iodine. It is considered as the earliest stage of vegetable tissue, and as being endowed with a certain formative power. By Barry, the organizing matter is called Hyaline (ναλος, glass), from its pellucid nature. Some say that in this protoplasm nuclei are developed which give origin to cells; others state that the nitrogenous matter becomes at once divided into celllike cavities, each of which produces a covering of cellulose for itself. The formation of nuclei or cells in a protoplasmic matrix, without the influence of another cell previously existing, may be called extra-cellular.

When a cell has been produced, we can then trace some Botany. of the stages by which new cells are formed. This process is called cell-development or Cytogenesis (κύτος, a cell, and γένεσις, origin), and it has engaged the attention of many able physiologists. There appear to be four modes in which vegetable cells are multiplied, viz., by nuclei, by division, by gemmation, and by conjugation. New cells originate in the protoplasmic fluid contained in a parent cell by a process of *intra-cellular* formation. The new cells may either proceed from a nucleus, or, as Schleiden calls it, Cytoblast (βλαστός, a germ); or they may be formed at once in the protoplasm. In the former case, the nucleus becomes as it were the centre of vital action, and on one side of it a bladder-like vesicle arises (Fig. 14, b). This original

vesicle is bounded by a protoplasmic membrane, which ultimately becomes covered with a deposit of cellulose. The protoplasmic membrane forms the inner lining (primordial utricle of Mohl) of the new cell, and to it all the subsequent vital actions of the cell are referred. The nucleus either remains in the cell-wall, or it is absorbed. The newly-formed cell contains a formative fluid in which nuclei are produced, which, in their turn, give origin to other cells. Besides a nucleus, there are seen occasionally in cells very minute bodies called nu-



cleoli, which some consider as being concerned in forming the wall of the nucleus. The nuclear formation of cells has been fully illustrated by Schleiden in the case of the Embryo plant. According to Mohl the nucleus is in the centre of the cell, and is attached to its walls by filamentous processes of protoplasm, as seen in the hairs of Tradescantia. When no nucleus is present, the protoplasm at once forms cells. This is called non-nuclear or free cell-formation. In both instances the formation of new cells takes places in the interior of previously formed cells. In progress of increase, nucleated and non-nucleated cells cause absorption of the walls of the parent cell, which finally disappears. It sometimes happens that the nucleus itself divides into two by a contraction in the middle, and each of its parts gives origin to cells. In this way a rapid multiplication of cells takes place. In Figure 14, b, there is represented a parent or

mother cell, containing two nucleated cells in its interior. These gradually increase, cause absorption of the walls of the parent cell, and become free. In Figure 14, a, a parent cell is shown enclosing five nucleated cells.

After a cell is formed, we often remark that its contents divide into two or four parts. This is accomplished by the folding inwards of the protoplasmic inner lining, the primordial utricle of Mohl. Each division forms for itself a covering of cellulose. These newly-formed cells increase, cause absorption of the walls of the parent or mother cell, and separate from it Portion of a cell plant as distinct cellular formations capable of going through the same process of division. Sometimes a cell divides into two or more parts, each of which becomes a separate cell, without any destruction of the walls of the original one, as shown in Figure 15. This is accomplished by a similar folding of the inner lining, and a subsequent formation of cellulose in each division,



ortion of a cellniar plant
(Conferva glomerata), showing at a the primordial utricle
or inner cellwall folding
inwards, so as
to make a septum or partition, which is
represented at
b in a com-

but it differs from the previous method of division in the circumstance that the walls of the parent cell remain without being absorbed. These modes of cell-multiplication are called fissiparous, or merismatic (fissum, cleft, μερισμός, division)

Cells are also produced by a process of budding; in other words, by a continuous growth from various parts of preBotany.

viously formed cells. A cellular protuberance or mammilla appears either at the apex or at the sides of these cells, which elongates and ultimately divides by a partition or septum into two, one of which is arrested in its development, and the other goes on elongating and dividing. In this way a continuous row of cells is produced, as in certain Algæ and in the Yeast plant (Fig. 16), or a branching filament, as in some kinds of Confervæ (Fig. 17), and moniliform Fungi (Fig. 18), or a flattened thallus composed of interlacing cells,

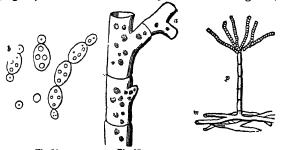


Fig. 16. Fig. 17. Fig. 18.

Fig. 16. Cells of the Yeast plant (Torula cerevisiae), in different stages of growth; a, single cells; b, cells giving off buds either at one or both ends; c, a congeries of cells united, those at the extremities producing new cells in the form of cellular buds.

If. Cells of an Alga (Chatophora), giving off new cells, a, by a process of budding.

If. A species of Mould-fungus (Penicillium), consisting of long cells, m, producing cellular buds, which form a continuous row of cells, p, by gemmation and division, bearing branching meniliform threads, c, composed of a congeries of united cells.

as in Lichens. This mode of cell-multiplication is gemminations, and is said to take place by a process of gemmation.

parous, and is said to take place by a process of gemmation.

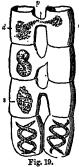
Another mode in which new cells are formed is by the conjugation or union of two cells having different contents

(Fig. 19). This is well seen in Zygnema. and other allied plants, and it will be particularly noticed under Embryogeny. This process may be called generative cell-production. The cell developed in this way constitutes the spore or germ in the lower class of plants, and the first cell of the embryo in the higher plants. The embryonic cell produces nuclei, by means of which a multiplication of cells is effected.

The rapidity with which cells are developed in some cellular plants is astonishing. Ward observed Phallus impudicus shoot up three inches in the space of twenty-five minutes. Bovista gigan-teum (gigantic puffball) has grown in a 'Alga (Zygnema), unti-single night in damp weather from the size of a mere point to that of an enormous gourd. From an approximate calculation, it is found that in this plant

not less than 20,000 new cells were formed everyminute. Kieser calculated that the tissue of some Fungi augmented at the rate of 60,000 cells per minute. Large tracts of snow in the arctic regions and in alpine districts are sometimes suddenly reddened by the development of innumerable cells of the Red Snow-plant.

Cellular tissue is very hygroscopic. If cellular plants, such as Sea-weeds, are dried, and then put into water, they take up the fluid rapidly. Some of them, as the different species of Tangle (Laminaria), have been used as hygrometers. In mosses, the cellular teeth of the peristome (Fig. 20, p), curve inwards on the application of moisture, by the distension of the teeth of the application of moisture, by the distension of the outer row of cells. The twisting of the stalk of Mosses, and of the awn of the wild Oat, are accounted for in a similar manner.



anow the contents of one cell, c, to pass into another, d, and thus give origin to new cells, s, which receive the name of spores.



peristome, a, which fold in-wards when moisture is ap-plied.

The fronds of a species of Lycopodium (L. squamatum or Botany. Selaginella convoluta), from Brazil, curl inwards in the dry season, so that the plant appears like a brown ball, and during the wet season they spread out so as to cover the soil. The plant called Rose of Jericho (Anastatica hierochuntina), shows a similar hygroscopicity in its pod; and some of the Cape species of Mesembryanthemum open their seed vessels when moisture is applied. The spores or germs of Horsetails (Equisetum) are provided with cellular clavate filaments (Fig. 9), which contract and expand under the influence of moisture and dryness, and thus assist in placing the germ properly in the soil. These Equisetum spores are interesting objects under the microscope, and their movements are seen by breathing upon them. Hairs, which are composed of cells,

also show hygroscopic properties.

Liquids pass through the walls of cells by a process of imbibition. Thin-walled cells take up fluids very rapidly. To the movement of fluids through membranes of different kinds Dutrochet has given the names of Endosmose (ἔνδον, inwards, and ωσμός, impulsion), or inward movement, and Exosmose (ἔξω, outwards), or outward movement. These movements take place both in living and in dead tissue, and they are influenced by the nature of the fluids and of the membrane. The fluids on either side of the membrane must differ from each other in density, and they must have an affinity for the interposed membrane, and for each other. By the endosmotic process, a thin liquid passes in large quantity and with great force through a vegetable or animal membrane, in order to mix with a denser liquid, while the latter passes outwards in small quantity by a slower exosmotic movement. If a unicellular plant, as one of the cells of the Yeast plant, is placed in a dense liquid, the contents of the cell pass cutwards rapidly, and the cell becomes more or less collapsed; if, on the other hand, it is put into a thin liquid, the reverse takes place, so that the cell is distended.

The cells of plants contain liquids of different densities, and hence these movements must be constantly taking place, so as to cause an interchange of their contents. The bursting of the seed-vessel of the Elaterium (Ecbalium purgans), and of the Balsam (Impatiens), is traced in part to the distension of cells by endosmose, which causes a curvation in the parts and an ultimate rupture. It must, however, be borne in mind, that endosmose is modified in the living plant by the vital actions going on in the cells, and that it is to these actions we must refer the continued movements of fluids through the cell-walls.

The endosmotic phenomena may be illustrated by means of a tube of glass, containing syrup or a saturated solution of salt, the end of which is covered by a membrane, such as a piece of bladder, and then placed in water. In this case the water will enter in such quantity into the interior of the tube, through the membrane, that the fluid will rise. With a membrane about 1-6 inch in diameter, a tube of about 1-12th of an inch, and syrup of density 1.083, the fluid rose, according to Dutrochet, more than an inch and a half in an hour and a half; when the syrup had a density of 1.145, the fluid rose nearly three inches; and when the density was 1 228, the rise was four inches. The force with which the movement takes place is very great. Dutrochet estimated that in the case of syrup of density 1.3, the force of endosmose was equal to the pressure of $4\frac{1}{2}$ atmospheres.

In many cells there is observed a distinct motion of fluids and granules. Schleiden thinks that this takes place in all active formative cells at a certain stage of growth. Mohl looks upon it as a universal phenomenon, and says that it is connected with the protoplasm, and not with the watery cell-sap. This intra-cellular movement or circulation is seen in many aquatic plants as well as in certain hairs. It has received the names of Rotation and Gyration. It is confined to individual cells, and its direction is more

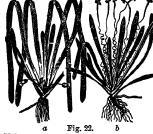
Botany. or less spiral. In Characeæ (Fig. 21) this spiral intra-cellular movement is observed easily under a moderate microscopic power. During the healthy state of the plant, a constant motion of fluid containing granules takes place, the current passing obliquely up one side, changing its direction at the extremity, and flowing down the other side. The stream takes a spiral course, and the ascending and descending currents are bounded by transparent spaces which appear to be caused by the adhesion of an internal membranous sac to the outer envelope. The space between the outer and inner wall is thus divided into two cavities, which communicate with each other at the ends of the cell. The fluid does not pass from one cell to another, and if one of the long cells is divided by a ligature, a separate movement is seen in each division. Rotation continues for some days in detached cells placed in water.

Fig. 21.

A small portion of a Chara magnified to show the magnified to show the certification. The arrows mark the direction of the fluid and granules in the different cells. The clear spaces are parts where there is no movement. of the cell. The fluid does not pass

In the cells of Vallisneria spiralis (Fig. 22), a diœcious

aquatic found in ditches in the south of Europe, an intra-cellular movement takes place, and is easily seen under the microscope by laying a portion of the leaf in water, and making a slanting section of the end of it, so as to render the object more transparent by transmitted light. If the movement is not visible, the leaf may be vallisneria spiralis, an aquatic plant immersed for a short time in water of the temperature of 70° or 80.° The piece of The piece o the leaf should always be prepared for an hour before it is



exhibited. In the cells there are numerous green chlorophyll grains, some starch granules, and an occasional large nucleus, which are carried with a mucilaginous fluid round the interior of the walls of each cell, as represented in Fig. 23. This movement is seen not only in the cells of the leaf, but also in those of the root, flower-stalk, spathe, and calyx. The movement takes different directions in different cells, but it seems to keep the same course ; in any given cell; for if stopped, it resumes the same direction. The motion continues for many days in a detached piece of the leaf when kept in water. The rapidity of the movement varies from half an inch to five inches per hour.

In Vallisneria the motion ceases entirely at about 45° Fahr., while in Chara it goes on at a lower temperature. A moderate heat quickens the circulation, but if above 150° the motion ceases. It is said to go on even in darkness, and the presence of green granules does not appear to be necessary, for it is seen in the Large internal ransparent roots of Vallisneria. Prussic acid, solutions of opium, of acetate of lead, and of corrosive sublimate, alcohol, acids, and alkalies, cause cessation of the movements. Similies, cause cessation of the movements. Similar motions are seen in many other aquatics, more espe-

cially in the cells of Anacharis Alsinastrum, a plant which Botany. seems to have been introduced into Britain from America, and is now naturalized.

The cause of these intra-cellular motions is obscure. They appear to be connected with the nourishment of the cell and the process of cytogenesis. Some have attempted to account for them by physical causes, but the explanations given are very unsatisfactory. Certain authors have referred the phenomenon to endosmose depending on different densities in the cell contents, while electrical agency has been called into requisition by others. Amici thinks that in Chara the rows of chlorophyll-granules which line the walls of the cells exercise a galvanicaction upon the sap, and thus give rise to the motion. The action of the nucleus has also been thought to account for the phenomenon. It is not connected with the general circulation of the sap, but is a special movement in individual cells. yet no good explanation has been brought forward, and all we can say is, that the movements are of a physico-vital nature.

Some cells connected with the lower tribes of plants move about in a liquid medium. Species of Oscillatoria have an undulating movement, and when placed in water in the field of the microscope, they seem to pass from one side to the other. Their elongated filamentous cells sometimes twist, and then project themselves forward by uncoiling. Oscillating movements are also seen in species of Pleurosigma and other Diatoms. In many Algals the cellular spores are surrounded by vibratile hairs called cilia (Fig. 8), which continue to move for some time in fluid after the spore (zoospore) has been discharged from the plant. The ciliary motions cease when the spore begins to sprout.

III.--VESSELS AND VASCULAR TISSUE.

1. Anatomy of Vessels.

The vessels of plants which collectively form vascular tissue or Angienchyma (ἄγγος, a vessel) may be considered as differing from cells chiefly in their length. They are closed tubes tapering to each extremity. Their walls are composed of the chemical matter called cellulose in a membranous form, and they are thickened and altered in various ways by the formation of deposits in their interior.

Woody Tissue.—This is composed of thickened tubes or elongated cells, with conical extremities overlapping each

other, as seen in Figure 24. The tubes are said to be fusiform or spindle-shaped, and the tissue has received the name of Pleurenchyma, from a Greek word $\pi\lambda \epsilon \nu \rho a$, meaning a rib, on account of the support which it furnishes to the stems and leaves of plants. The woody portion of trees and shrubs, and of all the ordinary flowering plants, consists in part of this tissue. It exists also in the inner bark, and in the veins of the leaves. The materials used for ropes and cordage, linen, certain Indian muslins, mummy cloth, and mats, consist of the woody fibre of plants from which the more delicate tissues have been removed by maceration in water. Flax or lint is thus procured from the bark of Linum usitatissimum,* hemp from Cannabis sativa, New Zealand flax from Phormium tenax, Pita flax from Agave americana, Sun-hemp from Hibiscus cannabinus, and bass or bast from the common Lime or Linden-tree. Fibres are also procured for manufacture from the Pine-apple plant (Ananassa sativa), from Yucca gloriosa, from Boehmeria nivea, which yields the Chinese grass fibre, from most of the plants belonging to the mallow and nettle tribes, and from some of the leguminous plants, such as Crotalaria juncea which supplies a kind of Bengal hemp. If the maceration of the fibre is carried to a great ex-

tent, a pulp is formed from which paper is manufactured.

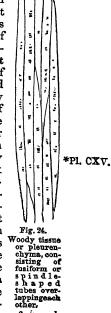


Fig. 23.

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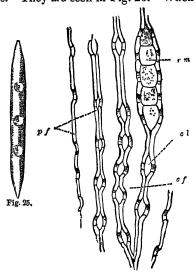
Botany.

Pleurenchyma does not occur in cellular plants, such as Lichens, Sea-weeds, and Mushrooms. The tissues of these plants speedily disappear under the action of water, and hence, perhaps, the reason of their rarity in a fossil state. In the very young state woody tubes are delicate, and it is only in proportion as they attain maturity that their walls acquire a thick consistence. This depends on the formation of layers of cellulose, which have received the name of ligneous matter. In the sap-wood of ordinary trees the woody tubes are thickened in their walls, but are pervious; while in the heart-wood they are rendered solid by the deposited matter, which is often variously coloured. Some of the fully-formed woody tubes, when cut across, exhibit distinct zones or circles of ligneous deposit. The diameter of the

woody tubes varies from 2000 th to 200 th of an inch.

Punctated or Disc-bearing Woody Tissue.—This kind of woody fibre or pleurenchyma is seen in firs and other conebearing trees. It is sometimes called glandular woody tissue. When a section is made in the direction of the rays running from the centre to the circumference of the stem, the fibres exhibit under the microscope discs or large circular dots, which are saucer-like spaces or depressions on the walls of the tubes. They are seen in Fig. 25. When

two woody tubes lie together face to face, the depressions or hollowed-out spaces on each of them are applied like two watch-glasses leaving lenticular cavities, which are sometimes filled with air. When viewed by transmitted light under the microscope, these appear like circular discs. The dot seen in the centre of the disc depends on a portion of the wall being thinner than the rest. In Fig. 26 this structure is seen

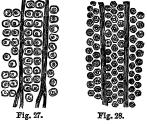


in a magnified form. Fig. 26. Punotated woody tissue of the fir. The walls of the marked pf, the internal cavity of the fibre c f, and the lenticular cavities c l.

Fig. 25. Punotated woody tissue of the fir. 26. Vertical section of part of the fir. 26. Vertical section of part of the fir. 26. Vertical section of the fir. 27. The walls of the same fibre or woody tube. cf is the earlier of a woody tube. cf is the earlier of a woody tube. cf is the lenticular cavities formed by two contiguous tubes. These earlies appear as discovery consisting of cellular tissue proceeding from the centre to the circumforence.

formed between the two contiguous fibres, r m being one of the cellular rays proceeding from the centre to the cir-

cumference, interposed between the walls of two contiguous fibres. In the case @@ of some fossil woods, pieces of silica like double-convex lenses have been removed from the cavities. The discs are in single, double, or triple rows (Figs. 27, 28). When there is more than one row, the individual discs in the rows are either at the same level, that is, opposite to each other (Fig. 27), as in



the case of ordinary pines; or they are at different levels, that is, alternate with each other (Fig. 28), as in Araucaria. Sometimes spiral fibres are seen between the discs. Woody

tissue with discs, but without the central dot, occurs in many Botany. plants, as in Drimys Winteri,* and Illicium floridanum.

Dotted or Pitted Vascular Tissue.—The vessels, or, as *Pl. CXI. they are often called, Ducts, forming this tissue, are usually continuous tubes of a larger size than the other vessels of plants (Fig. 3), and presenting often broad or oblique extremities in place of pointed ones like other vessels. Their dotted or pitted appearance depends on the mode in which the encrusting matter or cellulose is formed inside. This matter in place of being deposited equally over the whole surface of the membrane, as in ordinary woody fibre, leaves rounded uncovered spots at various intervals; and these, when viewed by transmitted light, appear from their thinness to be perforations or holes. Hence the name Porous, which is often applied to these vessels. In old dotted ducts it is occasionally found that the thin membrane of the dots or pits has been absorbed, and actual perforations have taken place. Dotted vessels frequently exhibit contractions at intervals, giving rise to a jointed or bead-like appearance.

In such cases, as in Figure 29, they are seen to be formed of dotted cells placed end to end, with the partitions between them obliterated, so as to form continuous cylindrical and sometimes branched tubes. Occasionally they seem to be formed, as in Rhubarb, by a filling up of the interspaces between fibres, until a small pit only remains; or, as in Alnus serrulata, by a number of lines arranged at first like those of a ladder, and then united by transverse ones forming a grating, the angles being finally filled up and rounded; or, as in Populus tremuloides, by a uniform deposit over the whole membrane. In the Elm and Lime the dotted ducts have sometimes spiral fibres ramifying between the dots. The membranous walls of dotted vessels occasionally unrol in a spiral manner. Dotted ducts are found in the wood of trees, and they constitute the large rounded



openings which are seen in the transverse section of the stems of Oak, Poplar, Willow, &c. They also abound in the Bamboo (Fig. 4), and in other plants of rapid growth. The names of Bothrenchyma and Taphrenchyma, given to this tissue, are derived from Greek words βόθρος and τάφρος, signifying a pit.

Spiral vessels.—These form the tissue called Trachenchyma (τραχύς, rough) on account of its resemblance to the tracheæ or air-tubes of animals. They are tubes tapering

to each extremity, and having their membranous walls strengthened by the formation of elastic spiral fibres within (Fig. 30). They vary from 3000th to 300th of an inch in diameter. When lying together the vessels overlap each other at their extremities, and occasionally, by the absorption of the membrane, perforations of their walls take place, so as to establish a communication between two contiguous tubes. fibres are usually rounded and simple; but sometimes two or more are combined so as to form a flat band. These flat ribands, consisting of fibres which vary in number from 2 to 25, or more, are met with frequently in the stems of Bananas and Plantains, and in the shoots of Asparagus. The spirals in such cases are called compound, and the vessels Pleiotracheæ (πλείων, more). The spiral fibres have such tenacity, that when the vessels are ruptured they can be pulled out and separated from the inside of the membrane. This capability of being unrolled characterizes the fibre of true spiral vessels. On breaking the young shoots or leaf-stalks of the Geranium, Strawberry, and Rose, or the leaves of the Hyacinth, Amaryllis, and Banana, and pulling the parts gently asunder, the fibres can



Fig. 30. Spiral vessels sels over lapping at their point-

Botany. be easily seen in the form of a fine cobweb. When the aerial stems of the Banana and Plantain are cut across, the spiral fibres may be pulled out in large quantity so as to be used for tinder.

The coils or volutions of the fibre are said to be in general left-handed, that is, turning to the left of a person supposed to be in the axis. In the garden lettuce vessels are met with, some having the fibre turning to the left, others to the right. In the scarlet bean the coils of the fibres are left-handed, while the plant itself turns to the right in twining. Spiral vessels are abundant in young plants and shoots, while in the hard

stems of trees and shrubs they chiefly surround the pith.

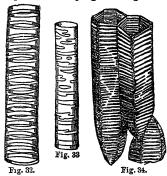
Modifications of Spiral Vessels.—The spiral vessel is the type of what is called the Fibro-vascular tissue, or that tissue which is composed of vessels having membranous walls strengthened by fibres of some sort. In their perfect condition the vessels have a complete spiral or cork-screwlike coil inside, which is elastic, and can be unrolled. In different plants, however, and in different parts of the same plant, the spiral vessel undergoes certain modifications and changes. Sometimes, as in ferns, the spiral fibres become united to the membrane so that it cannot be unrolled. This constitutes what is called the *Closed* spiral. At other times the fibre is broken up into rings, reticulations, bars, or dots. These changes take place in the progress of growth, (Fig. 31) and

their various stages may be traced in the vessels of such plants as the garden balsam or melon. Annular (annulus, aring) vessels are those in which the fibre is in the form of rings (Fig. 32). These rings in Mammillaria quadrispina, and in some other plants of the Cactus tribe, are very deep, and leave only a small hole

Fig. 31. Fig. 32. Fig. 32. Fig. 33. Vessel partly spiral and partly annular taken from the melon plant.

32. An annular vessel taken from the melon plant. The dots are in this case opaquo, and thus differ from pits in porous vessels.

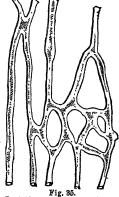
34. Scalariform or ladder-like prismatic vessels of tree ferns.



in the centre of the vessel. Annular vessels are from 800 th

to $\frac{1}{\sqrt{100}}$ th of an inch in diameter. Reticulated (reticulum, a net) vessels (Fig. 33) have interlacing fibres on the membrane, while in Scalariform (scala, a ladder) vessels (Fig. 34) the fibre is so broken up as to appear in the form of bars or lines like the steps of a ladder, whence their name. The entire walls of some scalariform vessels are capable of being unrolled in a spiral manner. In Ferns we meet with scalariform vessels which assume a prismatic form. In place of lines, the fibre is in some instances so broken up as to appear in the form of dots or opaque points. The ap-

F1g. 31.



pearance of bars, dots, and reticula-tions, may sometimes be traced not Laticiferous vessels or Cinen-chyma from the dandelion.

to a thickening of the membrane by means of fibres, but to an actual thinning of the membrane, such as has been already noticed in the case of dotted ducts.

Laticiferous Vessels.—These vessels (Fig. 35) consist of long branching tubes or passages, having a diameter of about 1400th of an inch, forming, by their union, an anastomosis or net-work, like the veins of animals. They receive their name from containing a fluid called Latex, of a granular nature,

often milky or coloured, and well seen in the India Rubber and Botany. Gutta Percha plants, the Mudar plant, the Cow-tree, Spurges, Dandelion, Lettuce, * Chicory, and Celandine. It frequently *PICXXIII contains a large quantity of caoutchouc. The Latex exhibits movements which have given origin to the name Cinenchyma (κινέειν, to move), applied to Laticiferous vessels by some authors. When fully formed, the vessels of latex exhibit in their course contractions and dilatations of an irregular kind. They are considered by some as composed of cells placed end to end, with their partitions more or less completely absorbed; while others look upon them as inter-cellular canals lined with a special membrane. These vessels are found especially in the bark and leaves of plants. The milky sap of Euphorbia phosphorea, according to Martius, is luminous.

2. Physiology of Vessels.

We have seen that the plant, in its earliest stage of development, consists entirely of cells. It is from them, accordingly, that the other structures are formed. Some cells become elongated, so as to form fusiform tubes, the walls of which are thickened and strengthened by deposits of different kinds, and thus give rise to woody tubes, dotted vessels, and fibrovascular tissue. In connection with these vessels are observed nucleated cambium cells, which appear to be concerned in their development. Barry maintains that in every instance in which fibres are present in tissues, he has noticed filaments of a similar nature in the earliest state. Agardh has recently stated that fibres are the origin of the tissues, and that the cell-walls are made up of bundles of solid fibres interwoven together. The tubes forming the wood (Fig. 24) are pervious to fluids in their young state, but their walls soon become thickened by deposits of lignin, and in the heartwood of trees their cavities are obliterated. This filling up of the tube takes place often in a concentric manner, and when it is completed the active life of the cell or tube may be considered as having terminated. The dotted or porous vessels (Fig. 3) constituting bothrenchyma, do not exist in all vascular plants. Thus they do not usually exist in Conifers. These vessels appear to be employed in the rapid transmission of fluids, and they are so constructed as to unite the utmost possible strength with the greatest lightness.

The functions of the fibro-vascular tissue (Figs. 30-34) have been long a subject of dispute. Early authors, such as Grew and Malpighi, considered them as tubes for the transmission of air, probably from their resemblance to air-tubes of animals. Hales mentions that air-bubbles arose from the vessels of the Vine when cut, and Bischoff, in his Dissertation on the Functions of the Spiral Vessels, says that he distinctly observed air to come from the spirals of Cucurbita Pepo when the stem was cut across with a very sharp knife, as well as when the vascular bundles were placed under water and gently pressed. During the day the air was found to contain 279 to 298 per cent. of oxygen. When the cut stem was inserted in coloured solutions, he found that the fluid in these circumstances entered the spiral vessels as well as the other tissues. The recent experiments of Hoffmann confirm in a great measure these observations. He found that in Monocotyledons and Ferns, spiral vessels, and those allied to them, such as annular and scalariform vessels, usually contained air in their normal condition; but if there was a rapid and copious entrance of sap, then the fibro-vascular tissue took up liquids as well as air. When the roots were cut across and immersed in water, then the liquid passed into all the tissues, including the spirals. From all the observations made, it would appear that spiral vessels and their allies are receptacles for gaseous matter formed in the course of the movement of the sap.

Laticiferous vessels (Fig. 35) are distinguished from others by their branching and anastomosis. Most authors believe that they contain the elaborated sap which has been exposed to the influence of air and light. The fluid contained in these

Botany. vessels is sometimes clear and transparent; at other times opaque, from the presence of granules of resin, caoutchouc, and other matters. In plants with milky and coloured latex, as the India Rubber plant (Urostigma elasticum), the Gutta Percha tree, Dandelion, Euphorbia, and Celandine, when examined under the microscope, evident movements have been perceived in the laticiferous vessels. In making this examination, it is necessary to fix upon a more or less transparent organ, and to examine it while still attached to the plant, so as to avoid all sources of fallacy. In the calyx of Celandine (Chelidonium majus) the orange-coloured fluid contained in the laticiferous vessels can be distinctly seen moving with great rapidity, so as to resemble in many respects the appearance presented by the circulation in the web of a frog's foot. In the stipule of the India Rubber plant, a similar motion, but usually slower and less apparent, may be detected without injuring the plant. These movements were noticed by Schultz, and were called by him vital. Mohl and others have recently attempted to show that the movements are merely caused by injury done to the tissues in submitting them to microscopic examination. But this will not account for those cases where the motion of the latex was seen in an organ without detaching it from the plant. Moreover, it is by no means difficult to distinguish between the continuous rhythmical motion in these vessels and that caused by pressure or by injury. When the stipule of Ficus, still attached to the plant, is laid gently on a glass plate under the microscope, we may, by applying artificial pressure, show that the oscillation thus caused is different from the circulation in the vessels. The movement in the laticiferous vessels has received the name of Cyclosis (κύκλωσις,

motion in a circle). It seems to take place in all directions, the currents, as shown in Fig. 36, running in contrary directions in contiguous vessels. The movement is said to be most vigorous in parts which are in the progress of development. It is promoted by the application of heat, and it is checked by cold and by an electric shock. Carpenter considers it as analogous to the capillary circulation in animals. It is not caused by a vis a tergo, because it is by no means constant in its direction, and there is no organ to supply a propelling force; and it cannot be attributed to a vis a fronte, like that which operates in causing the sap to ascend from the roots to the leaves. Moreover, it goes on for some time in parts detached from the rest, where



Fig. 36.
Branching and anastomosing tubes of laticiferous vessels. The arrows mark the direction of the current.

neither of these powers can be exerted. There is no evidence of contraction in the vessels themselves to account for the phenomenon. It seems to be a peculiar vital movement connected with formative actions, and attributable to affinities existing between the tissues and the fluids concerned in nutrition.

IV .- CONTENTS OF THE ELEMENTARY TISSUES.

It is not proposed at this place to give an account of all the substances which are found in the tissues of plants, but simply to notice a few of the more evident contents of cells and vessels. Some substances are found generally in the cells and vessels of all plants, while others are very limited in their distribution. To the former class belong cellulose, lignin, starch, gum, sugar, oils, colouring matter, and certain nitrogenous and saline compounds; to the latter belong alkaloids and some special secretions.

Cellulose.—This is an essential part of the structure of cells and vessels. It is in many respects allied to starch, and is changed into starch by the unaided action of heat, or by sulphuric acid, or caustic potash When iodine is applied

to it, it becomes yellow, and if sulphuric acid is added, a blue Botany. colour, like that of iodide of starch, is produced. Cellulose was long considered as peculiar to vegetable tissues, but it has been recently detected by Schmidt, Löwig, and Kölliker, in the tunics of ascidia and other molluscous animals. The thickening of the cellular membrane is accomplished by the deposition of layers of encrusting matter, to which the name of Sclerogen (σκληρὸς, hard) or Lignin has been given. This substance may be looked upon as a modification of cellulose. It is frequently seen in the form of distinct concentric layers, which vary in their composition in different circumstances. The hard cells in the stone of the peach, and in the shells of other fruits and seeds, consist of cellulose, with deposits of lignin. So also woody fibre, the encrusting matter of which varies in hardness and colour in different trees and shrubs. The spiral threads, rings, and bars, in the membrane of cells and vessels, consist apparently of two layers, one being cellulose, the other woody matter. Cork is a nitrogenous substance, which, next to cellulose, according to Mitscherlich, is the most important constituent of the cell-wall. It occurs in a marked degree in the outer bark-cells of many trees, and it is also found in other plants, such as in potatoes. In the latter the cork-cells do not contain starch, and they are thus distinguished, as well as by chemical properties, from the cells made up of cellulose. Cellulose, corky substance, and fatty matters, seem to be found in the same cell; and when the cellulose has been absorbed, the corky substance alone remains. It forms the outermost part of the cell-wall, and unites the cells together.

Starch—Is one of the substances found in great abundance in the cells of plants, where it is stored for the purposes of nutrition. It is composed chemically of Carbon and the elements of water (Hydrogen and Oxygen), its formula being C_{12} H_{10} O_{10} . It is not found in animal tissues, although a substance isomeric with it is stated to have been detected in them by Gottlieb. A distinguishing character of starch is the blue colour which it assumes on the addition of iodine. It occurs in fine grains, more or less oval or rounded, which vary in diameter from the 4000th to the 240th of an inch. The individual grains either lie distinct from each other in the cells, as in the potato, wheat, and

peas (Fig. 37), or they are aggregated so as to form compound grains, as in West Indian Arrow-root, and Portland Sago procured from Arum maculatum.* Grains of starch frequently present at one end a spot called the hilum, which is seen in the grains given in Fig. 37. It is a concavity or nucleus over which successive layers have been deposited, giving rise to the striated appearance seen in potato starch. Starch is accumulated in the internal, and often in the subterranean parts of plants. It occurs abundantly in fleshy roots, and in stems, as well as in seeds and fruits, and is easily separated by washing. The ordinary cultivated



Fig. 37.

grains yield starch in considerable quantity, so also do the Potato, Arrow-root and Cassava plants,* the Sago-palms, and *Pl. CXIII. Banana fruit. That procured from the Arrow-root plant Fig. 1. (Maranta arundinacea) consists of dull white grains, while that from the potato, and from various species of Canna supplying tous-les-mois, is in the form of large shining particles. Sago and Tapioca are granulated forms of starch, the former being procured from the cells of various species of Sagus and Metroxylon, the latter from the Cassava plant. The existence of starch in the bark and young wood of trees, such as the Birch and Pine, renders them useful as articles of food in cold countries. Lichenin is a form of starch existing in the cells of Iceland moss and other lichens; while Inuline is the starchy matter supplied by the roots of the Dahlia, Dandelion, and Elecampane. By the action of

* Plate

Botany. prolonged heat, as well as by the addition of diluted sulphuric acid, and of malt, starch is converted into a soluble gummy substance called dextrin. The same change we shall find occurs during germination or the sprouting of the seed.

Gum—Is another substance contained in vegetable tissues. When pure, it is clear, soluble in water, and also in dilute acids, but not soluble in alcohol or ether. It is one of the forms through which vegetable matter passes in being applied to the purposes of plant life. It exists largely in the vegetable juices. From the bark of many trees it is procured in the form of an exudation. Two well-marked kinds of gum are met with: Arabine, soluble in cold water, constituting the chief ingredient of gum-arabic, procured from various species of Acacia; and Cerasine, insoluble in cold water, and readily soluble in boiling water, constituting the gummy secretion obtained from the cherry and plum. A substance called Bassorin, or vegetable jelly, is found in Tragacanth, the roots of some Orchids, as well as in Carrageen (Sphærococcus crispus), and other sea-weeds. It is allied to gum, but differs in swelling up and becoming gelatinous when mixed with water. Another jelly-like substance called Pectic acid exists in the juice of turnip, beet, and carrot, as well as in the apple, pear, and other common fruits.

Sugar—Occurs abundantly in the sap of plants. When pure, and in a solid state, this substance is crystalline, and soluble in water. It occurs, however, in an uncrystallizable form. There are two marked varieties of it. Cane sugar, procured from the sugar-cane, sugar-maple, beet, carrot, and many other plants; and grape-sugar, occurring in numerous fruits, as grapes, gooseberries, currants, peaches, and apricots. The formula for Dry Grape-sugar is C12 H12 O12. During the sprouting of the seed, starch is converted into grape-sugar, and a similar change is induced by the action of malt, and of any ferment. A sweet substance (not a true sugar), called Mannite, is procured from the Manna-ash, as well as from various seaweeds, from species of Eucalyptus, and from the Dandelion.

The substances which have been noticed as occurring in the elementary tissues are important as organic products concerned in the growth and nourishment of plants. Some differences of opinion exist among chemists as to their exact atomic composition; it is sufficient at present to notice that they all consist of a definite proportion of carbon, united to oxygen and hydrogen, the elements of water. They are convertible into each other by the action of heat and of various chemical re-agents, and by the powers of vegetation. The ultimate composition of several of them is identical, and the difference of their properties, in such instances, seems to depend on differences in the arrangement of their atoms.

Another class of substances, found in the tissues of plants, and essential for the process of vegetation, consist of carbon and the elements of water, with the addition of nitrogen or azote. Hence they are called nitrogenous or azotized. They occur abundantly in the gluten of wheat flour. Schleiden includes them under the general name of vegetable mucus. The chief substances which enter into the composition of this nitrogenous matter are albumen, fibrine, caseine, legumine, and emulsine.

Nuclei.—The cells of plants, at some period of their existence, usually contain what are denominated nuclei or cytoblasts. The nucleus is a small rounded body resembling a minute cellule, which is either loose or attached to the walls of the cell containing it (Fig. 12). It frequently contains smaller bodies called nucleoli. The nucleus has an important function to perform in cell growth, as has been noticed under cytogenesis or cell-development, and after a certain period it frequently disappears.

Chlorophyll and Colouring Matters. - Chlorophyll or Phytochlor, is the matter which gives the green colour to plants. It is a coloured fatty or wax-like substance, which may be separated by the action of alcohol and ether. The green colour is associated with globules of various sizes,

which are either free or united together. The globules of Botany. chlorophyll can be seen under the microscope in any of the green parts of plants. In delicate structures, such as the cellular tissue of mosses and liverworts, they are easily examined. The colour is only produced under the action of light; hence chlorophyll exists in the superficial cells of the parenchyma, thus differing from starch, which is produced in the internal and subterranean organs, whence light is excluded. It undergoes changes according to its state of oxidation; hence the tints which the green leaves acquire in autumn. There would appear, therefore, to be a colourless chlorophyll present in plants, which is acted on by light, oxygen, and other agents, so as to give rise to green, yellow, and red tints. Schleiden says, the yellow leaves in autumn contain proportionately more wax than the green leaves of summer, the yellow rind of the ripe fruits more than the green rind of unripe fruits. The tints of flowers depend either on variously-coloured insoluble globules, which are considered to be of a nitrogenous nature, or on soluble substances which have not been fully examined. Colouring matters not green are included under the name of Chromule.

Oily, Fatty, and Resinous Matters. - These are contained in cells and in special canals and cavities, called receptacles of secretion. The oils are either fixed or volatile; the former being divided into drying, fatty, and solid; while the latter are distinguished according as they consist of carbon and hydrogen alone, or of these elements combined with oxygen or with sulphur. Resinous matter occurs either in the form of fluid balsams, or of the various kinds of solid resin and pitch. In the rind of the orange and lemon, receptacles of oil occur. These are represented in Fig. 38,

which is a vertical section of part of the rind & of the orange, the reservoirs of volatile oil being marked RRR. The cellular tissue of the rind is seen surrounding the oil

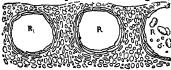


Fig. 38.

cavities, and the cells are elongated and condensed,

so as to form a compact tissue in the walls. Turpentine canals are met with in the bark of Pines; and Vittæ or oil-canals in the fruit of Umbelliferous plants,* such as the Coriander. In*Pl. CXXI the fleshy covering of the fruit of the Olive, there are nume-Figs. 2 & 3 rous oil-cells. The fruit of the Guinea-palm yields a solid oil called Palm oil. The dotted appearance of the leaves of the orange, myrtle, Eucalyptus, and St John's wort, depends on the presence of numerous cells or cavities containing essential oil.

As allied to these secretions, we may notice Caoutchouc, which is found in the milky juice of plants, especially those belonging to the Fig, Spurge, and Dogbane orders. The trees most prolific in this substance are, Siphonia Caoutchouc, Urceola elastica, and Urostigma elasticum. Gutta Perchais the concreted milky juice of the Taban plant (Isonandra Gutta). Wax is also found in the tissues of plants, and it frequently occurs as a secretion on the stems, as in the Wax Palm, and on the surface of fruits, as in the bloom or glaucous secretion of the plum and the candleberry myrtle.

Air-Cavities.— Cells and intercellular spaces containing air
are found in many aquatic and Fig. 39.

Fig. 39.

Fig. 39.

weed, showing vesicles or bladders 4, full of air je the cellular front; at the fructification.

marsh plants, apparently with the view of rendering them buoyant (Fig. 39, a). In some cases they are regular in

Botany.

their formation, being surrounded by cells which are built up on a uniform plan in each species of plant, as in Pondweeds (Fig. 40, 1). In other instances they are formed by

the destruction or absorption of part of the cellular tissue, as in the case of many hol-*Pl. CXX. low stems.*



RaphidesCrystals. -Cells and

Fig. 40. Vertical section of the leaf of Potamogeton or Pondweed showing air-cavities or lacunes, i, and parenchymatous cells, p, with granules.

vessels also contain various mineral and organic acids, combined with alkaline substances. The most important of these acids and alkalies will be noticed when considering the chemistry of vegetation, and the products furnished by different natural orders. At present we shall consider the composition of certain crystalline matters found in cells, to which the name of the Raphides (papis, a needle), has been given. These are present in greater or less quantity in almost all plants. They consist of oxalic, phosphoric, malic, sulphuric, and carbonic acid, in combination with lime, and they exhibit various forms. Crystals of phosphate of lime occur usually in the form of acicular crystals, varying from $\frac{1}{1000}$ th to $\frac{1}{1000}$ th of an inch in length (Fig. 41, r); to these the name of needles or raphides was originally given. Cells with clusters of raphides may be seen attached to the divisions between the cells in the Banana. Crystals of oxalate of lime assume an octohedral form, and vary from 10th to 20th of an inch in length (Fig. 42). They are abundant

in the root of Turkey Rhubarb, to which they impart grittiness, and in Old-Man-Cactus they constitute 60 to 80 per cent. of the dried tissue. The Squill bulb, and the bulb of the onion, exhibit raphidian cells, which are easily separated during the decay of the plants. In a single cell of the Poke (Phytolacca decandra), twenty to thirty crystals may be seen.

Siliceous matter occurs in the walls and cells, and enters into

gether.
... 42. Cells of Beet-root, containing conglomerate crystals. their composition. This is the case with Grasses and Horsetails, and, in a remarkable degree, with those peculiar organisms supposed by Ehrenberg to be Infusoria, but now referred to the vegetable kingdom under the name of Diatomaceæ.

F1g. 42.

ig. 41.
Cells of Rumex, c, containing raphides, r. The cells are called Raphidiau. The raphides consist of accoular or needle-like crystals united to-

V .-- INTEGUMENTARY SYSTEM.

The general Integumentary covering of plants consists of cells variously aggregated, and may be considered in connection with the elementary tissues. It has been divided into two parts—the Proper Epidermis, and the Outer Pellicle or Cuticle. The epidermis is formed of one or more layers of colourless thick-walled cells cohering together, so as to constitute a firm membrane, which can be pulled off from the subjacent tissue. The colour of the epidermis in general depends on that of the parenchymatous cells below, from which it can be separated as a colourless layer. Occasionally, however, the epidermal cells contain colouring matter, as well as waxy, siliceous, and calcareous substances. In the case of Orchids, it is not uncommon to find spiral cells

in the epidermis covering their aerial roots. The epidermis Botany. covers all parts of plants exposed directly to the air except the stigma, which is formed of loose cells at the upper part of the pistil or central organ of the flower. The epidermis is sometimes much thickened, as in the Oleander and American Aloe, by being composed of numerous layers of cells, while at other times it is very thin. A delicate epidermis, called *Epithelium*, lines the internal cavities of certain organs, such as the ovary containing the young seeds. The boundaries of the epidermal cells frequently assume a waved or sinuous aspect (Fig. 44). The outer cuticle is a thin . layer covering the true epidermis, and apparently formed from the cells of the latter. It may be merely a changed condition of the walls of these cells, or a modification of

the inter-cellular substance which surrounds the cells. It forms the covering of hairs, as seen in Figure 43, which re-



Fig. 43.

Cuticle, or outer integument of the Cabbage (Brassica oleracea), showing the covering of the hairs, h, and the openings called stomata, s.

presents the cuticle of the cabbage with hairs, h, and it extends into certain openings in leaves called stomata (Fig. 43, s). In plants constantly under water, and in certain of the lower tribes, the cuticle is the only integumentary covering. The outer cuticle is considered by Mitscherlich as a corky substance, which prevents the penetration of moisture. The same substance, according to him, cements the cell-walls.

Epidermal Appendages.—These consist of openings to which the name of stomates is given, as well as of hairs, glands, and scales. They are not invariably present in the epidermis of all plants, and some of them, after having been developed, disappear in the progress of plant growth. Their presence and absence, as well as their form and structure, give rise to important botanical characters. A surface without hairs is called glabrous, while one having hairs is pilose. When the hairs are short and soft, the surface is pubescent; when long, distinct, and tolerably soft, hirsute; when long and stiff, hispid; when the hairs arise in tufts, the term bearded or stupose is applied. When they are entangled like cotton, and at the same time rather rigid, the term tomentose is given.

Stomata or Stomates.—These are orifices between the epidermal cells situated on the leaves and other green parts of plants exposed to the air, and communicating with intercellular spaces. They are sometimes called breathing-pores.

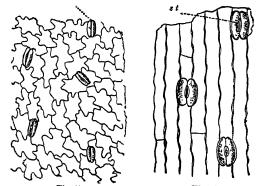


Fig. 44.

Fig. 45.

Fig. 45.

44. Epidermis of the garden Balsam (Balsamina hortensis), showing wavy lines bounding the flattened cells and stomata, st, of an elliptical form.

45. Epidermis of Lily, showing the lines bounding the compressed and elongated cells, and stomata, st, composed of two cells, with an opening or slit between them. Some granular matter is seen in the stomaticalls.

These openings are bounded by two (sometimes three or four) cells (Fig. 45, st), of a delicate nature, which have the

Botany. power of opening or closing the orifice. When moist, these cells become swollen, and, while they lengthen, curve outwards in the middle, so as to leave a free opening; when dry, they are shortened and straightened, and thus their sides are applied to each other, so as to close the orifice. They are not found in underground roots, nor in plants which have grown excluded from light; and they are rarely seen in those which are constantly under water. They are best seen on the under surface of leaves. When the epidermis becomes hard and glazed, stomata sometimes disappear, or are altered in their appearance. Their form is usually oval or elliptical, but in some instances they are spherical or quadrangular. They are either scattered singly at regular or irregular intervals over the epidermis, or they are arranged in clusters. Their number varies from 200 to 160,000 or more in a square inch of surface. In the leaves of the White Lily there are 60,000 in a square inch on the under surface, and about 3000 on the upper; on the leaves of the Cherry-Laurel there are 90,000 on the lower surface, and none on

Hairs—are prolongations of the epidermal cells. They consist either of single cells, more or less elongated (Fig. 46), or of several cells placed in a linear series, like beads, as in Figure 47, or united both longitudinally and laterally, as in Figure 48, where the lower part of the hair consists of numerous cells. In Figure 49, the hair divides at the apex into two, in a forked manner. In Figure 50, a, it splits into

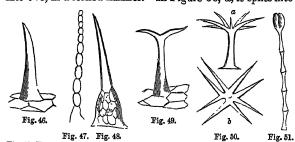


Fig. 48. Unicellular hair of the common Cabbage.

... 47. Monliform or necklace-like hair of Virginian Spiderwort (Tradescan-

21. Moniliform or necklace-like hair of Virginian Spiderwort (Tradescantia virginica)
48. Sting (stimulus) of Nettle (Urtica dioica); its base is formed by numerous cells containing irritating fluid; from these arise a simple unncellular conical hair, which serves as a duct for conveying the fluid.
49. Forked or bifurcated unicellular hair of Draba or Whitlow-grass.
50. Unicellular hair a, of Alyssum, dividing into rays at the apex. The stellate or star-like arrangement is represented in the lower figure b.
51. Glandular multicellular, or many-celled hair of Frogsmouth (Antirrhimum majus). It is a partitioned capitate hair.

several cellular projections, which in the lower figure, b, are represented spreading out in a star-like or stellate manner. A forked hair sometimes has the divisions hooked (uncinate), at other times barbed (glochidiate). In Figure 51 is seen a multicellular hair having a rounded top, and called capitate. Hairs are sometimes attached to seeds, as in the Cotton plant, for the purpose of scattering them. The cotton hairs consist. of elongated cells, the walls of which in drying collapse in the centre, so as to present a twisted appearance. Various parts of plants are transformed into hairs. Thus in Rhus Cotinus or the Wig-tree, the flower-stalks are changed into hairs, and in the common Dandelion and other composite plants,

the outer covering of the flower, called the calyx, assumes a hairy or pappose aspect. Hairs which have secreting cells at their apex, as in the Chinese Primrose, and in Sage (Fig. 52), are called glandular. The cells of the hairs occasionally secrete colouring matter, more especially when Glandular they arise from parts of the flower, as in the Iris and Virginian Spiderwort. When the cells of hairs are hardened by deposits, as in the Rose and Bramble, they are called Prickles (aculei). Bristles (setæ) are rigid hairs usually formed of a

Fig. 52. unicellular hair of Sal-via. The hair is called capi-tate, from

single cell; while stings (stimuli), as in the common Nettle (Fig. 48) and Chili Nettle, are stiff hairs arising from a series

of cells which secrete an irritating fluid. The scales produced Botany. on the leaves of Oleaster (Fig. 53), and of some Begonias, the

scurf on those of Bromelias, and the chaff (ramentum) covering the fronds of Ferns, are all modifications of epidermal cellular tissue.

Glands—are epidermal cells containing various fluid and solid secretions. They are either applied closely to the surface (sessile), as in the Ice-plant, where tney appear as elevations of the epidermis, containing a transparent fluid like ice, or in the Hop (Fig. 54), where they appear as resinous such saaly hairs or scale in Eleagnus, the Oleaster. Such soaly hairs of cont waxy and other rescretions. scales of different shapes; or they are raised on stalks (stipitate) of different lengths, and then may be called glandular hairs, as in the Sundew.



The bases of undeveloped hairs sometimes assume the

appearance of glands. The secretions of glands are of an oily, waxy, resinous, gummy, saccharine, saline, acid, or irritant nature. The honey-like matter of the flower is secreted by glands. In Figure 55 is represented one of the leaves of the flower of the Crown-imperial, showing the depression, g, at its base, in which the honey is se-

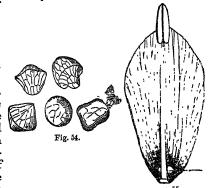


Fig. 54. Superficial glands of the Hop, containing a resinous secretion, called Lupulin,

55. One of the petals or leaves of the flower of Fritillaria imperialis, Crown Imperial, shewing a pit or depression g at the base containing a honey-like secretion. This gland is sometimes called a nectary. A stamen is attached to the petal.

creted; a similar pit is seen in the common Buttercup. The cells at the base of the Nettle hair (Fig. 48) contain an irritant secretion, those at the apex of the Sundew hairs contain viscid matter. The glands on the flower-stalk of Dittany and Rose secrete oil, while those of the Chick-pea have an acid fluid in their interior. On the inner surface of the base of the stipules of Cinchona and allied genera, there are numerous small sessile glands which secrete a gummy matter.

CHAPTER II.

NUTRITIVE ORGANS OF PLANTS.

Having now considered the Elementary Tissues of plants, their composition, and contents, we proceed to view them in combination, as forming various compound organs. These are naturally divided into the organs destined for the nourishment or Nutrition of the plant, and those concerned in Reproduction, or in the formation of the new plant. as individual beings, plants present various aspects. Some,

like the Red-snow plant (Fig. 56), are composed of single isolated cells, which are capable of performing the functions both of nutrition and reproduction. Others, as Fungi and reproduction. Others, as rungi and sea-weeds, are composed of cells of the Red-snow plant numerous cells, united either in a linear series or as a flattened expansion, some of which are appropriated to the nutritive, and others to the reproductive functions.

The relaxation of the reproductive functions.



These plants are denominated Cellular. The higher classes of plants have cells and vessels Fig. 58.

trition and reproduction, and they are denominated Vascular.

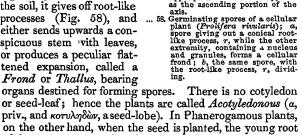
In the lower classes of plants there are no evident flowers -their organs of reproduction are obscure, and hence they are called Flowerless and Cryptogamic; while the higher classes have conspicuous flowers, and evident organs of reproduction, and hence are called Flowering and Phanerogamous or Phænogamous. In both classes the young plant, or embryo, in its earliest state, is cellular. This state

is retained by the embryo or spore (Fig. 8) of the former; while in the latter it assumes a high degree of development in the seed, and at maturity exhibits the parts which are to form the root, stem, and leaves, associated with certain temporary leafy

appendages or lobes, called cotyledons (Fig. 57).

When the spore of Cryptogamic plants is sown in the soil, it gives off root-like

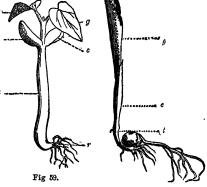
Fig. 57. Embryo contained in the seed of the Barberry. The lower portion of the axis gives origin to the radicle or young root which protrudes at the micropyle. The upper portion afterwards appears as the ascending portion of the axis. processes (Fig. 58), and ... 58. either sends upwards a conspicuous stem with leaves, or produces a peculiar flattened expansion, called a



of the embryo, proceeding from one end of the primary axis,

descends, while the stem ascends, bearing leaves and conspicuous flowers. This process is represented in Figure 59, where r is the young root coming off from the radicular end of the axis; and tis the stalk supporting the two cotyledons seed-leaves c c, t whence the plant is called Dicotyledonous (δis , twice); g g are the first leaves of

the plant. The same process is seen in Figure 60,



where the roots
are seen proceeding from the lower part of the axis t; the young stem is

seen in right out the radicular end of the axis; t, the stalk bearing the two cotyledons c c; the young stem is

realed a road a circle cotyledon or seed-leaf is seen at Fig. 60.

marked g, and a single cotyledon or seed-leaf is seen at c; whence the plant is called Monocotyledonous (μόνος,

When we take a comprehensive view of the Vegetable Kingdom, we find that all the organs of plants are formed upon one harmonious plan. All are produced from cells, which are modified and aggregated in various ways, and are fitted for the special functions performed by the different parts of plants. The organs called Root, Stem, and Leaves, with their modifications, are those destined for nutrition or vegetation; while certain cellular bodies in Cryptogamic

Botany. combined, presenting more complicated organs of nu- plants, and the Flowers in Phanerogamous plants, are the Botany. organs of reproduction.

I.—ANATOMY OF THE NUTRITIVE ORGANS.

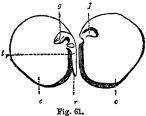
I.—THE ROOT OR THE DESCENDING PORTION OF THE AXIS.

The root (Fig. 59, r), generally speaking, is that part of the plant which descends into the soil, avoiding the light. It is the first organ developed from the axis of the embryo. The portion of the axis from which it arises is called radi-

cular. In Figure 61, the embryo of a Pea exhibits, at r, the portion of the axis from which the young root proceeds. This portion is called the Radicle; while the part t is connected with the ascending axis bearing the cotyledons (seed-lobes), c c, and the young stalk, g, which lies in a depression, f, of the cotyledons. The root consists at first entirely of cellular tissue; and, in cellular plants, this continues to be the cotyledons, f:

Fig. 61.

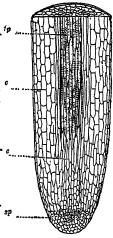
The Dicotyledonous embryo of the Pealaid open; c. the two fleshy cotyledons, or seed-lobes, which remain under ground when the plants whence the root arises; the axis bearing the young stalk and leaves, g, which lie in a depression of the cotyledons, f:



the case throughout life. In vascular plants it is strengthened by the addition of woody fibres and vessels, and presents the same internal structure as is seen in the stem. It may be considered a downward prolongation of the

The extremities of the roots are composed of loose cells, which appear to be the terminal tissue of the radicle, carried forward by the elongating root. These cells have been called Spongioles or Spongelets, but they ought not to be reckoned special organs. They do not consist of the newlyformed tissues, but they are in reality an annual mass of older cells, pushed forward by the root as it is developed. and when they decay, they are replaced by the layer be-

neath. Thus, according to Schleiden, the point of the root consists of older and denser tissue than that imme- 1p diately behind it. In the structure of the root we rarely meet with true spirals. The epidermal covering does not present stomata; but hairs, usually formed of a single elongated of cell, are produced, often in great abundance, which appear to serve the purpose of absorption. Figure 62 represents the magnified extremity of a young root of Orchis; o c c being the cellular tissue, passing into fusiform dotted cells and vessels, f p; the cellular extremity of the root, called the spongiole, being The extremities of sp marked s p. some roots, as those of Duckweed and Pistia, are covered by a nume cap-like process, or Pileorhiza, $(\pi i \lambda os, a cap, and pi (a, a root), which consists of a cellular layer, separating from the external parenchyma, but with <math>(\pi i \lambda os, a cap, and pi (a, a root), which consists of a cellular layer, separating from the external parenchyma, but <math>(\pi i \lambda os, a cap, and pi (a, a, a))$



the point of the root, which perishes if the covering is removed. The young roots of Cryptogamic or Acotyledonous plants

arise from every part of the surface of the cellular axis or spore (Fig. 58), and hence the plants have been called by Richard Heterorhizal (ετερος, diverse, and ρίζα, root). In Monocotyledonous plants, the young roots arising from the raBotany. dicular portion of the axis separate into numerous fibres are sometimes covered, as in the Screw-pine, with a pe- Botany. \checkmark (Fig. 63, r), which, in piercing the axis, are covered with a

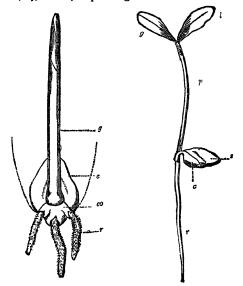


Fig. 63. Grain of Oats, a Monocotyledon, sprouting. The roots, r, passing through sheaths, co, the single cotyledon, c, and the young stalk and leaves, g. Richard calls it Endorhizal.
... 64. Seed of Orange, a Dicotyledon, sprouting, showing the root, r, descending and tapering. c, the cotyledons in the seed, t; the young leaves, g. The plant is called Exorhizal by Richard.

Fig. 64.

Fig. 63.

sheath (Fig. 63, co), called a Coleorhiza (κολεός, a sheath). These roots have been called Endorhizal, (evoor, within). Schleiden considers them as being adventitious. In Dicotyledonous plants the young root elongates directly from the extremity of the radicle (Fig. 64), and afterwards divides. It is called Exorhizal (ἔξω, outwards). These divisions of Richard are not adopted by Schleiden.

Roots have no proper leaf-buds; but in certain circumstances they are capable of producing them. Roots occasionally arise from different parts of the stem. Thus, when a cutting of willow is placed in moist earth, or branches are bent so as to be inserted into the ground, roots are given off, in the form of cellular prolongations, from the surface, or from small lenticular points to which the name of Lenticels has been given by some. Such roots are Adventitious, Secondary, or Abnormal. The term Aerial is given to roots which arise from the stem and branches of plants, and which, during the whole or part of their growth, are suspended in the air. Remarkable instances of these aerial roots are seen in the Banyan tree (Fig. 65), and in various other species of



Ficus (Urostigma) Indica, the Banyan tree, sending out numerous adventi-tious roots, which reach the soil, and support the branches.

Ficus; in the Screw-pine (Fig. 66), and in the Mangrove (Fig. 67), in Tree-ferns, and in some Palms, as Iriartea exorhiza. The extremities of these roots, when in the air, culiar cap-like covering. These abnormal roots ultimately reach the soil, and become subterranean, serving to support and prop up the trees to which they are attached.

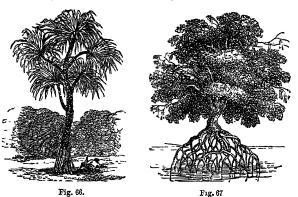


Fig. 66. Pandanus odoratissimus, the Screw-pine, giving off numerous aerial roots near the base of its stem.

... 67. Rhizophora Mangle, the Mangrove tree, supported, as it were, upon piles by its numerous roots, which raise up the stem.

The aerial roots of Iriartea are covered with numerous spines. In Epiphytes, or plants growing in the air, attached to the trunks of trees, such as Orchids, the aerial roots produced do not reach the soil. They continue always aerial and greenish, and they possess stomata. Delicate hairs are often seen on these Epiphytal roots, as well as a peculiar investment over their true epidermis. The aerial roots of the Ivy are not the proper roots of the plants, but simply processes intended for mechanical support.

Parasitic plants, as the Mistleto, Broom-rape and Rafflesia, send root-like processes into the substance of the plant whence they derive nourishment. In the Dodder,* the bark over the roots swells into a kind of sucker (haustorium), which is applied flat upon the other plant, and ultimately becomes concave, so as to attach the plant by a vacuum. From the bottom of the sucker the root protrudes which penetrates the supporting body. In the case of parasitic Fungi, such as mould, there are cellular filaments which spread among the tissues of plants, and which may be looked upon as equivalent to roots and stems united. They form the spawn or mycelium of these plants, and in some cases cause rapid destruction of the tissues of plants, as in the disease called Dry-rot.

Roots vary in their duration. In plants which grow up, flower, and die in one year, they are annual. In such cases they are usually composed of slender fibrils, which are deciduous, like leaves. These roots, consisting of numerous fibrils, springing from one point, are called Fibrous (Fig.

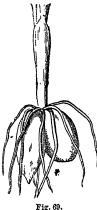
68). They are seen in many annual grasses. Plants which spring from seed one year, and flower the second season, and then die, have biennial roots; while those which continue to live and flower for many years, have perennial roots. In the last two cases the roots are often of a fleshy or woody consistence.

Perennial woody roots, when cut transversely, exhibit a structure similar to that seen in stems. Fleshy roots contain much starch, sugar, and gelatinous matter in their structure. They either descend singly, in an elongated tapering form, without branching, giving rise to various forms of branching, giving

Tap-root—conical in the carrot, fusionin of spindle-shaped in the radish, and napiform in spindle-shaped in the radish, and napiform in a fibrous—root of a grass. Numerous fibrils coming off *Pl. CXXI. roots, as in Ranunculus and Dahlia, and Tuberculate or Tu-



peculiar Annulated root, showing contractions at short intervals, while in Spiræa Filipendula the root becomes Nodose, presenting irregular swellings on its fibrils. Occasionally a Tap-root is suddenly arrested in its growth, and in place of tapering to a point, ends abruptly. This is seen in the Bittenrooted Scabious, the root of which is called Premorse. In some cultivated plants, as turnip, the central root is sometimes injured, so as to end abruptly, and it then divides into numerous branches, resembling a fasciculated root. This gives rise to the disease called Fingers and Toes, which is very injurious to the crop. The mode in which the fibres of roots are produced Orchis, and developed, thus gives origin to different forms of Rhizotaxis (bula, root, and rakes, order), or root-arrangement.



rchis, showing tuber-cules or tuberous roots, which contain a gummy matter called Bassorin.

II.—THE STEM OR THE ASCENDING PORTION OF THE AXIS.

1. Various Forms of Stems and Branches.

The stem is the ascending portion of the axis which is developed in an opposite direction from the root. It differs from the latter in usually seeking light and air, in bearing leaf-buds, which are produced at regular intervals, and in growing throughout its whole extent. In flowering plants conspicuous stems are met with, which differ in their texture, some being herbaceous, and dying down annually to the ground, others being woody and permanent, as in trees and shrubs. When stems are weak and trail on the ground, they are called prostrate or procumbent, when such stems rise towards their extremity they are decumbent, and when they rise obliquely from near the base they are ascending. Some stems are so slender that they require the aid of other plants for their support. They are either climbing and scandent plants, such as the Passion-flower, which clings to other plants by tendrils, or the Ivy, which adheres to rocks and walls by its root-like processes; or they are twining, when the whole stem coils round other plants in a spiral manner, the coils being either from right to left, i.e., to a person supposed to be in the centre of the coil, and the stem twining across his chest from his right to his left, as in Convolvulus, Phaseolus vulgaris, and Dodder; or from left to right, as in the Hop and Tamus.

Names are given to plants according to the nature and duration of their stems. Herbs, or herbaceous plants, have stems which die down annually. In some of them the whole plant perishes after flowering; in others, the lower part of the stem forming the crown of the root remains, bearing buds, from which the stem arises next season. In what are called biennial herbs, the whole plant perishes after two years, while in perennial herbs the crown is capable of producing stems for many years, or new annual products are repeatedly added many times, if not indefinitely, to the old stems. The short permanent stem of herbaceous plants is covered partially or completely by the soil, so as to protect the buds.

Plants producing permanent woody stems are called Trees and Shrubs. The latter are less than five times the height of a man, and produce branches from or near the ground; while the former have conspicuous trunks, which attain at least five times the height of a man. Shrubby plants of small stature are called *Under-shrubs* or *Bushes*. The limits between these different kinds of stem are not always well defined; and there are some plants occupying

Botany. berous roots, as in Orchis (Fig. 69). In Ipecacuan there is a an intermediate position between shrubs and trees, to which Botany. the name of arborescent shrubs is occasionally given. The usual name given to the herbaceous stem is Caulis; in grasses the stalk is called a *Culm*; while in Palms and Tree-Ferns the stem is denominated *Caudex* and *Stipe*.

Stems sometimes assume anomalous forms. In the Tortoise-plant, or Elephant's-foot-plant, the stem forms a large irregular thick mass, with a rough and tuberculated exterior. In the Melon-Cactus it is globular, in other species of

Cactus, it is jointed, columnar, or angular; while in many Orchids (Fig. 70) it assumes an oval or rounded form, and is called a Pseudo-bulb. The stem is so short in some plants, as the Primrose, Cowslip, Gentian, and Dandelion, that they are called Stemless or Acaulescent. A similar term is given in ordinary language to plants whose stems are buried in the soil, such as Cyclamen or Sow-

The stem, although it has a tendency to rise upwards when first developed, in many instances becomes prostrate, and either lies along the ground, partially covered by the soil, or runs completely An underneath its surface, giving off roots from one side, and buds from the other. Some stems are therefore subterranean,



and are distinguished from roots by the provision made for regular leaf-buds.

The points where leaves or leaf-buds are produced are called Nodes. In certain jointed stems or branches, as the Bamboo, these are well marked; but in stems which are not articulated, the nodes are often distinguished chiefly by the leaves which they bear, or by the scars left after their fall. The intervals between the nodes are denominated Internodes, and they are of different lengths, according to the distance at which the leaves are placed from each

The stem may be considered as formed of a series of leaves, at first closely aggregated on a shortened axis, and afterwards separated by more or less evident intervals. As the leaves decay and fall off, the stem becomes more conspicuous and uninterrupted. Buds may be regarded as shortened leaf-bearing axes, capable of elongation, so as to form stems and branches, with nodes and internodes. Some buds are terminal, or are produced at the extremity of the primary axis, just as the first bud in the Embryo-plant. These buds in their after-growth continue to add to the length of the stem. Other buds are lateral, or are produced on the sides of the axis. These are concerned in the production of branches.

In trees which do not ramify, as most palms, there are no lateral buds. In plants which have permanent stems, and in which the leaves are deciduous, provision is made for subsequent growth, by the production of buds which lie dormant during the winter, or the season of repose, and are ready to burst forth when the spring or the rainy season returns. The buds are situated at the angles where the leaves join the stem, or in what is called the Axils of the leaves. In cold and temperate climates these buds are protected by a coarse external scaly covering, and sometimes also by a waxy, glutinous, or resinous matter, as is well seen in the Horse-chestnut.

Buds, in place of producing branches, are in some instances abortive, or remain latent, ready to be developed when any injury has been inflicted on the terminal buds or branches. Occasionally, after a partial development as branches, buds are arrested and form knots or nodules. The embryo-buds or nodules of the Beech, Cedar, and Olive, are apparently of this nature. Sometimes several

Botany. buds unite together in the axil of a leaf, and form a peculiar flattened branch.

Branches are sometimes long and slender, and run along the ground, producing roots and leaves at their extremity or apex. This is seen in the Runner (flagellum) of the Strawberry. In the Houseleek (Sempervivum) there is a similar prostrate branch of a shorter and thicker nature, producing a bud at its extremity capable of independent existence. It receives the name of Offset (propagulum). A Stolon differs from these in being a branch which curves towards the ground, and, when reaching a moist spot, takes root and forms an upright stem, and ultimately a separate plant. It is a sort of natural layering, and the plant producing such branches is called Stoloniferous.

Spines or Thorns are usually abortive branches ending in sharp points. This is shown by their producing leaves occasionally (Fig. 71), and by their being frequently changed into ordinary branches during cultivation. Plants bearing thorns (modifications of branches or leaves) are denominated spiny, spinose, or spinescent. Tendrils (cirrhi) are frequently an altered state of leaf-buds or branches, as in the Passion-flower and the Vine, enabling the plants to climb. In the Vine, as represented in (Fig. 72), the ten-

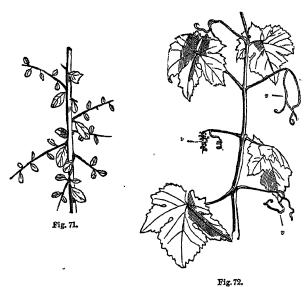


Fig. 71. Branch of the Sloe (*Frunus spinosa*), producing spines or thorns, which are abortive branches, as shown by their bearing leaves.

... 72. Part of the stem of the Vine, showing the formation of tendrils, each of which are considered as terminating axes. Between each leaf and tendril a bud is given off which forms an axis ending in a tendril, v.

drils, v v v, are considered by some as the terminations of separate axes. The lowest leaf in the figure is connected with the first axis, which ends in a spiral tendril, v; and between this tendril and the leaf a bud is given off, forming a second axis, which ends in the second tendril, v_i between which and this second axis another bud is given off, forming a third axis, ending in a third tendril, v, and so on. The different axes are in this case called cirrhose.

Subterranean Stems and Branches are sometimes short and thick, at other times they are elongated. Some are completely under ground, while others are only partially so; some increase by lateral, others by terminal buds. Many of them are in the ordinary language called roots, from which, however, they are distinguished by the power of forming regular buds, or by having rudimentary leaves or scales on their surface. Many of them contain much nourishing matter, which is stored up for the future growth of the plant.

Rhizome, or root-stock, is the name given to certain root-like forms of creeping stems, which are more or less

completely subterranean. They are seen in Iris, in Ginger, Botany. and Convallaria (Fig. 73). Such stems exhibit on their upper surface the marks or scars of leaves, and it is to the scale-like appearance of these markings that the plant called Solomon's seal (Fig. 73) owes its name. Of a similar nature is the Soboles, or creeping stem of Carices, Papyrus, and other grass-like plants, which spread through the sand and loose mud in such a way as to bind the particles together.

In the Banana (Fig. 86), there is an underground stem which sends Rhizome, root-stock, or par-up shoots of a herbaceous na-ture to bear the flowers and the stem of Solomon's send (Poly-gonatum multipliorum).

fruit. In Asparagus the shoot developed from the subterranean stem is called a Turio; it is the part used as an article of diet; at first it is covered with scales, but it afterwards gives off branches, which bear leaves, flowers, and fruit. In the Rose and Mint a subterranean branch arises from the stem, which runs horizontally to a certain extent, and ultimately sends up an aerial stem, which becomes an independent plant. Such branches are denominated Suckers, and the plants are called Surculose. The gardener divides the connection between the sucker and the parent stem, in order to propagate these plants.

The Tuber is a subterranean branch, which is arrested in its growth, and becomes remarkably thickened, in place of being elongated. It is seen in the Potato and Jerusalem Artichoke; and the eyes produced in these instances are true leaf buds. When the older parts die away, these tubers are found to belong to one axis with the new structures, which are subsequently formed. In the Arum,* Col- * Plate

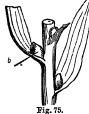
chicum, and Crocus, the tubers are perfected after the other CXXXV. parts, which belong to the same axis with themselves, so that they and the new structures belong to two axes, or at least to two different processes or shoots of the same axis. Such tubers are called Corms. They have a central axis, which is sometimes covered by thin scales; and they may be looked upon as shortened axes with scaly leaves, or as subterranean buds. Corms may be regarded as dilated stems intervening between the first buds and the roots. They give off buds in the form of young corms, and occur in monocotyledonous plants. In Gladiolus, the new corms are so superimposed upon each other, that they gradually rise above ground. In Colchicum (Fig. 74) the new corm, b, is produced alternately at either side of the old one, a, which shrivels. Sometimes three generations may be seen at the same time-the old corm, the new corm, and the bud of next year.



The Bulb is also a short subterranean axis, which is covered with fleshy scales containing succulent cells. It is a bud produced under ground, the centre corresponding to the axis, which is clothed with scales, and which sends flowering stems upwards, and roots downwards. In the Lily the thick and narrow scales are arranged separately in rows, and the bulb is called scaly; while in the Leek the scales are broad, and inclose each

other in a concentric manner, the outer ones being thin and membranous, and the bulb is said to be tunicated. The scales are equivalent to leaves, and they produce buds in the form of cloves or young bulbs at the part where they join the axis. At the base of the bulbs there is a flattened rounded por-

tion, which produces roots from one side, and scales and leaves from the other. The central bud produces the flowering stem. The lateral buds or cloves sometimes remain attached to the axis, and produce flowering stems, so that the same bulb continues to flower for many years, as in the Hyacinth and Tulip; at other times the young bulbs are detached, and form separate plants. In the case of some form separate plants. In the case of some plants, as Lilium bulbiferum (Fig. 75); bulbs are also produced on the stem, in the form of bulbels or bulblets, b, which are scaly buds, capable of being detached, and of forming independent plants.



2. Internal Structure of the Stem.

The forms of the stem having been considered, we now proceed to examine its anatomical structure. This structure consists of the elementary tissues combined and arranged in various ways. In some plants the part which serves the purpose of a stem is composed entirely of cells arranged in the form of very narrow filaments, which are simple or branched, as in some Fungi* and Confervæ, or which form an CXXXVI. expanded surface, called a Thallus or frond. Such cellular plants have received the name of Thallogens or Thallophytes (θαλλος, a frond); while those producing stems composed both of vessels and cells are sometimes called Cormogens or Cormophytes (κορμος, a stem or stipe). In ordinary conspicuous stems, both cellular and vascular tissue are present.

> The arrangement and development of the cellular and vascular systems give rise to three marked forms of stems: -1. Acrogenous, in which the bundles of vessels are simultaneously developed, and the additions to the stem take place at the summit, by the union of the bases of the leaves. Plants having this kind of stem are called Acrogens (akpos, summit, and yevvaew, to produce), or Summit-growers. Tree-ferns furnish an example. 2. Endogenous (ἐνδον, inwards), in which the bundles of vessels are definite, and are deposited towards the centre, which becomes filled up with them in the progress of growth, so that the diameter of the stem increases in a great measure by the new matter pushing out that previously formed. Such plants are called Endogens, or Inside-growers. Palms and Screw-pines supply examples. 3. Exogenous (ἔξω, outwards), in which the bundles of vessels are produced indefinitely in an outward direction, and the stem increases in diameter by the annual formation of a new layer of woody matter formed on the outside of the preceding layers. Such plants are called Exogens, or Outside-growers. Ordinary trees, such as the Oak and Ash, furnish instances.

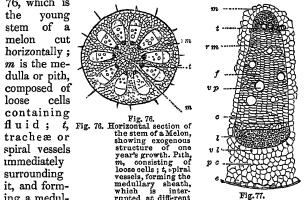
While the structure of the stem supplies obvious characters, it will be found that other distinguishing marks separate these three great classes of plants even in their earliest state. Thus, Acrogens are Acotyledonous (Fig. 58); Endogens are Monocotyledonous (Fig. 60); and Exogens are Dicotyledonous (Fig. 59).

a. Exogenous Stem or the Stem of Dicotyledonous Plants.

Exogens are the largest class of plants in all parts of the globe, and the structure of their stems is familiar to us in the trees of cold and temperate climates. In Britain the trees of our forests are all exogenous in their formation. Such trees, however, occur also in warm regions, associated with others exhibiting endogenous and acrogenous structures.

An exogenous stem, in its earliest condition, is entirely Botany. cellular. When the plant begins to grow and send up its first leaves, the cellular tissue of the axis is seen to be traversed by bundles of vessels (vascular bundles), which soon divide the stem into two marked portions; an internal, forming the central pith or medulla, and an external, forming the cortical pith or bark, covered by epidermis. The connection between the central pith and cellular bark is kept up by means of lines of cellular tissue, called medullary rays, which are interposed between the vascular bundles. At the end of a year's growth, we observe, in the exogenous stem, a central cellular pith, a circle of vascular bundles in the form of wedge-shaped masses, an external bark and integument, and rays passing from the pith to the bark. This is the complete structure of exogenous herbaceous stems, which die down annually. The appearance is exhibited in Figure

76, which is young the stem of a melon cut horizontally; m is the medulla or pith, composed of loose cells containing ing a medullary sheath; r m, medullary rays, composed of more or less flattened cells, which extend from the pith to the external cellular bark or



which is interrupted at different points to allow medullary rays, rm, to pass from the pith to the bark. The medullary rays divide the stem into ten wedge-shaped vascular bundles, the outer part of the bundles forming the fibrous layer of bark, and the inner constituting the wood; the pitted vessels are represented by large round openings. The circumference is the outer portion of the bark, consisting of cells which are covered by the general integument bearing hairs.

hairs.
77. One of the vascular wedges of the Melon separated to show its composition; m, medulla or pith; t, spiral vessels of medullary sheath; r m, medullary ray; f, woody fibres; v p, pitted vessels; c, cambium cells between wood and bark; l, inner bark, consisting of woody fibres, and called endophiœum; v l, latioferous vessels; p, c, cellular envelope of the bark; c, general integument.

cortical layers; on the outside of the bark is the integument with projecting hairs, and between the medullary rays are ten wedges of fibro-vascular bundles, consisting of woody, porous, annular, reticulated, and spiral vessels; in these wedges the porous vessels are represented by large rounded openings. In Figure 77 is given a horizontal section of one of the fibro-vascular bundles, in order to show its composition. The section extends from the pith to the outer integument; m, medulla or pith; t, tracheæ or spiral vessels, forming the sheath round the pith, the fibres being unrollable; r m, cellular medullary ray at the side of the vascular wedge; f, woody, annular, and reticulated vessels; v p, porous or pitted vessels of large calibre; c, a layer of green and active cells, forming what is called the cambium layer; I, woody fibres, constituting a layer called the inner bark; v l, ramifying laticiferous vessels; pc, cortical cells, constituting the cellular bark, which is covered by the common integument, e.

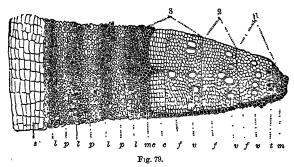
In stems which are not annual, the growth of the second year consists of a new formation of vascular bundles outside the previously formed layer, between it and the barkthe connection between the pith and the bark being still kept up by cellular rays. Between the pith and the bark there are annually formed a layer of active formative cells, called cambium cells, which are concerned in the development of new woody fibres. In Figure 78 is shown a transverse section, A, and a vertical section, B, of one of the

of the second year of growth —the letters referring to both sections; t, tracheæ, or spiral vessels, forming the medullary sheath, which allows the medullary rays to pass through at different points; v p, porous or pitted vessels, constituting bothrenchyma or taphrenchyma, and presenting large rounded openings; f, f, fibres formed of fusiform tubes, the inner, f, marking the fibres forming the wood of the stem, and the outer, f, those which form the cortical fibres of the inner bark; c, cambium cells between the wood and bark; p c, p c, cortical polyhedral cells, often of a greenish colour, forming a cellular layer of bark; s, outer cellular layer of bark, composed of cubical or tabucomposed of cubical or tabular colourless cells, often of a Corky nature, and hence called suberous; this cortical layer is covered by the general integument. Thus, at the commencement of the second year's growth. Thus, at the commencement of the second year's growth there is a distinct formation of cambium cells, by the action of which a new layer of fibrous bark is formed: and these cambium cells height growth as distinct from the cellular layer below; on the cut-side of the suberous layer is the second year's growth as distinct from the cellular layer below; on the cut-side of the suberous layer is the second year's growth; p.o. p.e., constituting the inner bark (liber or bark (Epiphlœun); s. suberous layer of bark may be action of the stem of a Maple at the commencement of its second year's growth. A, Horizontal section; B, Vertical section, Spiral vessel vertical section, Spir

formed; and these cambium cells, being in connection with the medullary rays, keep up the connection between the medullary and cortical cells.

Fig. 78.

Let us now trace the changes which take place in the permanent woody stem of the Maple, after three years' growth, as represented in Figure 79. The yearly growth



Horizontal section of one of the vascular wedges of the Maple, taken from a stem three years old.

of the woody bundles is marked by the Figures 1, 2, 3:-1. The Pith, m, is surrounded by tracheæ, t, which are not repeated in the growth of subsequent years; outside these are the pitted vessels, v, and fibrous tissue, f, of the first year's growth. 2. Pitted vessels, v, and fibres, f, or woody and other vessels of the second year's growth. 3. Pitted vessels, v, along with fibres, f, of third year; c, layer of cambium cells outside the wood of third year. The outer part of the section consists of the layers of bark; s, the suberous, or outer layer of bark cells; immediately within, is p, the cellular layer, and l l, the fibrous layer of the bark of the first year; then follows the bark of the second year, p l; and, finally, the cortical layers of the third year, p l, which VOL. V.

Botany. fibro-vascular bundles of the maple at the commencement are separated from the wood by a cortical layer of new cells, Botany. me, and the cambium layer, c.

> In examining, therefore, the growth of an Exogenous stem, it will be seen, that while additions are yearly made to the layers of wood in an outward direction, so as to give rise to the term Exogen, or outside-grower, the bark, on the contrary, increases by annual additions on the inside. The increase of the diameter of such stems takes place by successive deposits of vascular wedges in concentric circles, year after year, and during this growth the bark becomes gradually distended. On examining old stems the different annual layers can be counted, especially in trees of cold and temperate climates, where there is a marked cessation of growth during winter.

> Let us now proceed to examine the different parts of an Exogenous stem proceeding from the centre to the circumference.

The Pith (Fig. 76, m)—consists of cellular tissue (parenchyma), at first succulent, but afterwards becoming dry, as its juices are absorbed for the use of the young plant. The dry pith of the stem is sometimes used for paper, as in the case of Rice paper or Schola, which is produced in India from the stem of Æschynomene paludosa, in the Malay Archipelago from that of Scævola Taccada, and in China from that of Aralia papyrifera (Tung-tsaou). the progress of growth its cells are sometimes broken up, so as to form large empty cavities, as in the Walnut, Poke, Jessamine, Horse-chestnut and Hickory; at other times the whole pith gives way, owing to the rapid distension of the outer part of the axis in its early state, and then the stem becomes hollow, with shreds of pith attached to its interior, as in Umbelliferæ* and Grasses. The cells of pith *Pl. CXX are well seen under the microscope in the Elder.

The Medullary Sheath—is the first formed vascular layer (Fig. 77, t). It consists principally of spiral vessels (Fig. 30), the fibres of which can be uncoiled. This is the only part of an exogenous stem in which these vessels ordinarily occur. This medullary circle is not always complete, spaces being left between the vessels where the medullary rays and the pith communicate. The tracheæ traverse the cellular tissue so as to reach the leaves.

The Wood.—The layers of wood (Fig. 77, f) are formed outside the medullary sheath. They consist of woody fibres (prosenchymatous tubes) such as those represented in Figure 24, mixed with dotted ducts (Fig. 3), and occasionally with a few annular (Fig. 32) and reticulated (Fig. 33) vessels belonging to the spiral type. On making a transverse section of the stem of the Chestnut, Ash, or Oak, the extremities of the dotted ducts (pitted vessels) will be seen in the form of large rounded openings on the inner side of the woody circle or zone. In the Maple (Fig. 79), Plane, Lime, and Hornbeam, the openings are large, and are diffused throughout the annual zones, mixed with pleurenchyma. In coniferous (cone-bearing) plants, as the Fir and Pine, the woody layers are composed of disc-bearing pleurenchyma (Fig. 25), without any dotted ducts, and hence under the microscope no large rounded openings are seen in the woody lavers.

In the young state the pleurenchymatous tubes of the woody zones are pervious, but by degrees they are obliterated by the deposits of ligneous matter (lignin). In old exogenous trees the central wood is hard and durable, constituting the Heart-wood or Duramen, while the exterior wood is soft, forming the Sap-wood or Alburnum. The lignin deposited in the heart-wood frequently acquires a marked colour, as in the Ebony tree, where it is black; in the Black Walnut, where it is dark-brown; in the Barberry and Judas-tree, where it is yellow; in the Red Cedar,where it is purplish-red; and in the Guaiac tree, where it is greenish. The relative proportion between alburnum and duramen varies in different trees. Those in which the hard

Botany. wood predominates are best fitted for building, and for withstanding the effects of moisture, dry rot, and the attacks of insects and other animals. The durability of woods depends on the nature of the ligneous matter deposited in their pleurenchyma, and this varies much.

The woody zones annually formed are not always of the same size. Much depends on the state of the climate and season, the exposure of the plant to air and light, and the nourishment which it receives. A narrow ring of wood may be considered as recording a cold season, while a wide one indicates a warm season. The same zone also varies in size at different parts, so that, in many cases, the pith is excentric-that is, not exactly in the centre of the stem, owing to the circles being thicker on one side than on the other. Bravais and Martins noticed a Scotch Fir in which the two semi-diameters of the stem were to each other as nine to nineteen, or the one more than double the other. In such cases, it usually happens, that the side of the tree having the greatest thickness is that which has been best exposed to

From the mode in which layer after layer of wood is formed, it follows that the age of an exogenous tree may be estimated by counting the number of woody circles (Fig. 80.) In trees of cool climates, where there is a marked

cessation of growth, this may be done with tolerable accuracy up to a certain age at least; but in trees of warm climates, where there is a less marked period of repose, this cannot always be done accurately. It is said that in some of the trees of tropical America monthly circles are formed; while in species of Cactus and Cycas more than one year is required to form a single year is required to form a single

zone. In estimating the age of trees in temperate climates, the rings or zones of woody matter must be counted from the pith to the bark. Mistakes have been committed, in many instances, by merely making a section of the stem of an Oak, showing the pith in the current the woody layers formed in concentric circles around it, and the layers of bark on the outside. There are six woody circles, indicating that the stem of the same age is indicated by that the stem of the distribution of the distribution of the distribution. and then estimating from their size for the whole diameter of the tree.



Fig. 80.

The Medullary Rays.—These connect the pith and the bark (Fig. 76, r, m). They consist of flattened quadrangular cellular tissue, having an appearance like bricks in a wall, and hence called muriform. In the young stem these rays are large, while in the more advanced woody stem they are seen as lines only. They constitute the silver-grain so conspicuous in the Maple, and they give the peculiar silvery lustre to many woods when cut in the direction from the pith to the bark. These rays do not proceed in a continuous plane from the top to the bottom of the tree. They pass through the woody layers in such a way as to be interrupted in their course, and when a section is made perpendicularly to the rays, or, in other words, as a tangent to the circumference of the stem, their ends are seen projecting irregularly through the woody fibres. They are said by some authors to represent the horizontal system of the stem, or, as it were, the woof, which is traversed by the vertical woody bundles, like the warp. The medullary rays are in some cases, as in Clematis and Aristolochia, large and broad, while the woody wedges are comparatively small. Besides complete medullary rays, there exist others which only extend partially through the stem.

The Cambium Layer.—This is a layer of nucleated cells, lying between the wood and the bark, and originally connected with both. They are formed in a mucilagmous fluid

called Cambium, and they are concerned in the formation Botany. of the woody tubes of the inner bark, and of the pleurenchyma, as well as in the additions made to the cells of the medullary rays. When these cells are carrying on the process of growth with activity, during the flow of the sap in spring, the bark can be easily separated from the

The Bark—is at first composed of uniform cellular tissue, resembling that of the central part of the stem (Fig. 77). In the progress of growth transformations of the tissue take place, by which fusiform prosenchymatous tubes are formed in the inner portion of the bark next to the woody circle. This portion is called the Inner Bark or Liber (Endophlæum -ἐνδον, within, and φλοιὸς, bark). It consists of thickened pleurenchyma with some laticiferous vessels. It is the fibrous part of the bark, and is often called Bast tissue. The fibres of the liber are long and tenacious, and are employed for various useful purposes. Those of the Lime-tree, Hemp, Mallow, Hibiscus, Boehmeria, Nettle, and Daphne cannabina, are employed for different articles of manufacture. The fibres sometimes separate, so as to form meshes, as in the Lace-bark tree. The inner bark of Antiaris saccidora has tenacious fibres, which are used in India for cordage and matting. The tree is common in the jungles near Coorg, according to Dalzell, and the people manufacture curious sacks from it. A branch is cut corresponding to the length and breadth of the sack wanted. It is soaked a little, and then beaten with clubs until the liber separates from the wood. The liber, in the form of a sack, is then turned inside out until the wood is sawed off, with the exception of a small piece left to form the bottom of the sack. These sacks are in general use among the villagers for carrying rice. The inner bark of various trees has been used for writing upon, and hence the name liber.

On the outside of the liber lies the cellular portion of the bark, consisting of two layers, the Cellular Envelope, called also Mesophlœum (μέσος, middle), and the Corky or Suberous Envelope, called also Epiphlœum (ἐπὶ, upon, on the outside). The former is composed of loose thin-walled polyhedral cells, containing chlorophyll, and hence often denominated the green layer; the latter consists of flattened tabular parenchyma, giving the peculiar colour to the branches and young stems of trees and shrubs. The epiphlœum is rarely green; it is generally some shade of ash-colour or brown. It is sometimes developed to a great extent, constituting the cellular substance called cork, procured from the Cork-oak, and produced also by various species of Elm. In some trees the epiphlœum falls off at certain intervals. In the Cork-oak it does so in eight or nine years, leaving a tabular layer of cells below. In the Birch the outer bark is the part which separates in layers, owing to the formation of a stratum of thin-sided cells below the lamellæ, which easily separate into fine powder when disturbed. On the outer surface of the epiphlœum is the Epidermis, or general integument, which in old trunks is thrown off.

The different layers of bark increase by additions of new cells to their inner surface. The cellular layers, however, soon cease to grow, while the liber continues to increase by additions from the cambium layer. The thickening of the pleurenchyma of the liber takes place by concentric deposits of lignin, in the same way as in the case of woody tubes. Sometimes the different annual circles of bark may be traced, but in general, after a certain length of time, all the layers are more or less amalgamated by the growth and pressure of the parts below, so that it is impossible to ascertain the age of the tree by the cortical layers. It is obvious that, by the constant additions to the wood on its outside, and the bark on its inside, the latter is distended, and when the cellular portion has ceased to grow, it cracks and splits in various ways, and ultimately falls off. The distension and

Botany.

Botany. increase in diameter of an Exogenous stem is such, that a woody climbing plant, for example Bauhinia or Honeysuckle, when surrounding it, gives rise to marked grooves on the surface, and often arrests its growth entirely by pressure on the sap wood.

Although all these parts are generally observed in Exogenous stems, and present the order now mentioned, still, various peculiarities occur, especially among exogenous trees

of warm climates, which often obscure the arrangement. Thus, in some trees of great age only one marked zone or circle of woody matter is seen, consisting of a series of separate wedges; in other trees there are several such zones, each of which is the produce of more than one year's growth. In such cases the stem increases in diameter by the formation of new wedges, or by additions to the old ones. Occasionally the woody matter is so formed as to be in separate masses, surrounded by cellular tissue, which pre-

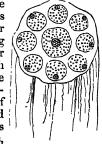


Fig. 81.

sents the same appearance as the outer bark (Fig. 81). Such a stem looks as if it was formed by several united together.

Some Exogenous plants with twining stems become much altered by compression; other exogens exhibit fluted stems. In the Yarroura wood, or Paddle-wood (Aspidosperma excelsum), the stem is singularly fluted, and presents a waved or sinuous aspect. The same kind of appearance is seen in some woods which are imported for the purpose of furnishing dyes, such as Logwood, Nicaragua wood, and Rio de la Hache wood (Cæsalpinia echinata), &c.

The Branches of Exogens.—In Exogenous stems a provision is usually made for the formation of branches, or, in other words, the stems grow, not merely by producing buds at the apex, which cause an increase in height, but also by lateral buds which give origin to branches. These are connected with the centre of the stem, and their tissues can be traced to the pith and its sheath. From this mode of growth Exogenous trees have a form more or less tapering as regards their stem and branches. In the arrangement of their parts, branches resemble the stems from which they proceed. When regularly developed they taper to a point, and continue to produce buds, which again form smaller branches and twigs by constant subdivision.

The mode in which branches grow and subdivide gives rise to different aspects in forest trees. In the Cedar, the branches spread nearly at right angles; in the Italian Poplar they come off at an acute angle with the upper part of the stem; in some plants, as the Weeping Elm, they come off at an obtuse angle. In the Birch and Willow the branches become so slender at their extremities that they bend by their own weight. When the terminal bud of a stem or branch of an Exogen is cut off or arrested in its growth, the lateral buds are produced abundantly, and thus give rise to the appearance seen in pollard trees, and in the clustering of the twigs of the Birch and other trees. The comparative length of the branches in the upper and lower parts of trees tends also to give them a peculiar physiognomy. When the lowermost are longest, and the others are gradually shorter as we proceed upwards, the conical form is produced, as seen in the Douglas Pine (Abies Douglasii). When the uppermost are longest, as in Pinus pinea, the form is somewhat like that of an inverted cone. When branches are produced under ground, and in darkness, they frequently become thickened and contorted in various ways, as seen in the potato, the tuber of which is a branch of this kind. When the potato is allowed to grow above ground, but in darkness, the ordinary branches sometimes assume the form of tubers.

b. Endogenous Stem, or the Stem of Monocotyledonous Plants.

This kind of stem is not seen in its fullest development in northern climates. We must look to the Palms and Screw-Pines of warm regions, in order to see the striking effect produced by its mode of growth. The trunks of palms differ much in their aspect from the trees of this country, They have usually simple unbranched, cylindrical stems, towering to a great height, and covered by a large mass of remarkable foliage (Fig. 82).

In the structure of the woody endogenous stem there is no marked distinction between pith, wood, and bark; there are no medullary rays, nor concentric circles. Definite vascular bundles are diffused through the cellular tissue without apparent regularity, and the whole is enclosed by an external covering which differs from the bark of Exogens, in not having annual layers, and in not being separable from the wood. In Figure 83, which exhibits a transverse section of a Palm-stem, this arrangement of tissues is seen. On the outside is the cortical portion not separable from the rest; the vascular bundles are marked f, and the cellular portion, which is looser towards the centre, m. In the early state the stem is entirely cellular, but in the progress of growth vascular bundles are produced, consisting of woody, spiral, dotted, and laticiferous vessels. In Figure 84, there

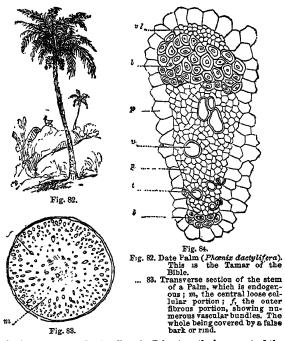


Fig. 84. One of the vascular bundles of a Palm-stem, the lower part of the figure being that next the centre. Upper p, the general cellular parenchyma surrounding the bundle; lower p, woody fibres; ll, ilbrous thickened woody vessels, resembling those of the liber of exogens; t, trachem (spiral vessels); v, large dotted wessels; v l, lationferous vessels.

is represented a transverse section of one of the fibro-vas cular bundles of an Endogenous stem; upper p marking the general cellular parenchyma surrounding the bundle; lower p, woody fibres; l, woody vessels analogous to those of the liber; t, tracheæ (spiral vessels); v, dotted vessels of large calibre; v l, laticiferous vessels. The vascular bundles are most abundant near the circumference, while the cellular tissue is in larger quantity in the centre. In the bundles the woody vessels (Fig. 84, 11), generally surround the other vessels.

The vascular bundles may be traced from the leaves downwards, some proceeding more or less directly towards

Botany. the root, others curving outwards towards the cortical integument or rind (Fig. 85, fv). The mode in which these bundles proceed from the leaves towards the centre, in the first

instance, has given rise to the term Endogenous, or inside-growers; the idea originally entertained by physiologists being, that the vascular bundles were always produced on the inside of those which preceded them. The bundles, however, although they have a tendency towards the centre at first, do not always remain there, but follow a curved course towards the periphery, and in this way the outer rind becomes completely incorporated with them, so as not to be separable. The structure of the bundles varies in different parts of their course. Near

Tig. 85.

Vertical section of a Palm-stem, so their course. Near

Tig. 85.

Vertical section of a Palm-stem, so their course. Near

Tig. 85.



the base of the leaves they contain all the vessels already mentioned, but as we trace them downwards, the spiral, dotted, and laticiferous vessels disappear, and the woody fibres alone remain when they reach the rind, or, as it is often termed, the false bark.

From the mode in which the vascular bundles are added, it will be seen, that the tendency is to push the older vessels outwards, and to render the periphery hard. In Palms, therefore, the hardest part of the stem is external, which is the reverse of what takes place in Exogens. By the internal addition of vascular bundles from terminal buds only, and by the interstitial growth of cells, the stem of a Palm increases in diameter until it acquires the full limit to which the outer rind can be distended, and attains ultimately a uniform diameter throughout. Thus, there appears to be a definite limit to the lateral growth of a Palm, while no such limit can be seen in the case of Exogens, in which vascular bundles go on increasing indefinitely, and the bark is se-Palms consequently do not exhibit trunks of a diameter equal to that of Exogenous trees, nor does their bole present a tapering form. The first part of the stem of a Palm is formed by vessels which are connected with the first crown of leaves; the next crown, or terminal bud, produces more woody bundles internal to the first, and thus the stem is thickened during successive seasons, until at length the lower part is fully formed. The same process goes on throughout the whole stem, until it acquires a continuous cylindrical form. From the structure and mode of growth of a Palm-stem, it follows, that a woody twining plant does not produce the same injury as in the case of an Exogen.

Palms grow in a uniform manner as regards height in their native countries, and their age may in general be de-termined by the length of their stem. The destruction of the terminal bud of the Palm stops its growth, in consequence of the want of provision for lateral buds. In some instances, however, as is particularly seen in the Doum Palm of Egypt (Hyphæne thebaica), branches are given off in a forked, or what is called a dichotomous manner. There are also many endogenous stems which produce lateral buds. The Screw-Pine (Pandanus), for instance, and species of Dracæna, have branching stems. In the Dragon trees (Dracæna), a remarkable increase of stem takes place in consequence of the cortical integument remaining soft, and capable of unlimited distension. The vascular bundles, after reaching the circumference in these plants, descend towards the root, and being produced both by terminal and lateral buds, they are developed in large quantity, and thus give rise to enormous stems. Such a stem is seen in the famous Dragon tree of the Canaries, which near the ground is 70 feet in circumference. When numerous buds are produced laterally, the lower part of the stem receives more bundles than the upper,

and thus the stem tapers. This is seen in the Asparagus Botany. and Bamboo, which in this respect resemble Exogens.

In some Endogenous stems the rapid growth of the outer part gives rise to a rupture of the central cells, and thus the hollow stems of many grasses are produced. In the Bamboo the hollow cavities in the stem are separated by partitions formed by the crossing of the vascular bundles. In Xanthorrhœa Hastile, the grass-tree of New Holland, a liliaceous plant, the structure of the stem and branches is peculiar. On making a vertical section the structure appears to be that of an Exogen. The woody part is formed of vertical loose fibres like Palms, and there are other fibres, radiat-

ing from the centre, and cutting the preceding at right angles. These horizontal fibres resemble the medullary rays, but differ in their structure. They probably serve for the origin of leaves, which are numerous, and are disposed throughout the whole length of the stem.

Endogenous stems sometimes remain under ground. The corm is in fact a shortened endogenous subterranean stem. Bulbs, are under-ground endogenous stems, covered with scales. In the Banana (Fig. 86), as well as in the Asparagus, the true stem is subterranean, Banana (Musa septentum), having an unand sends up shoots bearing leaves. flowers, and send-ing up a herbaceous shoot, which bears leaves, flowers, and fruit.



Fig. 86.

fruit, which, after dying down, are succeeded by other shoots. The peripherical portion of some subterranean endogenous stems, as Sarsaparilla, presents a circle of vascular wedges, resembling in appearance the stem of certain exogens; and the false bark of some aerial endogenous stems. as Testudinaria, becomes much thickened by the formation of cellular matter resembling cork.

c. Acrogenous Stem, or the Stem of Acotyledonous Plants.

This stem, in its complete development, is seen in the Tree-ferns of foreign countries. It resembles the Endo-genous stem in being unbranched, and in producing a crown of leaves at its summit. The Tree-fern form gives a peculiar aspect to the vegetation of the countries in which it occurs. The structure of the stem, which is called a caudex, consists of cells and vessels, arranged in a peculiar manner. The vascular bundles are formed simultaneously. They consist of woody tissue, often of a dark colour, surrounding a paler layer of vessels, chiefly scalariform, and dotted. The bundles assume various shapes, giving rise to the zig-zag appearance, presented in a transverse section, as seen in Figure 87. The bases of these leaves (or fronds as they are called) by their union form the stem, which is increased by additions to the summit; hence the name given of Acrogens, or summit-growers. The growing point is carried upwards by the leaves, and when once formed the stem increases very little in diameter. It is often hollow by the rupture of the internal cellular portion. On its outside the scars of the leaves remain (Fig. 88), with the markings of the vascular bundles. These bundles follow a course similar to that of the woody tissue of the liber of Exogens. The stem of Tree-ferns, then, is of moderate diameter, and does not produce lateral buds. Sometimes it terminates in two buds, which, by their growth, produce a forked stem. In the stems of the ordinary ferns of this country the acro-

genous structure is seen, although they seldom attain any height, but usually creep along the ground, forming rhizomes.

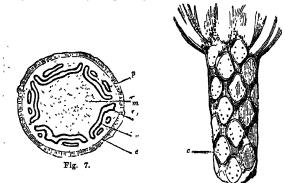


Fig. 87. Transverse section of the stem of a Tree-fern (Cyathea); celln'ar tissue in the centre, m; that of the circumference, p; vascular bundles, f u, consisting of dark-coloured woody fibres, f; and paler vessels, chiefly scalariform and dotted, u; the outer cortical portion formed by the bases of the leaves, c.

38. Rhizome of Male Fern (Lastrea Flix-mas), showing the scars (cicatrices) of the leaves (fronds), with the markings of the vascular bundles, c.

The acrogenous stem occurs in Horsetails, in Clubmosses, and in true Mosses, but in these plants it does not exhibit the same marked characters as in the permanent woody stems of Ferns. Many acotyledonous plants produce stems which consist entirely of cellular tissue without any admixture of woody fibre or vessels. Such stems are either aerial or subterranean. They often present a flattened expansion or thallus lying on the surface of the Sometimes these cellular stems float in water, as in the case of Sea-weeds; at other times they creep under ground, or among the tissues of other plants, as in the case of Fungi. The spawn (mycelium) of Fungi is a sort of cellular creeping stem, which insinuates itself among the dead tissues of plants and other decaying substances. The cellular stalk of some Thallogens occasionally presents, on a transverse section, an appearance like that of an Exogenous stem. Thus Lessonia fuscescens, a species of sea-weed, has stems which are often five to ten feet long, and as thick as the human thigh, and which show concentric elliptic cellular rings. Such is also the case with Usnea melaxantha, a tree-like lichen. In these plants, however, the structure is entirely cellular, and quite distinct from that of Exogenous plants.

III. THE LEAVES AND THEIR MODIFICATIONS.

Leaves proceed from the nodes of the axis, and commence as cellular processes at the extremities of the medullary rays. In the progress of development the cells multiply, vessels are produced which ramify in the form of veins, chlorophyll is elaborated, and the foliar or leaf organs are thus completed. These organs usually spread horizontally, so as to expose one surface to the sky and the other to the earth—the surfaces differing in appearance and structure. In some plants, as Alstræmerias, the leaf is twisted naturally upon itself, so that what should be the under surface becomes the upper. Erect or vertical leaves occur, in which both sides are equally exposed to light. In some New Holland plants the leaf-organs present their edges to the earth and sky.

1. Arrangement of Leaves on the Axis.

The mode of arrangement of leaves on the stem has been denominated Phyllotaxis (φύλλον, a leaf, and τάξις, order). It is regulated by certain definite laws, and depends on the development of the nodes and internodes of the stem and branches. When the internodes are so short that the stem is apparently wanting, the leaves are denominated Radical, *Pl.CXXIV as in the Cowslip, and in the Dandelion.* In such cases

there is often at first sight some difficulty in determining Botany. the leaf-arrangement. When the internodes are elongated, and the nodes thus separated from each other, then the phyllotaxis is easily seen.

Each node is capable of producing a leaf or leaf-bud. When each of the nodes on an elongated axis produces a single leaf, the leaves are said to be Alternate (Fig. 89), because they are placed alternately on different sides of the axis. When two leaves are produced at a node, they are called Opposite (Fig. 90), because they are situated on opposite sides of the axis; while the production of three or more leaves at a node gives origin to a circle or whorl of leaves, which are then said to be Verticillate (Fig. 91).

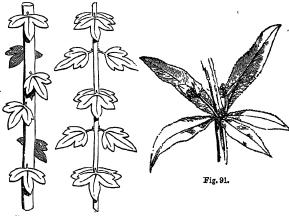


Fig. 89. Fig. 90. Fig. 89. Fig. 90.

Fig. 89. A stem with alternate leaves, arranged in a Pentastichous or Quincuncial manner. The sixth leaf is directly above the first, and commences the second cycle. The fraction expressing the divergence of the leaves is two-fifths.

... 90. A stem with opposite leaves. The pairs are placed at right angles alternately, or in what is called a decussate manner. In the lowest pair one leaf is in front, and the other at the back; in the second pair the leaves are placed laterally, and so on.

... 91. Verticillate or whorled leaves of a species of Madder. There are five leaves in the verticil or whorl.

Alternate Leaves.—This arrangement is a very common one, occurring generally in Monocotyledons, and also being frequent among Dicotyledons.* The simplest arrangement *P1. CXV. is that in which the third leaf is placed directly above the fig. 2. first, while the second is placed on the opposite side of the stem, separated by half the circumference of the circle. In this case there are two rows of leaves, one on each side of the stem, and the arrangement is said to be Distichous (dis, twice, and origos, a row). When the fourth leaf is above the first, on the same principle of the leaves being placed at equal distances on the axis, the arrangement will be *Tristichous*, or in three rows, each leaf being separated from that next to it by one-third of the circumference of the circle. If the fifth leaf is placed above the first, the arrangement will be Tetrastichous, or in four rows; if the sixth leaf, Pentastichous, or in five rows. The last-mentioned arrangement is delineated in Figure 92, which represents the branch of an oak with six alternate leaves, the sixth being placed vertically over the first.

It will be observed that, in following the course of the alternate leaves on the stem, we proceed in a spiral or screwlike manner, and that the termination of the spiral cycle is to be found in the leaf directly above that from which we commenced. On reaching it the cycle begins again, and goes through the same course as regards the number and arrangement of the leaves. Thus, in Figure 92, the cycle ends at the sixth leaf, which, in fact, commences the new spiral coil. In completing this spiral cycle we may make a single turn round the stem, as in distichous leaves, or we may make two or more. Thus, in the pentastichous cycle we make two turns round the stem, and encounter five leaves besides the first (Figs. 89 and 92). The arrangement has, therefore, been marked by a fraction, of which the nu-

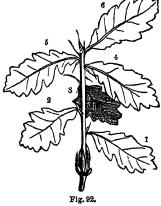
Botany. merator indicates the number of turns round the stem, and

the denominator the number of leaves in the cycle. This fraction at the same time gives the angular divergence of the leaves, or their distance from each other, expressed in parts of the circumference of the circle. Thus the fraction 1 indicates distichous leaves, where the angular divergence is one-half of the circumference of the circle, or 180° ; the fraction $\frac{1}{3}$ implies tristichous leaves, where the angular divergence is one-third of the circumference of the circle, or 120°; the fraction 2 applies to the Pentastichous or Quincuncial

Branch of Oak (Quercus pedunculata), showing the Pentastichous or Quincuncial

Branch of Oak (Quercus pedunculata), showing the Pentastichous or Quincuncial

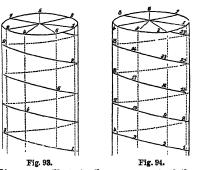
Branch of Oak (Quercus pedunculata), showing the Pentastichous or Quincuncial



arrangement (Fig. 89), a very common one among Exogens, in which the sixth leaf is immediately over the first, and two turns of the circumference are made before coming to it, the angular divergence being 144°.

The alternate phyllotaxis, and the angular divergence of leaves is explained more fully by Figures 93 and 94. In these it is shown that, in the case of alternate leaves, perpendicular lines may be drawn through the leaves placed directly over each other, and that the number of these lines indicates

the number of leaves in each spiral cycle, or the number of leaves between any leaf on the stem and that directly above it. In both these Figures it will be seen that the number of these lines is seven, and this, consequently, is the number of cycle. It is, there-



leaves in each Diagrams to illustrate the arrangement of the cycle. It is, there-consists of seven leaves.

fore, a Heptastichous cycle, ending with the eighth leaf which commences the new spiral coil. But it will also be noticed that the number of turns made round the stem in completing the cycle is different. Thus, in Figure 93, commencing with leaf No. 1, we reach leaf No. 8, or that directly above 1, after making three turns round the stem, and the fraction indicating this is 3; whereas, in Figure 94 we reach No. 8 after one turn, and the fraction, therefore, is 1. These fractions mark the angular divergence between any two leaves of the cycle, as represented in the divided circles at the upper part of the stems. In Figure 93, between 1 and 2 the angular divergence is obviously ? of a circle, or ? of 360° = 1544°, while in Figure 94 the divergence is 7 of the circle, or $\frac{1}{7}$ of $360^{\circ} = 513^{\circ}$.

Among the common arrangements of leaves may be noted, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{1}{13}$, $\frac{1}{3}$, $\frac{1}{3}$, and $\frac{2}{3}$. On looking at these fractions, it will be seen that they bear a constant relation to each other, for the numerator of each fraction is equal to the sum of the numerators of the two preceding fractions, while the denominator is the sum of the two preceding denominators; and the numerator of each is likewise the denominator of the next but one preceding. In the case of stems with marked internodes, with few leaves in the cycle, and with the points of insertion small, these arrangements can

be easily detected; but when the internodes are much short- Botany. ened, and the leaves are very numerous, it is difficult to trace the arrangement.

There is thus a general tendency to alternation in the foliar arrangements of plants, and when they grow regularly the law of phyllotaxis can be ascertained correctly The arrangement, however, is often much altered by interruption in growth, and other causes, so that we cannot in all cases detect its normal condition. The Phyllotaxis is uniform in the same species, but it frequently varies in species of the same genus. Thus, in the European Larch it is $\frac{3}{2}$, while in the American Larch it is $\frac{3}{2}$. The spirals proceed either to the right or to the left. The phyllotaxis of the branches is usually the same as that of the axis, and it is then called homodromous (δμός, similar, and δρόμος, course); but sometimes it is different, and called heterodromous (ετερος, diverse).

In typical arrangements, such as those noticed, there are always certain leaves placed directly over others in a straight series, the angle of divergence dividing the circumference into an exact number of equal parts. Such leaves are Rectiserial, and are considered as being normal. Cases, however, occur, in which the angle of divergence is such, that it is not possible to divide the circumference by means of it an exact number of times, and hence no leaf can be exactly placed above another. Such cases are called by Bravais Curviserial, being disposed in an infinite curve, and hence

incapable of being placed in straight rows.

Opposite and Verticillate Leaves.—In these arrangements two or more leaves are given off at a node. There is here also a tendency to alternation and spiral arrangement as regards the pairs and whorls. Thus, in Opposite leaves, the second pair is not directly above the first, but is placed either at right angles (Fig. 90), and then called Decussate, as in the Mint tribe; or slightly to one side, so that the third, or some higher pair of leaves, is that which is superimposed over the pair with which we commence, as in the Box and in Purging Flax.* In Verticillate leaves, as in Galium and *PI CXV. Madder, those of the second whorl are not directly, over those fig. 1. of the first whorl, but are so situated as to be above the in-

tervals between the leaves of the lower whorl.

The arrangement of the leaves furnishes characters in some families of plants. Thus, the Cinchona-bark tribe have opposite leaves; the Borage tribe alternate; Labiate plants, opposite and decussate; the Madder tribe, verticillate or whorled. The arrangement of the leaves, however, is not always constant, and we occasionally meet with alternate and opposite leaves in the same plant. In some instances this anomaly may be traced to a non-development of the internodes, by which two or more single-leaved (unifoliar) nodes are brought together. Thus, in Rhododendron ponticum, the alternate leaves, by such an arrestment, are sometimes seen almost verticillate. Again, in such plants as the Larch, Cedar, and Pine, the arrestment of the internodes, according to a certain natural law in their development, gives rise to clustered or fascicled leaves.

In the embryo state of dicotyledons, the leaves or cotyledons are opposite; while in monocotyledons the production of one leaf at the node shows the tendency to alternation. The early cotyledonary leaves are called Seminal; those afterwards produced, and constituting the ordinary leaves, are called Primordial. Leaves inserted on a shortened stem close to the ground, have been already noticed as Radical, those on the main axis are Cauline, on the branches, Ramal, and on the flowering stalks, Floral.

Vernation, or Præfoliation.—These names are applied to the arrangement of the leaves in the leaf-bud, and include both the mode in which each leaf is folded, and the relation which the leaves bear to each other. The leaf-bud is produced in the angle where a leaf joins the stem; it contains the growing point of the stem or branch, with its leaves and

Botany. certain protective appendages called scales, tegmenta or perulæ. These scales or outer leaves are often of a coarse nature, covered with resinous matter, and arranged differently from the leaves in the interior, as may be seen in the common Sycamore.

The individual leaves in the bud are folded and rolled up

in different ways. When the leaf is folded from its midrib, so that its halves are applied with their upper surfaces towards each other, as in Fig. 95.



Fig. 96. Fig. 97. the Oak and Fig. 95. Transverse section of a conduplicate leaf.

Magnolia, it is ... 97. Transverse section of a plicate or plaited leaf.

Conduplicate (Fig 95); when the apex is bent towards the base, as in the Tulip-tree, it is Reclinate, or Inflexed; when folded like a fan, as in the Maple and Vine, the leaf is Plaited, or plicate (Fig. 96); when the leaf has each of its edges rolled inwards towards the midrib, as in the Violet and Water-Lily, the vernation is *Involute* (Fig. 97); when outwards, as in Rosemary and Azalea, Revolute (Fig. 98);

when the leaf is rolled from one edge into a single coil, with the other edge exterior, as in the Apricot and Plantain, is Convolute (Fig. when



Fig. 98. Fig. 99. Fig. 100. Fig. 98. Transverse section of a revolute leaf. ... 99. Transverse section of a convolute leaf. ... 100. Circinate vernation.

rolled from apex to base like a crosier, as in Ferns and Sundew, it is Circinate (Fig. 100).

The relative position of the leaves in the bud gives origin to the following terms:—Valvate, when leaves are placed in a circle, so as to touch each other at their edges only, without overlapping; Imbricate, when the outer leaves successively overlap the inner to a greater or less extent (Fig 101).

These kinds of vernation occasionally become Twisted or Contortive. When involute leaves are applied



Fig. 101. Fig. 102. are applied in a circle
without
overlapping the vernation, is Induplicate;

Fig. 101. Fig. 102. Fig. 104. Fig. 103.

Fig. 103. Fig. 104. Fig. 104. Fig. 105.

Fig. 105. Fig. 106. Fig. 106. Fig. 106.

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Fig. 108 Fig. 104.

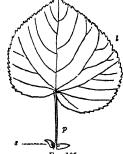
when conduplicate leaves successively embrace each other, as at the base of the Iris, they are equitant (Fig 102); and when the half of one conduplicate leaf covers half of another, the term Half-equitant or Obvolute is applied (Fig. 103); when a convolute leaf incloses another which is rolled up in a similar manner, the vernation is Supervolute (Fig. 104).

2. Anatomy or Structure of Leaves.

The leaf consists of a cellular and vascular portion; the former constituting the Parenchyma—the latter the Ribs and Veins. The whole is covered by an integument. The flat expanded portion is called the Lamina, blade or limb (Fig. 105, *l*), consisting of cells traversed by vessels, and the narrow portion is called the *Petiole*, or leaf-stalk (Fig. 105, p), in which the cellular tissue is less abundant, and the vessels are more closely united. At the base of the petiole there

are sometimes certain leafy appendages denominated Stipules Botany.

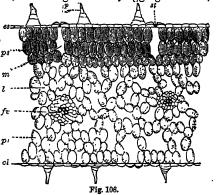
(Fig. 105, s). The petiole is sometimes wanting, and the leaf is then Sessile; at other times the blade is transformed, so as to appear like a petiole. The leaf may be denominated a flattened expansion of the green layer of the bark, strengthened by woody fibres and vessels. The Parenchyma varies much in its extent, and in the form of its cells. In fleshy leaves it is abundant, and its cells are loose, and more or less rounded. In an ordione of which (the upper) is exposed to the light. The epidermis covering these surfaces consists of compressed colourless cells. The telling transfer of the penole, p. The lamma or blade is marked to the penole, p.



compressed colourless cells. That of the lower surface is often of a paler colour, and is provided with stomata and hairs; while on the upper side the epidermis is more tough and dense, and is either entirely destitute of stomata, or possesses them in small number. In leaves placed vertically, the stomata sometimes exist in equal number on both sides: in floating plants, as Water-Lilies, the stomata exist only on the upper surface of the leaf; while in submerged leaves no stomata occur on either surface, and the true epidermal layer of cells is absent. De Mercklin states, that leaves have their origin in cellular papillæ arising from the axis. Their apex is the first part formed, and it is pushed forward by the growth of the part below. The leaf-stalk is formed after the blade, the lower part of it being the last developed. Leaves are undivided in their early state; all the divisions which take place in them are subsequent formations. The mode in which the parenchyma increases, and the arrangement of the veins, give to the leaves their varied forms.

Parenchyma.—In ordinary leaves, this consists of two distinct layers of cells, one connected with the upper surface (looking to the sky), and consisting of compact oblong cells, placed endwise (Fig. 106, ps); the other, connected with the lower side, consisting of loosely-aggregated cells,

having numerous cavities between them (Fig. 106, pi), and, when of an elongated ps form, placed with their long diameter parallel to the $^{\it l}$ epidermis. The cavernous nature of the lower epidermis seems to p be connected in some degree with the stomata and their functions. The cells on the upper side are usually placed close to each other, without any space be-



Section of a Melon-leaf, perpendicular to the surface; cs, upper epidermis; ct, lower epidermis; p, hans; st, stomata: ps, upper layers of parenchymatous cells; ps, lower layers of parenchymatous cells; ps, lower layers of parenchymatous cells; ps, meatus, or canalis connected with stomata; they are sometimes called hypostomatic spaces; t, lacune, or cavities between the loose cells in the cavernous lower parenchyma; fs, bundles of fibro-vascular tissue, consisting of woody, dotted, spiral, and other vessels.

tween them, except in cases where stomata occur (Fig. 106, st). Sometimes there are several layers of epidermal cells, more particularly in plants exposed to the heat of the tropical sun, as the Oleander. The parenchyma is occasionally deficient at some parts of leaves, giving rise to deep indentations or to perforations. In Monstera pertusa there are distinct holes in the leaves; and in an aquatic plant of South Africa (Ouvirandra fenestralis) the tissue of the leaf-

is made up of interlacing filamentous cells, with perforations between them, giving the appearance of a skeleton leaf. In Victoria regia there are peculiar perforations in the leaves. The surface of leaves is sometimes smooth (glabrous), at other times hairy (hirsute), downy (pubescent), or woolly. The hairs are either lymphatic or glandular. In the case of the Sundews (Drosera) the leaves are fringed with glandular hairs (ciliated), and their surface is covered with them

(Fig. 107); while in Venus's Fly-Trap (Dionæa muscipula) there are irritable hairs on the leaves, which, when touched, cause the two sides of the leaf to fold together.

Vascular system.—This consists of a double layer of vessels which may be separated by maceration. It is composed of woody, laticiferous, dotted, and various kinds of spiral vessels. These vessels collectively form the petiole or stalk of the leaf, and spread out in the lamina or blade, so as to constitute the veins. When a leaf is macerated, the cellular tissue is separated, and the vascular bundles alone remain. In some leaves, as in the Barberry, the vessels forming the veins are hardened, producing spines without any parenchyma. The hardening of the extremities of the vascular hairs.



tissue is the cause of the spiny margin of many leaves, such as the Holly, of the sharp-pointed leaves of Madder, and of mucronate leaves, or those having a blunt end with a

hard projection in the centre.

The firm and prominent bundles of vessels in the leaf are called Ribs po (costæ), and others less conspicuous are denominated Veins. The term Nerve, as applied to the vessels of the leaf, is now generally given up to avoid ambiguity as to function. In (Fig. 108) there is given a representation of a vertical section of a branch, showing the mode in which the vascular bundle, fv, gives off a prolongation to the leaf-stalk, f. The vessels pass from the sheath surrounding pc the pith, m, through the parenchyma, pc pc, and communicate with the young bud, b, in the axil of the leaf.

Venation.—This term has reference to the arrangement of the vascular tissue of the leaf. There are two marked forms of venation, one in which the vessels from the petiole or stem, on entering the leaf, are continued in the form of one or more ribs, which give off branches on either side, and form an anastomeois or network of vessels (Fig. 109): the other in mosis or net-work of vessels (Fig. 109); the other, in

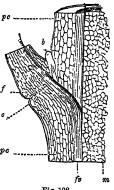


Fig. 108.

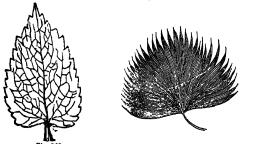


Fig. 109. Fig. 110

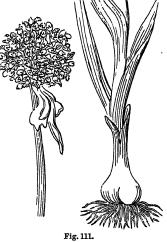
Fig. 109. Leaf of Dead-nettle (Lomium), showing retriculated venation.

... 110. Leaf of Fan-Palm (Ohamarops), showing the veins running from the base to the margin, and not forming an angular net-work. which the vessels, when entering the leaf, divide into several

veins or ribs, which run more or less parallel to each other, Botany. and are united by simple transverse veins, as in Palms (Fig. 110), grasses, and the leek (Fig. 111); or in which the midrib gives off lateral veins which run parallel, as in the Banana (Fig. 86). The former are Reticulated or Netted leaves, and

are common in dicotyledons, while the latter are Parallel-veined, and are characteristic of monocotyledons.

In reticulated leaves there is either one primary rib called *Midrib*, or there are several prominent ribs, as in Cinnamon. When a single midrib is present it gives off branches or veins. which either proceed directly to the margin, as in the Feather-veined leaves of the Oak (Fig. 92) and Chestnut, or which end within the margin in curved veins, as in Lilac and Dead-



nettle (Fig. 109); in Leek (Allium Porrum), with parallel-veined the latter case, marginal sheathing leaves proceeding from a bulb.

veinlets proceed from the curved veins. When there are three prominent ribs, as in Cinnamon, the leaf is Tricostate; when five, Quinquecostate. When the midrib gives off two ribs a little above the base, the leaf becomes Triplicostate; when it gives off five, Quintuplicostate.

In a many-ribbed leaf, the ribs may converge towards the apex, as in Cinnamon, or they may diverge. In the latter case they are said to radiate, and they give origin to Palmate and Palmatifid leaves, as in the Sycamore. Parallel-veined leaves have either a single midrib, the veins from which come off in a parallel manner, and run to the margin without forming a net-work, as in the Banana (Fig. 86), and Indian Shot (Canna); or they have numerous veins or ribs running from base to apex (Fig. 111), converging as in Grasses and Lilies; or diverging, as in Palms (Fig. 110).

In very succulent plants, as the American Aloe (Agave americana), and Fig-Marigolds, where the parenchyma abounds, the veins are obscure, and in plants such as Mosses and Sea-weeds, the so-called veins are composed of an aggregation of long cells, without any woody fibre. In many plants belonging to the Myrtle order (Myrtaceæ), which have ribbed leaves, there is an obscure vein which runs from the base to the apex of the leaf, close to the margin, and in which the lateral veinlets end. The primary veins come off from the midribs of leaves at different angles, and thus contribute to give form to the leaf. Primary veins coming off at a very acute angle, and converging, give rise to narrow leaves; those proceeding more at a right angle frequently produce broad leaves; while those coming off at obtuse angles cause prolongations at the base of the leaf. So also with veins radiating from a point, their greater or less divergence gives origin to leaves of a broader or a narrower form.

The arrangement and form of the foliaceous appendages of plants depend much on the number, the development, and the relation of the fibro-vascular bundles of the stem. In vascular plants the skeleton of the leaf is formed by an expansion of the fibro-vascular bundles of the stem. The leaves contain vessels similar to those forming the bundles at the point where they escape from the axis. The vascular bundles, as well as the parenchyma of the stem, expand in the leaf in various ways.

M'Cosh thinks that the venation of leaves bears an ana-

fig 1.

Botany. logy to the distribution of the branches, so that the leaf and its veins represent the stem and branches of the plant. He considers that in plants there are three homotypal parts, morphologically allied, and representatives of each other, viz., the root and its ramifications, the stem and its branches, and the leaf with its veins. These parts he looks upon as typically analogous. He has carried out his researches chiefly in regard to reticulated leaves. The angles at which the veins are given off, he considers as being the same as those at which the branches come off, and he has attempted to prove this position by numerous measurements of angles. In trees there is a certain normal angle at which branches are given off, producing a peculiar physiognomic effect. This angle may be much modified by circumstances, and it may vary according to the age of the branches. The determination of this angle is a point to which M'Cosh calls attention, and his researches lead him to adopt the view that the same angle will be found to prevail in the leafformation.

3. Conformation of Leaves.

With few exceptions, every plant has leaves at some

period of its growth. Even those which produce leafless stems have generally seed-leaves (Cotyledons) in their *Pl. CXXV. embryo state. The Dodders* and a few other plants, are exceptions to this rule. Leaves present various forms, from the scales of Broomrapes, and the linear leaves of Asparagus and Pines, up to the large foliar expansions of the Banana, and of the Talipot Palm. To the nature of the venation and the development of parenchyma all the leafy forms must be traced. Leaves are usually arranged under the heads of Simple and Compound; the former having a blade composed of one piece, and having no articulation beyond



Fig. 112.

the point where they join the stem, as in the Oak (Fig. 92); the latter having a blade divided into separate pieces or leaflets, which are articulated with the petiole (Fig. 112.)

Simple Leaves.—These, although formed of one piece,

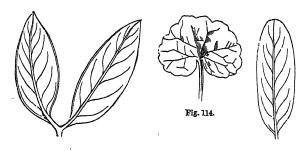


Fig. 113. Ovate-lanceolate leaves of a species of Senna. The leaves are oblique at the base and acute at the apex.

... 114. Leaf of Ground Ivy (Nepeta Glechoma), having a kidney-like form, and hence called reniform. Its margin is crenate.

... 115. Oblong leaf of a species of Senna. The apex is obtuse, and the base obligne.

may have their blades variously divided, provided the se-VOL. V.

parate portions are not supported on stalks, nor articulated Botany. to the petiole, nor to the midrib. In their very young state they are entire or undivided, and equally developed. When they increase more on one side than on the other, they become either oblique, as in the Begonia and Lime (Fig. 105), or slightly unequal at the base, as in Senna (Fig. 125); and when the cells and vessels increase and elongate only at certain points, divisions take place in the margin of the leaves, and in the substance of their laminæ.

In the circumscription or margin of the leaf, the following varieties occur:—*Entire*, without any divisions (Fig. 113); *Crenate*, with superficial rounded divisions (Fig. 114); Serrate, with acute points, arranged like the teeth of a saw (Fig. 109); Dentate, with similar pointed projections,

not arranged in a saw-like manner;* Repand and Undulated, *Pl.CXXII

when the margin is wavy and sinuous, or, as it is often called, crisp, as in curled leaves; sometimes, as in the Holly, the leaf is undulated, with spiny teeth. When the apex of a leaf is blunt and rounded, it is called Obtuse (Fig. 115); when sharp, and forming an acute angle, it is Acute (Fig. 113). The apex is Abrupt or Truncate, when it is terminated by a straight transverse line, as in the Tulip tree; Rerounded and

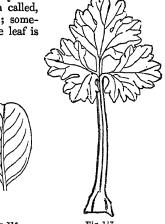


Fig. 117. Fig. 116. tuse, when it is Fig. 116. Emarginate leaf of a species of Senna. The leaf in its contour is somewhat obovate, or rounded and inversely egg-shaped, and its base is ob-

rounded and slightly depressed; ... 117. Tripartite leaf of Ranunculus. Each of the segments is lobed, and toothed at the margin. The petuole is dilated at the base. Venation radiating.

ciency or notch at the apex (Fig. 116); Obcordate, when the deficiency is very evident, and the lobes large, so as to resemble an inverted heart on cards. When the apex is drawn out into a long point, as in Ficus religiosa, the leaf is Acuminate or pointed; when the apex is blunt, and presents a stiff hard point, it is Mucronate.

When the substance of the lamina is divided to about the middle, the terms *Cleft* (in composition fid) and *Lobed* are applied; and when the division extends to near the base or midrib, the term Partite is used. These divisions, occur-

ring in a radiating-veined leaf, give origin to the terms, bifid (twice cleft), trifid (thrice cleft), quinquefid (five-cleft), and multifid (many-cleft); also to the terms bilobate (two-lobed), trilobate (threelobed), &c., when the divided portions of the leaf are large; and tripartite (Fig. 117), quinquepartite (Fig. 118), and multipartite, when the divisions extend to the base;

Palmate (like the palm of the hand), when there is a broad leaf is sometimes called palmi-partite, palmately-partite, or dissected. The venation is radiating, and the leaf are cuneate, and as in some species of Passionflower; Palmatifid, or Pal-



each of them is cleft and toothed at the apex.

mately-cleft, when the divisions are more than five, as in Castor oil (Fig. 119). The terms palmate and palmatifid are, however, often used indiscriminately to mark a leaf Fig. 1.

Botany. having a broad portion like the palm of the hand, and ferent parts determine in a great measure the contour of the Botany. either five or more lobes.* When the parts of a palmatifid *Pl. CXIV. leaf are narrow, like the fingers, the term digitilobed,

*Pl. CXIII. digitipartite, * and dissected, are applied; and when they are cut into thread - like divisions, as in the submerged leaves of Ranunculus aquatilis, they are said to be filiformly dissected. The term Pedate (like the foot of a bird) is applied when the lateral divisions of a three-lobed leaf are again divided, as in stinking Helle-* Pl. CX. bore* (Fig. 120).

Fig. 119.

Leaf of Castor-oil plant (Ricinus communis). It is palmately-eleft, and exhibits seven lobes at the margn. The petuole is inserted a little above the base, and hence the leaf is called peltate or shield-like. In a feather-veined leaf similar divisions give origin to the

terms Pinnatifid, with large lateral divisions, as in the Oak

(Fig. 92); Pectinate (comb-like), with very narrow divisions; Pinnatipartite, when the divisions extend near to the midrib (Fig. 121); Pinnately-divided, when the divisions extend to the midrib. When the primary divisions of

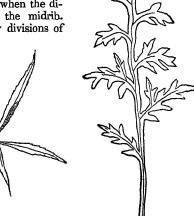


Fig. 120.

Fig. 121.

Fig. 120. Pedate leaf of stinking Hellebore (Helleborus fætidus). The venation is radiating. It is a palmately-partite leaf, in which the lateral lobes are deeply divided. When the leaf hangs down it resembles the foot of a bird, and hence the name.

... 121. Pinnatipartite leaf of a species of Poppy. The leaf is feather veined, and the divisions take place laterally to near the midrib. The segments are pinnatifid, and pinnatipartite. The leaf may be called bipinnatipartite.

such leaves are again subdivided in a similar way, the terms bipinnatifid and bipinnatipartite (Fig. 121) are applied; and when not only the primary, but also the secondary segments are divided in a similar way, the terms tripinnatifid and tripinnatipartite are used. In a pinnatifid leaf it sometimes happens that there are few divisions, in consequence of the lobes at the apex or base being united, thus giving rise to the Lyrate leaf (like an ancient lyre), with a large terminal lube, and segments becoming smaller as they approach the petiole (Fig. 122); and the Panduriform, when the lobes have a recess or sinus between them, so as to make the leaf resemble a violin. When the divisions of a lyratelypinnatifid leaf have acute terminations, and point downwards, as in the Dandelion, the term Runcinate is applied (Fig. 123).

In the case of reticulated leaves, the angle which the veins form with the midrib, and their comparative lengths in dif-

leaf. The following are some of the usual terms employed: -Linear, when the leaf is narrow, and the veins proceed-



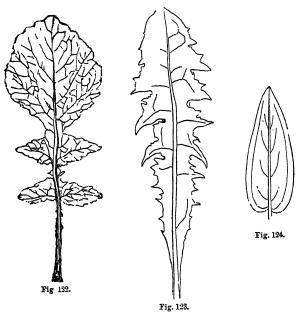


Fig. 122. Lyrate leaf of Turnip (Brassica Rapa). It is a simple leaf with reticulated venation, in which the terminal lobes are united, so as to make the leaf resemble an ancientlyre. When the lateral divisions of such a leaf become leaflets articulated to the petuole, then the leaf is compound, and is said to be lyrately-pinnate.

123. Runcinate leaf of Dandelion (Leontodon Tarazacum). It is a pinnatifid leaf, with the divisions pointing towards the petiole.

124. Ovate acute leaf of Coriaria myrtifolia, one of the adulterations of Senna. Besides the midrip there are two intramarginal ribs which converge to the apex. The leaf is therefore tricostate.

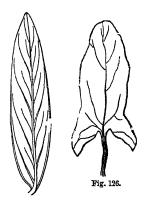
ing from the midrib are very short, and nearly equal. When linear leaves are sharp-pointed, as in Pines and Juniper, they are called Acerose; when linear leaves taper, so as to be like an awl, they are called Subulate; leaves are Oblong, when the veins from the midrib are longer than in linear leaves but still nearly equal, and the apex is rounded (Fig. 115); Rounded and Elliptical, when the veins from the centre of the midrib are longest, and the forms approach more or less to the circle or ellipse.

When the veins coming off from near the base are the longest, and the leaf has the shape of an egg, it is called Ovate (Fig. 124); it is Obovate (inversely egg-shaped) when the veins at the apex are longest, and the leaf is thus like an ovate one reversed (Fig. 116); when the apex of an obovate

heart on cards, the leaf is Cordate (Figs. 105 and 109); it

leaf is straight, or not uniformly rounded, it becomes Cuneiform (wedge-shaped); when an obovate leaf, with a round apex, tapers to the base, as in the Daisy, it is called Spathulate; a leaf is Lanceolate (Fig. 125) when the veins near the base are longer than those above and below, and the leaf tapers towards the apex; Ovato-lanceolate, when the general form is lanceolate, but the base is broad (Fig. 113).

When the lower veins come off at an obtuse angle from the midrib, and are curved back so as to form with the parenchyma two large round lobes at the base, with a nar-like the see. ... 126. Sagittate leaf of a species of convolvulus.



* Plate CXXXV. fig. 1.

Botany. is Reniform when the recess is large, and the contour stalklets of their own, or are sessile. Compound leaves may Botany. rounded, so that the leaf resembles a kidney (Fig. 114); Sagittate, when the lobes of a cordiform leaf are acute, so as to resemble the head of an arrow, as in species of Convolvulus (Fig. 126), and Arum;* Hastate, when the lower veins proceed nearly at right angles, and form two lateral narrow lobes, as in Rumex Acetosella (Fig. 127); Auriculate, when the lobes at the base of a hastate leaf are separated from the lamina, so as to be distinct segments; Deltoid-hastate, when a hastate leaf is short, and resembles the Greek letter delta, as in Ivy. Sometimes a leaf cordate at the base (next the petiole), has a rounded contour, and it becomes Rotundatocordate (Fig. 128, a).

The lobes at the base of leaves are sometimes united more or less completely, thus giving rise to the Peltate or Shieldlike form, as in the Indian Cress (Fig. 128, b), and Castor

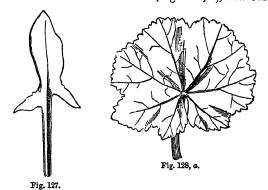


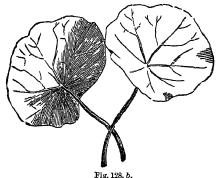
Fig. 127. Hastate (Halbert-shaped) leaf of Sheep's sorrel (Rumez Acetosella).

The lobes at the base are in this specimen unequal.

128. a. Rounded leaf of Mallow (Malva rotundifolia). It is cordate at the base, and is hence called rotundato-cordate. The margin is toothed and crenate.

oil (Fig. 119); and the Orbicular form, when the petiole is

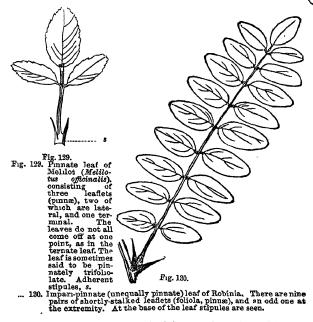
attached in the centre of a large rounded leaf, as in Pennywort (Hydrocotyle vulgaris) and Victoria regia. Very succulent leaves, with obscure veins, assume certain thickened forms, so as to become cylindrical, conical,



sword - shaped, Peltate (Shield-like) leaves of Indian Cress (Tropwolum and ave-shaped and axe-shaped.

Simple parallel-veined leaves usually have their margins entire, especially when the veins converge. They assume some of the forms already noticed, such as linear, oval, elliptical, oblong, and ovate. It is comparatively rare to find any marked divisions of their laminæ. When the veins diverge at the base, or come off at obtuse angles, we meet with hastate, sagittate, and cordate forms, and their various modifications. In some Palms, where the veins running in straight lines diverge, the margin of the leaf is cut into linear segments of different lengths (Fig. 110). In some Monocotyledons the leaves present a reticulated venation, and they are hence called Dictyogenous (δίκτυον, a net).

Compound Leaves.—These originate, like simple leaves, in the form of undivided cellular projections from the axis. When fully formed, they consist of laminæ divided down to the petiole or midrib into distinct pieces or leaflets, which are articulated, more or less distinctly, to the common stalk (Fig. 129). These leaflets (foliola) are either supported on



be reduced to two well-marked forms; those formed by the divisions of a feather-veined unicostate leaf, and including the various pinnate forms (Fig. 130); and those traced to

the division of a radiating-veined multicostate leaf, including the various digitate forms (Fig.

When there is a distinct midrib giving off primary veins laterally, which are covered with parenchyma in such a way as to form separate articulated leaflets, the leaf is Pinnate, as seen in Figure 130, which represents a compound leaf composed of nine pairs (juga), of shortly petiolated pinnæ, and an odd leaflet at the end.

If a pinnate leaf ends in septenate leaf of the Horse-chestnut (Escura pair of leaflets, the extremity of the midrib digitate.

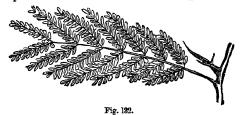
Fig. 131.

being either leafless or ending in a tendril or point, the leaf is said to be Equally or Abruptly-pinnate (pari-pinnate). When there is a leaflet at the point, the leaf is said to be Unequally-pinnate (impari-pinnate), as in Figure 130. When a lyrate leaf becomes truly pinnate, i. e., has its divisions articulated to the midrib, it is Lyrately-pinnate; and when the leaflets of a pinnate leaf are of different sizes, the term Interruptedly-pinnate is applied. Some parallel-veined leaves, as those of the Coco-nut, Date, and Sago Palms, are pinnate.

The number of pairs (juga) of leaflets in a pinnate leaf varies. There may be only three leaflets (Fig. 129), in which case two are lateral, and one is terminal. Such a leaf approaches to the ternate leaf which belongs to the radiating venation, and is distinguished by the distance intervening between the two articulated lateral pinnæ and the terminal one. When the leaflets of a pinnate leaf are divided into separate pieces or pinnules, the leaf becomes Bipinnate (twice pinnate), as in Figure 132. When the subdivision takes place

Botany. to a further extent, the leaf becomes either *Tripinnate* or *Decompound*.

Compound leaves referred to the radiating venation, i. e.,



Bipinnate (doubly pinnate, twice pinnate), leaf of Gleditschia triacanthos. Each of the primary pinnas is divided into small leaflets. It may be said to be a pinnate leaf, with the leaflets slee pinnate.

multicostate with diverging ribs, are distinguished from those referred to the feather-venation, by the leaflets coming off from one point. When the leaflets coming from one point are two, the leaf is Binate or Unijugate (one pair); when three, Ternate or Trifoliolate, as in Woodsorrel and Strawberry; when five, Quinate or Quinquefoliolate, as in Hemp; when seven, Septenate or Septemfoliolate, as in the Horsechestnut (Fig. 131). When the leaflets are five, the leaf is often called Digitate. Similar forms may occur among pinnate leaves (Fig. 129), but in them the leaflets will be seen not to come off from the point of the petiole, but at certain distances from each other. In the case of a ternate leaf, the two lateral leaflets may disappear, while the central one remains articulated to the petiole. Some consider this as being the case in the Orange leaf (Fig. 133), which is therefore looked upon as a compound leaf with a single jointed leaflet. A ternate (trifoliolate) leaf may divide in such a way as to form three leaflets on the secondary veins, proceeding from each of its primary veins, and thus become Biternate (doubly ternate); while a further subdivision, in a similar way, will render it Triternate (triply ternate).

4. Petiole or Leaf-Stalk.

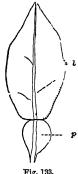
The stalk supporting the blade of the leaf is denominated the *Petrole* (Fig 105, p). It is absent in the case of sessile leaves; and, in certain instances, the distinction between the lamina and the stalk is not well defined. The petiole consists of a definite number of vascular bundles enclosed in a small amount of parenchyma. The vessels are woody, dotted, spiral, and laticiferous, and they are derived from the internal part of the stem, as shown in Figure 108, where the vessels, fv, surrounding the pith, m, are traced into the leaf-stalk, f.

At the point where the vessels leave the stem there is often a small enlargement (pulvinus), composed of cellular tissue, and an articulation or joint. When the leaf dies, it separates from the stem at the joint, leaving a mark or scar (cicatrix, cicatricula) in which the ends of the different vascular bundles are seen arranged in a definite order. The form of the scar, and the arrangement of the bundles, differ in different plants, and furnish, in some instances, distinct characters. In the case of many Palms, and of Tree-ferns, the scars left by the leaves are very conspicuous.

When there is no articulation between the petiole and the stem, as is the case with many Endogens, the leaf is continuous with the axis, and is not deciduous, but withers on the stalk. In many Liliaceous plants, the leaves during their decay continue attached to the plants. In compound leaves there is usually an articulation, where the leaflet or leaflets join the petiole. At this joint also a cellular swelling (struma) occurs. In many pinnate leaves, as those of the Sensitive plant, the axial and foliolar joints and swellings (pulvinus and struma) are very evident. Where the petiole joins the blade its vessels diverge, so as to form the ribs and veins—the vascular bundle which continues in the direction of the stalk being the midrib. The epidermis of the petiole has few stomata.

The petiole is usually either round, or half cylindrical, with a flattening or grooving on the upper surface. In the Aspen it is compressed laterally, or at right angles with the blade

and hence the trembling of its leaves from the slightest breath of air. When the leaves of a plant float in water, the petiole is sometimes distended with air cavities, as in the Water Chestnut. The edges of the petiole in plants such as the Orange (Fig. 133), the Quassia plant, Venus' Fly-trap, the Sweet Pea, and other species of Lathyrus, are bordered by a leaf-like expansion called a Wing, and hence they are denominated Winged or Bordered petioles. Such leafstalks are occasionally united to the axis for some extent, and thus become Decurrent. In many Endogens, especially grasses, the leaf-stalk forms a Sheath round the stem; this sheath in grasses terminates at the upper part, in a process called a *Ligule*, as seen in Figure 134, where g is the sheath (vagina), I the blade of the leaf, and lig the ligule. In Umbelliferous plants* the petiole is expanded, and forms a conspicuous sheath



rig. 133.

Leaf of Grange (Citrus Aurantium), showing a winged petiole, p, which is articulated to the lamina, l. It is considered a compound leaf, having only one *Pl.CXX leafer.

round the stem. This sheathing portion of the petiole is formed by the divergence of the vascular bundles on either side. The vessels thus surround the stem, and are covered with parenchyma. This petiolary sheath may be considered as a modification of stipules.

In some Australian plants belonging to the genera Acacia and Eucalyptus, the petiole is flattened, and becomes a foliar expansion, which occupies the place of true leaves. Such petioles have received the name of *Phyllodia* (φύλλον, a leaf).

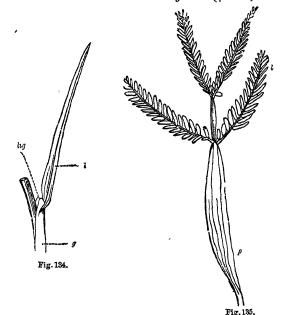


Fig. 134. Stem of a Grass (Poa) with leaf. The sheathing petiole, g ending in a process, tig, called a ligule; the blade of the leaf, l.

135. Leaf of an Acatia (Acatia hterophylla), showing a flattened leaf-like petiole, p, called a phyliodium, with straight venation, and a bipinnate lamina, l.

The trees bearing them give a peculiar character to some forests in New Holland. These phyllodia are usually placed vertically, presenting their edges to the sky and earth, and their venation is parallel. They occasionally bear pinnate or bipinnate laminæ, and in such cases they are frequently much narrowed in their dimensions. In Figure 135 a bipinnate leaf is represented, with its flattened petiole or phyllodium, the venation of which is straight. On the same tree may be seen naked and leaf-bearing phyllodia. By this, as

Fig. 136.

Botany. well as by their venation, their petiolary character is determined. Trees producing naked vertical phyllodia only have a singular effect as regards light and shade. Some shrubby species of Wood-sorrel exhibit phyllodia, which are either naked, or bear ternate leaflets.

5. Stipules or Stipulary Appendages.

Stipules are leafy appendages situated at the base of the petiole, and having normally a lateral position as respects the leaf. They have usually the same structure as leaves, and, in some instances, as in Lathyrus Aphaca, they constitute the only leaves which the plant produces. In the Pansy (Fig. 136), they are as conspicuous as the or-

dinary leaves. In the Pea, they are also large, and in many of the pea tribe they assume peculiar sagittate forms. Stipules are not present in all plants. Those having stipules are called Stipulate, those 1 without stipules are Exstipulate. At a certain stage of their growth, some stipules are larger than the leaves or leaflets produced before them. Thus they serve as a protection to the leaves in the young state, as in the India-rubber Fig, Potamogetons, Magnolias, and the Beech. These protective stipules generally fall off when the leaf expands.

The form and appearance of stipules vary; some are leaf-like, others cirrhose; some are small, others large; some assume a scaly or membranaceous appearance, others are hard and spiny; some are separated from the rate and free, others are united. In this way the nature of the stipules gives characters in many natural orders. In the Cinchons hark trees which have copperately. Cinchona bark trees, which have oppo-

site leaves, the stipules unite, so as to form one on each side of the stem between the petioles, hence they are called Internetiolar. In the Rhubarb tribe, which have alternate *PI.CXXX.leaves, the stipules unite, so as to form a sheath or Ochrea* round the stem. In the Plane tree, and in the Astragalus, they unite, so as to form a leafy expansion on the opposite side from the leaf, and in the Rose tribe they are united to each other and to the petiole, thus becoming adnate. The petioles of many plants have a sheathing portion at their base (Fig. 117), which may be considered as adherent stipules. On this account the reticulum, or mat-like substance, at the base of the leaves of palms, is often called stipular. Besides the leaves at the base of the petiole, smaller leaflets (stipels) are occasionally produced at the base of the pinnæ of compound leaves, as in the bean.

6. Transformations of Leaves and their Appendages.

Some of these transformations have been already noticed, but there are others to which it is necessary to direct attention. The morphological relations between leaves, scales, and spines—between petiole and laminæ, and between stipules and petioles, have been adverted to. All these nutritive organs are sometimes changed into tendrils (cirrhi), with the view of enabling the plants to twine round others for support. In Leguminous plants (the pea tribe) the pinnæ are frequently cirrhose. Sometimes a whole leaf becomes cirrhose, as in some species of Lathyrus. In Smilax there are two stipulary tendrils, while in the Cucumber tribe there is a single one at the base of each leaf. In the Passionflower the lateral leaf-buds, and in the Vine the terminal ones, become tendrils.

The leafy parts of plants are also liable to become hardened and spinescent. The leaves of some species of Astragalus and Barberry, and the stipules of the False Acacia

(Robinia) are spiny. In these instances the vascular bun- Botany. dles are developed in a marked degree, while the parenchyma is deficient. To the same cause is attributed the spiny margin of the Holly-leaf. In the Gooseberry, the swelling (pulvinus) at the base of the petiole, and below the leaf, assumes a spinose character.

Changes in the appearances of leaves are produced by adhesions and foldings of various kinds. When two leaves unite at their bases, as in some species of Honeysuckle (Fig. 137), they are called Connate. When the lobes at the base of a leaf unite on the opposite side of the stem

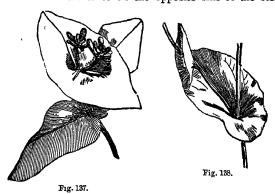


Fig. 137. Connate leaves of a species of Honeysuckle (Lonicera Caprifolium).

Two leaves are united by their bases.

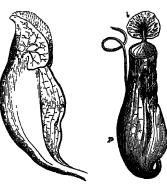
138. Perfoliate leaf of a species of Hare's-ear (Bupleurum rotundifolium).

The two lobes at the base of the leaf are united, so that the stalk appears to come through the leaf.

from the lamina, a Perfoliate leaf is the result, as seen in some species of Bupleurum (Fig. 138) and Baptisia. The formation of Peltate and Orbicular leaves has been traced to the union of the lobes of a cleft leaf. In the case of the Victoria leaf the transformation may be traced during germination; the first leaves produced by the young plant are linear, the second are sagittate and hastate, the third are rounded-cordate, and the next are orbicular. The cleft indicating the union of the lobes remains in the large leaves. Many forms of stipules, such as petiolar, interpetiolar, and sheathing, are traced to adhesion.

Folding of the leafy appendages, and union of their edges, give rise to the formation of a hollow leaf or Pitcher (ascidium, ascus). In the Side-saddle flower the ascidia are considered as being formed by the petiole or phyllode, a part of which, in an unadherent state, is prolonged upwards

Fig. 139). In the Pitcher-plant there is an evident lid, united to the pitcher by a joint (Fig. 140, l). The lid is looked upon as the metamorphosed lamina, articulated to the hollow petiole or phyllode. It may be said to resemble the jointed leaves of the Orange, or Dionæa, with their The hollow (fistu-



petioles folded so rate as to adhere by the edges, and their laminæ reduced in size, so as to form a lid (operculum).

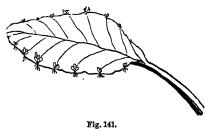
The hollow (fistu-

lar) leaves of the onion, and of other species of Allium, may

Botany. be traced to the folding and adhesion of the margins of the

It has been already remarked, that buds and bulbils are

produced at the points where leaves join the stem. In some instances, however, we find that budsare produced from the margins or surfaces of leaves. In Bryophyllum (Fig. 141), this is a company occurrence



141), this is a common occurrence,

Leaf of Bryophyllum calycinum, producing buds along the margin, at the extremities of the primary veins.

and it is met with in many plants of the order Gesneraceæthe leaves of which, when placed on the surface of moist earth, become what is called *proliferous*, or bud-bearing.

II.—PHYSIOLOGY OF THE NUTRITIVE ORGANS.

I. CHEMISTRY OF VEGETATION.—CONSTITUENTS OF PLANTS, AND SOURCES WHENCE THEY ARE DERIVED.

It is impossible to study the functions of plants without knowing their chemical composition, and the sources whence they derive the materials necessary for carrying on their vital processes. Hence, before proceeding to consider the plant in a state of activity, and as performing vital actions, it is necessary to give a general view of the Chemistry of Vegetation. This subject has engaged the attention of many distinguished chemists, among whom may be mentioned Saussure, Sprengel, Davy, Liebig, Dumas, Mulder, Boussingault, and Johnston. The subject has assumed importance in an agricultural point of view, and a knowledge of it is essential for carrying on farming operations in an enlightened manner. The theory of manures, and the practical application of them, is intimately connected with the knowledge of the composition of plants and of soils.

1. Organic Constituents of Plants.

The materials of which the substance of plants is composed are of two kinds, Organic and Inorganic. The organic constituents form the great bulk of the tissues of plants; they are completely consumed when the plant is burnt; they are produced by living organs alone, and cannot be manufactured in the laboratory of the chemist. The inorganic constituents, on the other hand, form a small portion of the tissues; they are incombustible, and remain in the form of ash after the organic constituents have been consumed by fire; and they can be produced in the laboratory of the chemist. The former may be called the combustible materials produced by living plants; the latter incombustible materials, found not only in plants, but also in the mineral kingdom. Both are derived originally from unorganized matter, and both enter into the composition of organized structures in a greater or less degree. The vegetable organic constituents are composed chiefly of Carbon (C), Oxygen (O), Hydrogen (H), and Nitrogen (N). The inorganic constituents are composed of metallic bases in combination with oxygen, acids, and metalloids. In the fresh plant there is always a large quantity of water (HO). This is removed by drying. The quantity varies in different plants-succulent and fleshy species containing a larger proportion of water than those which are dry and hard.

After the plants have been dried so as to remove the water, an estimate can be made, by burning, of the relative proportion of organic and inorganic matter—the former being dissipated by the action of fire, and the latter remaining in the form of ashes. Boussingault gives the following

tabular view of the quantity of Carbon, Hydrogen, Oxygen, Botany. Nitrogen, or the organic constituents, and of Ash or the inorganic constituents:—

	WHEAT.		OATS.		r Peas.	Seed.		bs.	.es.
	Grain.	Straw.	Grain.	Straw.	Yellow	Clover	Hay.	Turnips.	Potatoes.
Carbon	46·1 5·8 43·4 2·3 2·4	48·4 5·3 38·95 ·35 7·0		50·1 5·4 39·0 ·4 5·1	46·5 6·1 40·1 4·2 3·1	49·4 5·8 35·0 7·0 2·8	45·8 5·0 38·7 1·5 9·0	5.6	44·0 5·8 44·7 1·5 4·0
	100	100	100	100	100	100	100	100	100

This table shows that the quantity of ash is small, and that of the organic elements Carbon and Oxygen are the most abundant. The relative proportions of the different organic elements, it will be seen, vary in different plants, and in different parts of the same plant. Thus nitrogen is more abundant in the grain than in the straw of where and oats. It is also more abundant in yellow peas and in clover seed, than in the cereal grains and hay. Some of the organic vegetable compounds consist of Carbon. The called Nitrogen, and Nitrogen or Azote, and are bence called Nitrogenous or Azotized. Others are composed of Carbon, Oxygen, and Hydrogen, without the addition of Nitrogen, and are hence called Non-Nitrogenous or Unazotized. In considering these constituents, we shall make some remarks on the elements of which they are respectively formed.

a. Non-Nitrogenous or Unazotized Constituents and their Elements.

The organic compounds, denominated unazotized, are important constituents of all plants. Some of them, such as cellulose, lignine, starch, gum, sugar, and oily matters, are universally diffused over the vegetable kingdom. Others, such as vegetable acids, bitter principles, and resins, are more limited in their distribution. All of these substances, except cellulose and starch, which are organized, and gum, which is amorphous, are crystalline when they can be got in a solid state. Those unazotized matters, which are still subject to the law of crystallization, do not take part in the formation of tissues. Starch and cellulose, on the other hand, are concerned in the development of the organized parts of plants, but in order to effect this, they require the addition of certain azotized products as well as some inorganic matters. Cells and vessels cannot be formed without the presence of albuminous matter, which contains nitrogen and sulphur in its composition, and which cannot be produced without the presence of phosphates. The physicovital energies of the plant effect the union of carbon, oxygen, and hydrogen, in different proportions. These elements, existing in certain states of combination in the atmosphere, are within the reach of plants at all times.

Carbon—enters largely into the composition of plants. It is said to form two-thirds of the weight of dried plants in general. This substance is familiar to us in the form of wood-charcoal, and in its purest state it is seen in the diamond. Charcoal is porous, and has the power of absorbing soluble gases in large quantity, of separating saline and other matters from solutions, and of taking away disagreeable odours. When combined with two equivalents of oxygen, carbon forms carbonic acid (CO₂), and it is in this condition that it is taken up by the leaves and other parts of plants Some maintain that this carbonic acid is derived by plants entirely from the atmosphere, which contains about 1-1000th of its volume of the gas. The quantity contained in the air, although it appears small when compared with the whole

Botany. bulk of the atmosphere, is nevertheless sufficient to supply all the carbon of plants. A room 40 feet long, 24 feet wide, and 16 feet high, will contain in its atmosphere 15 cubic feet of carbonic acid, equal to 28 ounces by weight of carbon. The leaves of plants have a great power of absorbing carbonic acid. Boussingault proved this by passing air containing the usual proportion of carbonic acid over a vine leaf. Even by coming for a few seconds into contact with the leaf, the air was deprived entirely of its carbonic acid. The carbonic acid in the atmosphere is derived from various sources. Amongst the most evident of these are—1. The respiration and transpiration of man and animals. 2. The decomposition of dead animal and vegetable matter. 3. Various processes of combustion on the surface of the earth. 4. Volcanic action going on in the interior of the earth in different

The function of respiration in animals consists in the giving out of carbonic acid, or, in other words, the oxidation of carbon, while the great function of vegetables is the elimination of oxygen or the deoxidation of carbonic acid. The two processes are antagonistic, and a balance is kept up between the carbonic acid given off by animals, &c., and the oxygen given out by plants. A grown person is said to give off 3½ lb. of carbon in a day, and every pound of carbon burnt or oxidized yields more than $3\frac{1}{2}$ lb. of carbonic acid. While active volcanoes give out carbonic acid, there are also extinct ones which do so. The soil in the country on the Rhine, to the south of Bonn, gives out carbonic acid; and all the waters in that district are charged with it. carbonic acid of coal arises from the decay of vegetable

When plants decay they furnish to the soil a large supply of carbon in the form of humus or common vegetable mould. This cannot be taken up directly as food by plants, but it is acted on by air and moisture, and undergoes certain changes by which a portion of carbonic acid is probably formed. It also has the power of absorbing gases, such as ammonia, and sulphuretted hydrogen, as well as saline substances, and of making them available for the use of plants.

Oxygen—is another organic element of plants. It is known to us in a gaseous state as forming 21 per cent. of the bulk of the atmosphere, and as supplying materials for respira-tion and combustion. When one atom of oxygen is combined with one of hydrogen, water is formed, and carbonic acid is the result of the union of one atom of oxygen with two of carbon. In its combinations with metals and metalloids, oxygen forms a large proportion of the solid materials of the globe. All the oxygen in plants seems to be derived from carbonic acid and water. No vegetable contains more oxygen than can be accounted for by these two sources.

Hydrogen—is another element of plants which is known to us in the state of a gas. It does not, however, occur free and in a simple state in nature. It exists in small quantity in animal and vegetable substances, forms 1-9th of the weight of pure water, and enters into the composition of coal. The hydrogen of plants is derived from water.

As carbonic acid and water therefore exist at all times, more or less, in the atmosphere, it appears that the air is the source whence plants procure the carbon, oxygen, and hydrogen, which enter so largely into their composition. At the same time, it cannot be denied, that these elements also exist in the soil, and may be taken up by the roots of plants in the form of carbonic acid and water. The various nonazotized vegetable products (i.e. the products consisting of carbon, oxygen, and hydrogen) can be derived from carbonic acid (CO2), and water (HO), by a process of deoxidation; and as this process is constantly going on in every plant, by means of which oxygen is given out, we may conjecture that it is in this way that the products are formed.1

b. Nitrogenous or Azotized Constituents, and their Elements

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Another class of substances found in the tissues of plants, and essential to the process of vegetation, consists of carbon, hydrogen, oxygen, and nitrogen (N), with the addition of sulphur (S), and alkaline or earthy phosphates. They are commonly called Nitrogenous or Azotized or Azoto-sulphurized substances. Some authors include them under the general name of Mucus or Protoplasm. The constituents of these organic matters are known by the names of vegetable albumen, fibrine, and caseine. The general name of gluten is given to the glutinous part of wheat which remains after the starch and soluble constituents of the grain have been removed. This gluten consists usually of fibrine and albumen. Wheat contains from 8 to 24 per cent. of gluten; barley 3 to 6; oats 2 to 5.

Nitrogen enters largely into the composition of the tissues of animals, and hence it must be supplied to them in their food. Without the presence of azotized compounds, no blood nor muscle can be formed. Hence the quantity of these compounds in plants, along with phosphates which form bone, indicates their blood-forming or sanguigenous value. Nitrogen is known to us as a gas forming 79 volumes per cent. of the atmosphere, and moderating the effect of oxygen on all oxidable bodies. Like hydrogen, it is sparingly soluble in water. It enters into combination with hydrogen, and forms ammonia, composed of 1 equivalent of nitrogen and 3 of hydrogen (NH₃). Ammonia is given off during the decay of animal tissues, in the form of a pungent vapour, which is readily absorbed by water, and also in combination with other substances, such as carbonic acid and sulphuretted hydrogen. The nitrogen of the air may also, as some think, combine with hydrogen in the soil, and form ammonia. The presence of ammonia in the atmosphere was determined by Saussure in 1806. Ville has recently stated that the nitrogen of the air is assimilated by plants, but his observations have not been confirmed.

In order that azotized matter may be formed, plants must have a supply, not only of nitrogen, but also of sulphur and phosphates. The two latter are derived from the soil, in the form of soluble compounds of sulphuric and phosphoric acids, while the former is derived, according to Liebig, not from the nitrogen of the air, but from the ammonia diffused through it. This ammonia constitutes only 1-10,000th of the bulk of the air at the utmost; it is usually much less. This, however, has been shown to be sufficient for the supply of nitrogen to plants. Ammonia is returned to the air during the processes of putrefaction which go on in dead animals and plants, as well as in the excreta of the former, such as the urine. It is also yielded by transpiration. Thus ammonia is continually sent into the atmosphere, and by the constant movement of the air the supply is diffused. Ammonia is also absorbed by the soil, and may thus be rendered available for the use of plants. It is known also that in some instances volcanic action gives rise to the formation of ammonia. Daubeny believes that the ammonia, as well as the carbonic acid which formed the food of the first plants, was produced, not by processes of animal decay, but by such as were proceeding within the globe prior to the creation of living beings, and that the disengagement of both these compounds has been going on slowly and continually from the earliest period to the present time. Others think that part of the nitrogen of plants is derived from nitric acid and nitrates, and this view is gaining ground. Nitric acid is produced during thunder storms, and in the rain which falls during these storms this acid has been detected in small quantities. The nitric acid in these instances probably proceeds not only from a combination between the

Botany. nitrogen and oxygen of the air, but also from a combination between the ammonia and oxygen. The minute quantity of nitric acid and nitrates in some springs may also supply nitrogen. The nitric acid in these instances appears to proceed from the decay of animal matter, and from the oxidation of ammonia.

All the azotized matters to which we have alluded are formed by a process of deoxidation from carbonic acid (CO2), water (HO), hydrated ammonia (NH3HO), nitric acid (NO₅), and sulphuric acid (SO₃). They all contain much less oxygen than is necessary to convert their hydrogen into water, their carbon into carbonic acid, and their sulphur into sulphuric acid. They are never found alone in plants, but generally two of them together. They cannot exist without the presence of phosphates. Hence the ashes of plants are in part derived from the sanguigenous (blood-producing) matters, such as albumen and fibrine, which enter along with cellulose into the composition of the cell-walls.

2. Inorganic Constituents of Plants.

The terrestrial or telluric food of plants, as it is termed, consists chiefly of certain inorganic matters, the amount of which is ascertained by the ash left after burning. While the organic constituents of plants are destroyed by a high temperature, and undergo decay under the agency of moisture and warmth, the inorganic constituents are incombustible, and do not undergo the putrefactive process. There are at least 12 inorganie elements which enter into the composition of plants:-

> Sulphur, S, as Sulphuric acid, SO Phosphorus, P, as Phosphoric acid, PO₅. Silicium, Si, as Silicic acid, SiO₃. Calcium, Ca, as Lime, CaO. Magnesium, Mg, as Magnesia, MgO. Potassium, K, as Potassa, KO. Sodium, Na, as Soda, NaO. Chlorine, Cl, in combination with metals. Iodine, I, do. do. Fluorine, F, do. do. Iron, Fe, in combination with oxygen, Fe₂O₃. Manganese, Mn, do. do.

Alumina (Al₂O₃), the sesquioxide of Aluminum, which has been noticed by some authors as another inorganic constituent of plants, seems to be an accidental ingredient, being sometimes present, and at other times absent. Mr Stevenson Macadam has recently obtained indications of the presence of Bromine (Br.) in plants.

The quantity of inorganic matter in plants is small when compared with the organic constituents. It is nevertheless essential to the life and vigour of plants. The cellwalls cannot be formed without inorganic matters, and some of them enter into the composition of the azotized substances formed by plants. Thus sulphur and salts of phosphoric acid are necessary for the formation of albumen,. fibrine, and caseine. In some rare instances of plants forming mould, no ash has been detected.

The quantity of ash left by 100 parts of the following plants is thus given by Johnston:-

	Grain.	Straw.
Wheat	1.2 to 2.0	3.5 to 18.5
Barley	2.3 to 3.8	5.2 to 8.5
Oats	1.6 to 2.8	
Rye	1.0 to 2.4	2.4 to 5.6
Indian Corn	1.3	2.3 to 6.5
Field Peas	2.5 to 3.0	4.3 to 6.2
T3	Wood.	Leaves.
Larch 0		6.0
Scotch Fir 0	1.14 to 0.19	2.0 to 3.0
Beech ()·14 to 0·60	4.2 to 6.7

	Wood.	Leaves.
Poplar	. 1.97	$9 \cdot 2$
Willow	. 0.45	8.2
Birch	. 0.34	5.0
Elm	. 1.88	11.8
Ash	. 0.4 to 0.6	
Oak	. 0.21	4.5

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Thus the quantity of inorganic matter in the same weight of different crops varies. It will be seen, for instance, that the grain of barley yields more ash than wheat or rye. The quantity of inorganic matter also in different parts of the same plant varies, as seen in the grain and straw of cereal grains, and the wood and leaves of trees.

The following comparative results are given by Johnston of experiments made by different chemists regarding the more important inorganic constituent in 100 parts of some of the cultivated plants and trees:-

NAMES OF PLANTS.	Potash and Soda.	Lime.	Magnesia.	Phosphoric Acid,	Sulphuric Acid,	Silica.
Wheat Barley Oats Rye Maize Rice Beans Peas	33 22 26 34 33 30 44 44	33651165	12 7 10 10 16 12 8	59 39 44 50 45 53 38 33	0.25 0.10 11 1 3 0 1 4	1 27 3 0·4 1 3 1 0·51
Wheat Straw Barley do. Oat do. Rye do. Maize do. Rice do. Bean do. Pea do. Red Clever	13 7 29 18 35 14 55 5	7 10 8 9 8 0 20 55 33	434275778	3 3 4 17 1 7 5 8	6 2 3 1 0 4 1 7 3	65 71 48 65 28 74 7 20 7
Potatoes Turnips Beet Cabbage Potato Haulm Turnip do	56	2 14 9 21 17 23	5 5 5 6 7 3	13 8 8 12 8	14 14 2 22 7 13	4 8 10 0.74 4 1
Elm Bark Elm Wood Lime Bark Lime Wood Cherry Bark Cherry Wood Scotch Fir Seeds	35 21 41 23 36	72 47 60 29 44 35 2	3 7 8 4 5 11 15	1.7 3 4 4 3 9 45	0.6 1.2 0.7 5 0.8 4	8 3 2 5 21 2 10

From this table it will be seen that the quantities of different mineral matters vary in different plants, and in different parts of the same plant. Silica is present in large quantity in the stems of grasses, while it forms usually a small proportion of grains, leguminous plants, and succulent roots. Phosphoric acid is more abundant in the grain of cereal plants than in the straw; it exists also in considerable quantity in nutritive seeds and in potatoes and turnips. Lime abounds in the stems of beans and peas, in clover, and in the bark and wood of trees; while it exists in small quantity in the cereal plants and grasses. The proportion of lime in the bark of trees is greater than in their wood. Potash and soda enter more largely into the composition of green crops than into that of white crops; they are also more abundant in the wood than in the bark of trees.

Most plants contain more or less of potash and soda in their composition. The former prevails in inland plants,

Botany. the latter in maritime and marine plants. Some succulent sea-shore plants, such as Salsola Kali, and Salicornia herbacea, yield a large quantity of soda in their ashes. Some species of plants which grow both in maritime and inland situations contain a preponderance of soda in the former locality, and of potash in the latter. This is the case with the common Sea-pink (Armeria maritima), Scurvy-grass (Cochlearia officinalis), and sea-side Plantain (Plantago maritima).

The presence of lime has been detected in almost all plants. It is an abundant ingredient of the soil, and is often associated with magnesia. In combination with phosphoric acid, it is an essential ingredient of the nitrogenous matter of cereal grains, and of many other cultivated plants. As sulphate it occurs largely in some of the Charas and Medicks. It sometimes appears as an incrustation on the cells of plants, in the form of carbonate. This is seen in species of the genus Chara (especially Chara hispida) which grow in ponds. In the interior of cells, salts of lime are often seen in a crystalline form, constituting Raphides. Oxalate of lime crystals occur in Rhubarb root; in the best Turkey Rhubarb they constitute 35 per cent. of the dried tissue, in East India Rhubarb 25 per cent., and in English Rhubarb 10 per cent. In some of the Cactus tribe, especially in old specimens of Polocereus senilis, these crystals are so numerous as to render the stem brittle. Crystals of phosphate, sulphate, carbonate, tartrate, malate, and citrate of lime also occur in the cells of plants.

The presence of silica (SiO₃) in plants give solidity and firmness to their stems. The quantity in some plants, such as Equisetum, is very large. In these plants, as well as in grasses, the silica exists in the form of small plates, grains, or needles, as may be shown by the action of sulphuric acid. In the Bamboo (Bambusa arundinacea, and other species) the quantity of silica at the joints is frequently very large, and may be collected in masses, to which the name of Tabasheer is given. In the Diatomaceæ, belonging to the lowest tribe of Algæ, the cells have a siliceous covering, which enables them to retain their form, even after being

acted on by strong acids.

Iodine was considered formerly as an ingredient of maritime and marine plants only, but it has been recently detected in fresh-water plants, as well as in many ordinary land plants, by Chatin and by Macadam. The presence of fluorine in plants was first detected by Will of Giessen, and his observations have been confirmed and greatly extended by Dr George Wilson. It occurs in small quantity in plants, and it is often associated with silica, from which it is separated with great difficulty. Plants growing on the sea-shore, such as Sea-pink and Scurvy-grass, have been proved by Voelcker to contain fluorine. The test for the presence of fluorine is the etching which hydrofluoric acid produces on glass.

Plants derive all their inorganic materials from the soil, and it is consequently of importance to determine the composition of the latter. Some plants, however, are enabled to grow without coming into contact with the soil. Thus in the Botanic Garden of Edinburgh, Urostigma elasticum, Ardisia crenulata, Agave (Littæa) gemmipara, Billbergia nudicaulis, and Phœnix farinifera, have continued to grow for nearly four years suspended in the air, and merely moistened by common water allowed to come into contact with the roots by the capillary action of a worsted thread. Urostigma australe has grown suspended in the air for nearly twenty-five years. The plants have produced leaves and some of them flowers. They derive their organic nourishment from the air, and the quantity of inorganic matter in the water appears to be sufficient to supply their wants in

that respect for a long period. Air-plants or Epiphytes,

such as Tillandsias and Orchids, are usually attached to

rive inorganic matter. In hothouses these Epiphytes have Botany. also a quantity of moss round their roots, which is another source of inorganic matter. Lichens seem to have the power, in many cases, of acting upon hard rocks, and deriving from them inorganic matters. Mulder states that mould plants found on the surface of saccharine and gummy solutions, as well as in vinegar and other organic substances, consist of cellulose and nitrogenous compounds, without any inorganic matter. These plants, according to him, leave no ash on being burnt.

3. Composition and Properties of Soils as supplying Food for Plants.

Having considered the various organic and inorganic matters which enter into the composition of plants and of vegetable products, and having noticed the chief sources' whence plants derive their carbon, oxygen, hydrogen, and nitrogen, we shall now examine generally the nature of the soil, as the source whence the mineral or inorganic matters required for vegetable growth and nutrition are derived. We have seen that the atmosphere, with its carbonic acid, water, nitric acid, and ammonia, is capable of supplying the organic constituents of vegetables. At the same time we have found that sulphur and phosphates enter into the composition of some of the most important sanguigenous (bloodproducing) products. To the salts of sulphuric and phosphoric acid in the soil, we must look, therefore, for the means of enabling plants to assimilate their organic products. While we allow that the atmosphere is the great reservoir whence the organic elements are derived, still we cannot consider it as the exclusive source. It is probable that some of the carbon, oxygen, hydrogen, and nitrogen of plants may be supplied by the soil, and at all events we have seen that these elements cannot be combined in the form of albumen, fibrine, and caseine, without certain mineral matters of telluric origin.

The atmospheric supply of food is pretty uniform, and is not under the control of man. It is to the terrestrial (telluric) supply he must look as that which can be increased and modified by his efforts. The horticulturist and farmer direct their attention to the soil, and by alterations in its composition endeavour to effect changes in the plants which they cultivate. It is therefore of importance to ascertain the mechanical nature and chemical composition of the soil.

The following are the substances which enter generally into the composition of soils: - Silica, clay, lime, and humus or vegetable mould. According to the preponderance of one or other of these ingredients, soils are usually classified.

The presence of sand and gravel in soils renders them loose and friable. Such soils part with moisture easily, and When the proportion of sand is very are usually dry. large, the soils are barren and unproductive. The addition of clay, chalk, and marl, is useful in rendering sandy soils more tenacious. As silica enters more or less into the composition of plants, it must be taken up from the soil by the roots of plants. In order that this absorption may take place, the silica must be dissolved in water. In its uncombined condition it is insoluble, but by combining with alkalies such as potash, it forms soluble silicates, which enter the cells of plants.

Clayey soils contain a large quantity of insoluble silicates, and of alumina, which does not appear to be an essential constituent of plants, although it is occasionally found as an accidental addition to their tissues. The presence of clay has a tendency to make soils stiff and firm, so that they can retain the roots of plants and give them support. Clay soils are usually moist, impervious, and cold. Heavy clay land is improved by draining, by burning, and by mixing chalk and sand with it. Way finds that clay in the soil removes various important matters from the manures put upon

Botany. it, and does not allow the active ingredients to pass off into the drains. It retains the alkalies, as ammonia, potash, soda,

and magnesia.

Calcareous soils contain upwards of 20 per cent. of lime. This substance exists abundantly in the vegetable juices, and hence its presence is required in all productive soils. Calcareous soils exhibit different physical characters according to the proportion of lime, clay, silica, &c., which enter into their composition. The addition of lime to soils is often highly beneficial, by destroying noxious weeds, and by preventing disease in crops. Lime, in combination with phosphoric acid, is a valuable ingredient of soils. Sulphate of lime or gypsum seems to be useful, not merely in supplying sulphuric acid and lime, but also in fixing ammonia. In marly soils lime exists in proportions varying from 5 to 20 per cent. In loamy soils lime is in smaller quantity, and the clay does not exceed 50 per cent.

Humus soils contain much vegetable mould. This is in itself insoluble, and cannot be taken up by plants. By the action of air and moisture, &c., the humus is decomposed, and various acids are formed, which seem to be capable of supplying carbon to plants. Vegetable moulds also absorb gases, such as ammonia, in large quantity, and thus supply

nutritive matter to plants.

The alkalies, potash and soda, are important constituents of plants, and they exist in greater or less quantity in soils. They enter into the composition of minerals, such as felspar. They are taken up by plants in combination with acids. They render silica soluble, and they are essential to the development of acids, such as oxalic, citric, and malic, with which they are found in combination. They appear to replace each other in certain circumstances. In many fertile soils magnesia exists in combination with carbonic acid, phosphoric acid, and lime. In flax there is a large proportion of magnesia. In its caustic state magnesia is injurious to vegetation.

Iron has been detected in greater or less quantity in the ashes of all plants. It exists in the soil in combination with oxygen, sulphur, and carbon. The oxides of iron are found, more or less, in all soils, and the peroxide, which is the most abundant, imparts that reddish colour so often observed on the earth's surface. The protoxide of iron is of less value than the peroxide for vegetation, as it readily forms salts which are injurious to plants. It frequently abstracts oxygen from the soil, and becomes fully oxidized. Manganese exists sparingly in plants, and it is found in the soil combined with peroxide of iron. The presence of nodine in plants has been fully recognised by many observers. Chatin believes that there is an appreciable quantity of iodine in the atmosphere, in rain water, and in the soil, varying in different districts, and that the relative amount of iodine, in any one locality, determines, to a great extent, the presence or absence of certain diseases, such as goitre and cretinism. Mr Stevenson Macadam, from a very accurate series of experiments, has been led to the conclusion, that air and rain water do not contain iodine, at least in such quantity as to be detected by the most delicate tests. It is probable that it is derived from soluble iodides in the soil. Iodine is said to exist in coal and in the waters of the globe. The waters from igneous rocks, and from the rocks of the coal formation, are said to contain a considerable quantity of iodine. It is found in combination with sulphur, the ores of iron and manganese, and the sulphuret of mercury.

The sources of the Fluorine found in plants, Wilson regards as pre-eminently two-Simple fluorides such as that of calcium, which are soluble in water, and through this medium are carried into the tissues of plants; and Compounds of fluorides with other salts, of which the most important is probably the combination of phosphate of lime with fluoride of calcium. This occurs in the mineral king- thus rendered available for plants.

dom in apatite and phosphorite, and in the animal kingdom Botany. in bones, shells, and corals, as well as in blood, milk, and other fluids. Fluorides are much more widely distributed than is generally imagined. They exist in well, river, and

The productiveness of soils is very various. Some are entirely barren, such as quartz rock. This kind of soil is seen in many mountainous districts in which the bare quartz rock continues to show itself without any vegetable covering whatever. Others contain materials fitted for nourishment, but not available until they are disintegrated. This is the case with many granitic rocks containing valuable nutritive matter which can only be taken up by plants after the rocks have been pulverized by the action of the weather. Some hard granites which are not thus acted upon are barren. Some soils are unproductive on account of their physical characters, such as very stiff clays; others are so on account of being too loose and sandy; while others, from excess of water, are too moist, and require draining before they can be productive. The presence of substances in an unavailable form is the most common cause of sterility in soils. Barren felspar soils may be rendered fertile-by exposure to the air, or in other words, by lying fallow; by frequent ploughing and turning up; by the use of quicklime, which acts by accelerating the decomposition of felspar and clay, and separating the silica and potash from the former; by burning or calcination which acts in the same way as lime. Thus fallow, ploughing, liming, and burning act in the same way on barren felspar soils, by causing decomposition, and separating the materials required for the nourishment of plants. They all promote the solubility of different parts of the soil. Below the ordinary soil there occurs what is called the subsoil, in which there is less organic matter than on the surface. Into this soil many soluble matters are carried down by rains. The effect of subsoil and trenchploughing is to bring up these matters and render them available for the use of plants. The beneficial results of this kind of ploughing will depend upon the composition of

4. Rotation of Crops and Application of Manures.

Some plants require certain inorganic matters in larger quantity than others, and it is upon the knowledge of this that the rotation of crops is founded. The soil is constantly losing inorganic matters. By continuing to cultivate the same crop, we deprive the soil, to the depth to which the roots extend, of certain materials, while others are left nearly untouched; but by alternation of crops the latter may be made available for the purposes of growth. Farmers on this account have different crops succeeding each other in the same field. Wheat, barley, and oats are described as silica plants; peas, beans, and clover as lime plants; turnips and potatoes as potash plants. These crops, from the difference in their predominant inorganic ingredients, are made to alternate with each other. In some virgin soils, rich in phosphates and other inorganic matters, the same plants may be cultivated successfully for many years.

There is often a great quantity of fertilizing matter in the soil, but not in a condition immediately available for the growth of plants. Hence, in some cases where the crop is deficient, there are valuable materials still in the soil unassimilated. Thus phosphates exist often potentially in a dormant state in the soil in great abundance, but it is not until they have been brought into a soluble form that they are of any use as the food of plants. It is of importance for an agriculturist to discover the dormant inorganic materials, and to adopt means of rendering them available. Allowing the ground to lie fallow, and stirring and pulverizing of it, are methods by which air and moisture are admitted, and time is allowed for the decomposition of the materials, which are Botany.

The materials of which plants are composed, and which are all withdrawn from the unorganized world, are given back to the air and soil again by the disintegration of the living structures of which they have formed a part. If plants were not used for food, they would by their decay restore all that they had taken away for the purposes of growth. But as they contribute to the nourishment of man and animals, it follows that a portion of vegetable matter is constantly removed in order to build up the animal structures. This portion must be again supplied in order that the plant may be nourished. This is the principle of the application of manures. The farmer and horticulturist add to the soil what has been removed from it by crops. In order to do this properly, there must be a knowledge of the composition of the plant, of the soil, and of the manure; and hence the importance of accurate chemical analyses. In addition to this, attention must be directed to the functions of plants, and to the mode in which they take up nourishment; and the materials of growth must be supplied in such a way as to be made available for the purposes of plant-life.

The object of manuring is to improve the properties of the soil, and to supply what has been taken from it by crops which have been used for the food of man and animals. We may either supply the whole or some portion of the vegetable constituents in a soluble state, or we may add to the soil something which will decompose and act on its insoluble ingredients, so as to render them fit for the use of plants. Natural manures, such as those of the farm-yard, are excellent, because they restore to the land nearly all the substances which have been taken from it. Other manures supply one or two ingredients only. The exposure of the soil to the influence of the weather tends to make up for loss, by causing the decomposition of substances previously unfit for vegetable nutrition. Fallow then acts, in a certain degree, in restoring the fertility of the soil, but it will not give us all that is required, and, moreover, involves loss of time and money.

In the case of cultivated plants, those manures are considered the most valuable which furnish the materials necessary for forming the azotized compounds required for the sanguigenous food of man and animals. Hence the importance of manures containing ammonia and phosphates, substances which do not usually exist abundantly in the soil, and which are annually required in large quantity by crops. It has been found by comparative experiments that the quantity of gluten in wheat and other cereal grains is increased by the use of ammoniacal and phosphatic manures. The sewerage of towns, in this point of view, is one of the most valuable manures, and it is to be regretted that so little is done to save it for the purposes of the farmer and horticulturist.

The soil has a great power of absorbing ammonia, and supplies it gradually to the roots of plants in a state fit for their nutrition. The vigour of plants is much increased by the judicious application of ammonia either in the soil or in the air. It is essential that ammonia should be supplied in moderate quantity at a time, and at the proper season. It requires also the presence of phosphates, in order that its full effect may be secured in the production of nitrogenous matter. Some manures give off ammonia in large quantity by a process of fermentation; and in order to prevent the loss thus occasioned, it is frequently necessary to add sulphuric acid or sulphate of lime, so as to procure a non-volatile sulphate of the alkali.

Manures may be divided into—1. Farm-yard manure, containing all the ingredients required for a crop. This, when applied to the soil, is slowly decomposed, and its effects extend over several years, so that it exerts a beneficial influence upon all the crops of a rotation. It may be called in general a slowly-acting manure. 2. Special manures, composed of ingredients which are intended for the special bene-

fit of the crop to which they are applied, while comparatively little effect is expected to be produced on those that succeed it. These may be called rapidly-acting manures. The first is of importance for cereals which are slow-growing plants; the second are valuable for green crops, which of all others require the greatest quantity of nourishment in a given time. While ammonia may be supplied by both, still, in the former it is slowly produced by a gradual combination between nitrogen and hydrogen, while in the latter it is ready formed, and capable of being at once used by the plant.

Farm-yard manure consists of complex animal and vegetable compounds, which by free exposure to the air undergo a kind of fermentation, so as to be converted into other substances, of which carbonic acid and ammonia are the most important. This fermentation is promoted by moistening and turning over the manure, in order to permit the free access of air. It may be applied in a solid or in a more or less fluid state. The term liquid manuring is properly given to the use made of the urine of cattle, containing a large amount of urea, which, by decomposition, becomes carbonate of ammonia. Of late, however, this has been mixed with other matters from the farm-yard, as well as with carbonaceous and peaty substances, and the whole has been pumped over the field in the form of a fluid containing solid ingredients suspended in it. This kind of fluid manure is more beneficial than liquid manure properly so called.

Among Special manures there are some which supply ammonia and phosphates either separately or united, others furnish acids or bases, such as Sulphuric acid, Nitric acid, Potash, Soda, Lime, &c. The liquor of gas-works and soot owe their manurial value principally to ammonia. Bones are prized on account of the phosphate of lime in their composition, which amounts in general to about 50 per cent. In place of using bone-dust, which acts slowly, from the insoluble nature of the phosphate of lime, farmers are in the habit of mixing bones with sulphuric acid, and thus getting a soluble compound of phosphoric acid and lime (superphosphate), which, when dissolved in water, is easily taken up by the roots of plants. The addition of sulphuric acid also acts beneficially in supplying sulphur for the azotized compounds. One of the most important special manures is Guano, or the dung of sea-fowl, which has accumulated for centuries in some parts of the coast of South America and Africa, and now forms enormous deposits. Its value depends partly on ammoniacal salts and partly on phosphates. Some guanos, as Peruvian, Anagamos, and Bolivian, are rich in ammonia; while others, as Patagonian and Saldanha Bay, are rich in phosphates.

Various other special manures have been recommended, containing one or two of the inorganic constituents of plants. Nitrates and Carbonates of Potash and Soda appear to act by furnishing alkaline matter as well as nitrogen and carbon. Sea salt (Chloride of sodium) is considered by Mr Way as beneficial both to white and green crops. thinks that it probably acts on the silicates of lime present in the soil setting the lime free, and acting on the silica so as to render it fit for the purposes of vegetable life. In the case of cultivated plants which naturally grow near the sea, such as Sea-kale, Asparagus, Cabbage and its varieties, salt may be expected to be useful. Lime acts beneficially as a manure in the case of some plants, prejudicially as regards Occasionally a green crop is grown with the view of being afterwards ploughed into the soil, and of supplying, during its decomposition, materials which had been taken up by its roots from a considerable depth in the soil. This is called green manuring. Sea-weeds are also used as

II. PHYSIOLOGY OF THE DESCENDING AXIS OR ROOT.

The Root is the descending system of the plant, and is

Botany. the organ directly concerned in the absorption of nourishment from the soil. In its earliest state it is a cellular prolongation from an axis which is common to it and the stem. In cellular plants, the root consists also of cells. Root-cells are developed in a downward direction, and the fibrils spread through the soil, so as to absorb nutriment and to fix the plant firmly. The additions to roots are made at their extremities, and there it is that the chief absorbing cells are situated, constituting what have been called Spongioles (Fig. 62). Connected with young roots there are hairs or cellular prolongations from the epidermis, which also absorb fluid food. These hairs die early with the epidermis from which they sprung; the root then becomes covered with a corky layer, while its extremity continues to grow and send out fresh hairs. Any injury done to the absorbing extremity interferes more or less with the proper nutrition of the plant.

As plants are fixed to a spot, their food must be always within reach, and it is requisite that the roots should have the power of spreading, so as to secure renewed supplies of nutriment. A beautiful provision is made for this by the elongation of the roots taking place at their extremities, so that their advancing points are enabled easily to accommodate themselves to the nature of the soil in which the plant grows. If roots had increased by additions throughout their whole extent in the same way as stems, they would in many instances, when meeting with an impenetrable soil, have been twisted in such a way as to unfit them for the free transmission of fluid. But by the mode of lengthening at the point, they insinuate themselves easily into the yielding part of the soil, and when obstacles are presented to their progress, they wind round about them until they reach a. less resisting medium. They are thus also enabled to move from one part of the soil to another, according as the nourishment is exhausted.

The root, in its growth, keeps pace with the development of the stem and its branches. As the stem shoots upwards and develops its leaves, from which water is constantly transpired, the roots continue to spread, and to renew the delicate cells and fibrils which absorb the fluid required to compensate for that lost by evaporation, or consumed in growth. There is a constant relation between the horizontal extension of the branches and the lateral spreading of the roots. If the roots are not allowed to extend freely, they exhaust the soil around them, and are prevented from receiving a sufficient supply of food. The plants in such a case, deprived of their proper means of support, become stunted and deformed in their appearance.

If we wish trees to be firmly rooted, we must allow the branches to spread freely. When they are so planted that the branches and leaves of contiguous trees do not interfere with each other, and thus all parts are exposed to air and light equally, the roots spread vigorously and extensively, so as to fix the plants in the soil, and to draw up copious supplies of nourishment. But in crowded plantations, where the branches are not allowed freedom of growth and exposure, and the leaf-buds are consequently either arrested or feebly developed, the roots, also, are of necessity injured. They do not spread, and the trees are liable to be blown over by the wind; they exhaust the soil in their vicinity, circumscribed by the roots of the trees around; their functions become languid, and thus they react on the stem and branches, so that the additions to the wood are small, and the timber is of inferior quality. The spreading of roots in favourable circumstances is often remarkable. Thus, the roots of trees and other plants, when they reach reservoirs of water, as wells or drains, are found to increase very rapidly, and extend to a great length. Drains are sometimes completely blocked up by roots, in consequence of a single fibril entering at a small crevice, and then expanding into a large fibrous mass.

Roots, by depriving the soil of certain nourishing matters, Botany. render it unfit for the growth of the same species of plant, although it may still be able to contribute to the growth of other species. This is the principle of the rotation of crops, to which allusion has already been made. This exhaustion of the soil affords an explanation of the phenomenon called fairy rings, consisting of circles of dark green grass seen in old pastures. These have been traced to the successive generations of certain fungi spreading from a central point, exhausting the soil at first, and afterwards by their decay, causing a luxuriant crop of grass.

The spongioles and cellular hairs of the fibrils of roots absorb fluid food, and by diffusion communicate the matter absorbed to the neighbouring cells, and these in turn send it through their membrane upwards into the stem. Senebier proved by experiments that the absorption takes place principally by the cells at the points of the roots. After the corky layer is formed, the cells seem to have less power of taking up fluids through their walls. The imbibition by the roots may be traced in part to the process of endosmose already described, and in part to certain vital actions going on in the cells. By virtue of the chemical composition of its cell-walls and juices, and by vital affinity, a plant absorbs one substance more quickly than another, and consequently in a given time more of one than of another.

That the roots of plants have a certain power of selection was proved by the experiments of Saussure. He immersed the roots of plants in water, containing in solution an equal weight of two different salts, and when the plants had ab sorbed half the water, he took them out and evaporated the remaining water, so as to determine how much of the salts remained. This of course indicated what the plants had taken up. The salts were not absorbed in equal quantities. This difference in the proportion of salts taken up was only observable so long as the roots were entire; for when their extremities were cut off the different saline matters were taken up in the same proportion. The absorption of saline matters by the roots of plants varies in individual plants of the same species, as well as in plants belonging to different species. The absorption, according to the observations of Saussure, does not seem to have reference to the value of the substances as nutriment. Substances are taken up which prove injurious to plants. Trinchinetti placed different species of plants in mixtures of two salts-nitre and common saltwhich do not decompose each other, and he found that one plant absorbed the one, and another plant the other salt, in preference.

Besides absorption, it has also been stated that excretion takes place by roots, or in other words, that matters which have been taken up from the soil, and which are not required for the use of the plant, are again returned by the This subject was investigated by Macaire, who looked upon these excretions as injurious to plants. The recent observations of Gyde and others, however, lead to the belief that the excretions of roots are in small quantity, and that they do not possess the deleterious properties which were attributed to them. It is probable that the substances given off by roots may be referred to a process of exosmose.

Some roots which do not ramify have reservoirs of nutriment stored up in the form of nodulose or tubercular masses. This occurs in terrestrial Orchids, and in Dahlias. In the case of Spondias tuberosa, the tubercles of the roots contain a large quantity of watery fluid. In climbing plants, such as Ivy, the root-like processes by which they are attached to trees or walls seem to be means of support rather than organs of nutrition. Aerial roots take up nourishment from the atmosphere chiefly. This is the case with the roots of many Epiphytic Orchids, and in consequence of not being in a resisting medium like the soil, the elongation in them seems not to be confined to the extremities, as

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Botany. shown by the experiments of Lindley on Vanilla and Aerides cornutum. The roots of these Epiphytes or air-plants may derive some nourishment from the decomposition of the bark of the trees on which they grow, as well as from the decay of mosses, lichens, &c., which accumulate around them, but their principal nutriment appears to be supplied by the water, carbonic acid, and ammonia of the air. Roots, when exposed to the air, lose their fibrils, and take on the functions of stems, so as to produce leaf-buds.

Some plants, in place of sending their roots into the soil, or extending them into the air, have the power of attaching themselves to other plants in such a way as to prey upon their juices. These are called Parasites. Some of them have green leaves, such as the Mistleto; others have only white or brown scales, as the Scalewort and Broom-rape. In the former, the juices, after being taken up by the plant, are altered in the leaves by exposure to air and light. Some of these are root-parasites, in other words, become attached to the roots of other plants; as Broom-rape, Eyebright, Bastard Toad-flax, and Cow-wheat; others are stem parasites, growing by attachment to the stems of other plants; as the Mistleto, Myzodendron, Rafflesia, and Dodder.* All of them send cellular prolongations more or less deeply into the tissue of the plants on which they feed, and by means of these, which act as roots, they derive nutriment. They often cause great injury to the plants on which they

III.-PHYSIOLOGY OF THE ASCENDING AXIS OR STEM.

The stem produces buds which are developed as branches, leaves, or flowers. It conveys fluids in various directions, and allows the organs of plants to be exposed to the influence of air and light. In the case of subterranean stems, the leafy and flowering branches are sent upwards into the air, and they perform the functions of aerial stems. Herbaceous stems carry on their functions for one year, or for a limited period, while those of a woody nature continue to perform their functions for many years. While the former attain a moderate size, and perish after a brief period of existence, the latter are permanent, and frequently, as in the case of trees, acquire a great height and diameter. Herbaceous axes occasionally attain a large size, as may be seen in Bananas. Many cone-bearing trees, as Pines, Spruces, Larches, Araucarias, Sequoia, and Wellingtonia, have stems varying from 100 to 300 or more feet in height. Other dicotyledonous forest trees in Britain sometimes attain the height of 120 feet; while on the Continent and in America, they are sometimes 150 feet high. Monocotyledonous stems, such as those of Palms, are usually unbranched, and their height is sometimes 150 or even 180 feet. The Cable Palm runs among the trees of the forest to the length of 500 feet. Acotyledonous stems, as those of species of Alsophila, Dicksonia, and other Tree-ferns, attain a height of 50 or 60 feet. Some cellular stems also attain a large size. Hooker mentions a sea-weed—Lessonia fuscescens—with a trunk 5-10 feet long, and as thick as the human thigh. Stems often attain a great thickness. The stem of the Dragontree of Orotava is 70 feet in circumference; that of the Baobab has a circumference of 90 feet; some Cedars of Lebanon at the present day have a girth of 40 feet. Chestnut trees have occasionally a circumference of 60 feet, and trees of the South American forests are mentioned by Martius with a girth of 84 feet at the base of the trunk. While some Palms, such as Kunthia montana and Oreodoxa frigida, have slender reed-like stems; others, such as Cocos butyracea and Jubæa spectabilis, have trunks which are three or even five feet in diameter.

By means of terminal and lateral buds, stems increase in height and diameter. In their earliest state they are composed of cellular tissue, in the midst of which there is de-

veloped vascular tissue, which is arranged in different ways, as already described. The cellular tissue of the young dicotyledonous stem is early separated into two portions—a medullary or inner, and a cortical or outer-by the formation of vascular and woody bundles, which increase in concentric zones. In its young state, the pith is succulent and seems to be a reservoir of nourishment for the embryo plant during its early growth. The sheath surrounding the pith contains numerous spiral vessels, which extend upwards and outwards to the leaves. In ordinary circumstances these vessels contain air. The outer cellular portion of the stem constitutes the bark, which protects the other tissues, and often contains secretions, such as gums, resins, and alkaloids. When the bark is green, it seems to exercise the same functions as leaves. It is united to the pith by medullary rays which give a character to the wood. The cells and vessels of the stem are concerned in the circulation of sap, as will be afterwards noticed, and the woody tubes, when fully formed, give stability and durability to the

Between the pith and bark, as well as at the extremities of the buds and roots, there exist cambium cells, which, according to Schacht, form the first stage of the vascular bundles, and give origin to the proper parenchyma or nourishing tissue. A cylindrical layer of this cambium or organizing tissue is distributed in all the most perfect plants, so as to divide the parenchyma into pith and bark, as well upwards in the stem, as downwards in the root. In Dicotyledons, this cylindrical layer, called by Schacht the *thickening* zone, is active as long as life remains. It is by means of it that the stem enlarges—the cells of the tissue forming, toward the interior, new wood, and, towards the exterior, new bark.

In Monocotyledons and the higher Cryptogams, the thickening zone—in other words, the cylindrical layer of organizing tissue—continues active only for a short period of time, and hence these plants do not enlarge beyond a certain point; and at length they grow only in one directionnamely, in height. This thickening layer of cambium, while it adds to the size of the stem of Monocotyledons, causes the increase of the vascular bundles. After a certain period, however, this zone becomes woody, and then the vascular bundles only grow at their extremity, by means of unchanged cambium cells which are in immediate connection with the bundles. This cambium of the vascular bundles is essential to them, and gives them their character. In Monocotyledons it is situated in the centre of the bundles, and is surrounded by spiral, pitted, or woody vessels; in Cryptogams it surrounds the vascular bundles. The vascular bundles in both these classes of plants are limited, and they can only increase laterally by ramifying, as in Dracæna and some Tree-ferns.

The cambium appears to be the immediate agent in the development of new tissues. The origin of the cambium cells, and the mode in which the wood of trees is formed, as well as the influence exerted by the leaves and green parts of plants, have long been subjects of dispute among physiologists. Grew and Malpighi thought that the new woody layers were formed by the bark, while Hales maintained that they were formed from the previously existing wood. Dr Hope loosened the bark of trees, and found new layers of alburnum formed on its inside. Duhamel put plates of silver between the woody and cortical layers, and found the new formation on the outside of the plates; he also removed a portion of the bark of a plum-tree, and replaced it with a similar portion of a peach-tree, and after union had taken place, he ascertained that at the point of junction a thin layer of wood had been formed by the peach bud, and none by the wood of the plum. Hence these experimenters concluded that the new wood was produced by the bark. De Candolle, as the result of his observations, maintained that both the bark and the wood were concerned

*Plate CXXV.

Botany. in the formation of woody matter. All appear to agree in looking upon the cambium layer as concerned in the development of the wood.

We have seen that recent authors have ascertained more fully the nature of cambium, and that they consider it in the light of active formative tissue, developing cells and vessels in an upward and downward direction. Some adopt the view that there are in reality two systems in plants, an ascending and a descending one; and that what takes place in the sprouting of the embryo continues to be manifested during the life of the plant. This view, variously modified, was adopted by De la Hire in 1708, was supported by Darwin and Knight, and was particularly espoused by Aubert du Petit-Thouars in 1806, and subsequently by Gaudichaud and others.

According to Petit-Thouars and Gaudichaud, we see in the embryo a radicular and a caulinary portion, the one having a tendency to ascend, the other a tendency to descend. In both of these systems cells and vessels of different kinds occur. In Dicotyledons the ascending system is connected with the medullary sheath, and passes into the buds and leaves, while the descending system is the woody tissue sent down from the leaves between the sheath and the bark. The woody fibres of the leaves, favoured by the cambium, are developed from above downwards. In the wood the ligneous tissue of the upper leaves envelopes that of the inferior ones, while in the bark the fibrous tissue is inserted in the reverse way—the internal layer, corresponding also to the superior leaves, being the newest. The extension of the cellular tissue of the stem takes place in a horizontal or transverse direction.

The Radicular or vertical theory of wood formation has been supported by reference to the arrangement of the vascular bundles in Palms (Fig. 85) and Dracænas, and to the development of aerial roots from different parts of the stems of Screw Pines (Fig. 66), Figs, Vellosias, and Tree-ferns. Many travellers, such as Gardner, who examined Palms in their native countries, have espoused the vertical theory of wood formation. In these plants the bundles of woody vessels can be traced from the base of the leaves, taking a peculiar curved direction downwards, and interlacing in a remarkable manner. In many Palms the fibres burst externally through the stem, and appear as roots. In the case of Screw Pines, the formation of external or adventitious roots is very remarkable; in them the thickness of the stem is diminished below the points whence the roots proceed, as if the woody matter had appeared externally in place of proceeding internally. Adventitious descending roots are also seen in many of the Fig tribe, such as the Banyan (Fig 65) and the Peepul tree. In Tree-ferns the lower part of the stem is often much enlarged by these aerial roots being applied closely to it. Brown says that in Kingia (an Australian plant) the leaves send down, between the true stem and the bases of the petioles which form the only bark of the tree, a series of adventitious roots closely covering the stem, and resisting to a great degree the action of external destructive agents, such as fire. A further development of this root structure is seen in Barbacenia and Vellosia, where the whole outer part of the stem is made up of interlaced roots, which are traced inwards and upwards to the leaves. In Bananas and Plantains, as grown in the hothouses of Britain, we often see roots proceeding from the base of the leaves forming the herbaceous shoot. Roots are to be seen proceeding from sound portions of the wood of Willows, and running into those which are decayed, and wounds made in the stems of trees are sometimes covered by radicular fibres sent down from the upper

These views of Gaudichaud and others have been opposed by many able physiologists, more especially by Mirbel, Payen, Naudin, and Trecul. Mirbel has examined in a

particular manner the development of the Date, and he has Botany. been led to the conclusion that the fibres increase from below upwards, and not from the leaves downwards. He says that a Monocotyledon produces at its summit a mass of cellular tissue called a phyllophore, into which the vessels from the stem penetrate to form the vascular system; that after this the leaves are produced; that the vessels come from the internal periphery of the young part of the stem, arising at all heights, and that the roots have at first no immediate connection with the leaves. Trecul has examined the stems of Dicotyledons, and has been led to deny the downward tendency of the wood formation. He states that after the bark has been removed, a new layer of woody tissue and bark is formed at detached points, into which the medullary rays are continued directly without the slightest interruption. He thinks that the woody tissue is a lateral development from the already existing longitudinal cells; that fresh bark is formed on the woody tissue by the development of cells from the tissue, while the medullary rays penetrate directly into the new patches of wood; and that the woody fibre is equally capable of throwing off lateral cells, which, while in immediate connection with the old fibre, exhibit more or less imperfectly the character and form of the tissue from which they arise, while the free ends are mere parenchymatous cells. According to him the fibro-vascular bundles are not continued without interruption from the extremities of the leaves to the rootlets; the diameter of the stem may increase without the intervention of ligneous fibres descending from the leaves or buds; and the tissue of the wood and vessels, as well as the medullary rays and bark, are formed in situ, independently of the tissues higher up.

Amidst these opposing views, it is difficult to come to a decided conclusion. There is undoubtedly an ascending and a descending system in plants—a stem developed in an upward, and a root in a downward direction. The leaves are also of importance in the formation of wood, and the cambium cells are the active tissue of the stem. In so far all are agreed. The points of difference are the exact relation which the leaves bear to the woody fibres of the stem, and the direction in which these fibres are developed. The peculiar arrangement of fibres in the stems of Palms, and the production of aerial roots from various stems, favour in some measure the vertical theory of wood formation; while the woody excrescences occurring in the bark of some trees, and the production of particles of woody matter in the centre of decorticated portions of wood, and at the lower part of wounds, as shown by Trecul, seem to show that woody fibres are formed in some instances without any direct connection with leaves. While the weight of authority is in favour of the views recently propounded by Trecul, there are many facts brought forward by Gaudichaud which still require explanation, and which are not easily accounted for, unless we suppose an upward and downward tendency to be impressed on the tissues of the stem and of the buds, in the same way as on the embryo at its earliest growth. Physiologists in general concur in believing, that without the presence of leaves on the stem, no woody matter is formed.

IV .- PHYSIOLOGY OF THE LEAVES.

The leaves are arranged upon the axis in such a way as to be fully exposed to the influence of air and light. They are thus enabled to perform very important functions. As regards the development of leaves, Trecul states that some are developed from below upwards, as in the Lime; others from above downwards, as the pinnate leaves of Sanguisorba officinalis and Rosa arvensis, and the digitate veins of radiating leaves; a third set, as the leaves of Acer, exhibit both kinds of development, the lobes being formed from above downwards, and the secondary venation and toothing

Botany. from below upwards; and a fourth set, as those of Monocotyledons, have their veins formed in a parallel manner, the leaf lengthening by the base of the blade or petiole. Leaves having sheaths, or their lower portion protected by other organs, grow most at the base; those of which the whole petiole is very early exposed to the air, grow more towards the upper part of the petiole. The fluids which reach the cells and vessels of the leaves undergo changes by which they are elaborated and fitted for the formation of various vegetable secretions. In ordinary plants the non-development of the leaves arrests the formation of woody matter and of many important products. Leaves have the power of absorbing carbonic acid, ammonia, water, and aqueous solutions. They also exhale a certain amount of water, and they give off gaseous matters, especially oxygen. Thus leaves, in the performance of their functions, absorb and exhale watery and gaseous substances.

1. Absorption by Leaves.

When liquids are brought into contact with the leaves of plants, absorption takes place. Bonnet found that plants of Mercurialis, with the surface of their leaves in contact with water, absorbed as well, and kept for a time nearly as fresh as those of which the roots were immersed in the liquid; that the under surface of ordinary leaves took up liquids rapidly in consequence of the thinness of the cuticle, the laxity of the cellular tissue, and the presence of stomata; and that the thick and hard epidermis on the upper surface having few stomata, presented an obstacle to absorption. The hairs which occur especially on the under surface of leaves, seem to act like cellular rootlets, and to absorb moisture. Hoffmann ascertained that liquids are absorbed by the leaves in large quantity, and that in such cases they pass downwards by the tracheæ and the prosenchyma immediately surrounding them, displacing for a time the air usually contained in the spiral vessels. He states that after every fall of rain or dew there is an absorption by the leaves, and that this is followed by an immediate descent of sap. The absorption takes place with greater or less rapidity according to the nature of the leaves, and the fluid passes through the inter-cellular spaces, as well as the cells and vessels. The greater and the more rapid the absorption, so much the more have the fluids a tendency to enter the spiral vessels. The absorbing power of the epidermis of leaves varies. When composed of delicate thin-walled cells, with numerous stomata, the imbibition of liquids is carried on rapidly; but when the epidermal cells are hardened, and have thick walls, absorption is much impeded. Some gaseous matters are taken up rapidly by leaves. Boussingault found that air was speedily deprived of carbonic acid by coming into contact with the leaves of the Vine for a few minutes. Chevandier calculates that the trees of a forest, during the five summer months in which they bear leaves, withdraw from the column of air around them about 1-9th of its contents of carbonic acid.

Some researches have been made by Garreau in regard to the absorption of different liquids by the external surfaces of plants, and more especially by the leaves. In making his experiments, he employed endosmometers (long tubes with large open bulbs at the end) of nearly equal calibre, the diameter of the orifice of the ball being in all of them about half an inch, and the diameter of the tube about one-twelfth of an inch. Each epidermis, or cuticular surface, was fixed to the end of the endosmometer by means of a wax thread, and covered by wax at the margin. The fluid in the bulb of the endosmometer was a solution of one part of sugar in two parts of water. He found that the young epidermis is endosmotic, or has the power of absorbing fluids, but that it loses this property as it gets old. He attributes the absence of absorption in the epidermis of old leaves to the fatty or waxy matter which covers them,

and with which they are impregnated. His conclusions are: Botany. -1. The cuticle possesses a decided endosmotic property, the intensity of which is greater the younger the organ which it covers; when leaves become old they seem to lose their absorbing power. 2. The absorption of the cuticle is greater, the less there is of fatty or waxy matter in it. 3. The cuticle which covers the superior surface of the ribs, and more especially that which covers the petiole at the point where it joins the stem, is that part of the foliar surface which has the most marked power of absorption. 4. In some instances in which the cuticle or outer skin is absorbent, the epidermis or inner layer of integument presents obstacles to absorption. 5. Simple washing with distilled water, more especially washing with soap and water, augments the absorbing property of leaves. 6. When leaves have lost their power of absorbing water, they can still take up carbonic acid.

2. Exhalation by Leaves.

a. Exhalation of Watery Fluid, or Transpiration.

The leaves of plants, in the performance of their functions, give off a quantity of watery fluid. This constitutes what is commonly called Transpiration. The quantity of liquid transpired varies according to the structure of the leaves and the nature of the climate. When the texture of the leaf is hard and dry, as in Banksias, Proteas, and many other Australian plants, or the skin covering the leaf is thick and dense, as in the American Aloe and the Oleander, the

amount of transpiration is comparatively small. In this way certain succulent plants, as Cactuses (Fig. 142), are enabled to withstand the effects of dry and hot climates, without being destroyed by the great loss of water by exhalation. The thick covering of hairs on some leaves, as on those of Culcitium, seems to be connected also with the amount of transpiration. Some very hairy plants, as Shepherd's Club, have been known to resist the effects of great drought. The hairs have the power of becoming more



Fig. 142.

hairs have the power of becomes of Melon-Cactus, or less erect, and of absorbing the dew, Species of Melon-Cactus, they lie flat on a succulent plant. the surface and hinder the passage of fluid. In leaves with a very thin epidermal covering or skin the exhalation is great.

Schacht remarks that in the epidermis of plants the external sides of the cells become thickened generally more than the internal. They offer, especially when corky, resistance to the evaporation of the liquids in the parts filled with sap. They would completely prevent transpiration, were it not for the presence of stomata, which allow gaseous and vaporized substances to be exhaled as well as absorbed. The epidermis of the stem, as soon as it dies, is replaced by cork, which, when completely formed, prevents all transpiration, although by its porosity it may condense gases at the surface of the plant. The presence of corky matter in the cell-walls, which has been noticed by Mitscherlich, may thus materially modify the functions of absorption and exhalation. In order that leaves may perform their functions properly, there must be a certain degree of exhalation. If from the leaves being covered with soot or dirt, or with the cottony productions of scale insects, the proper amount of exhalation is prevented, much injury is done to the plant. Hence, the importance of having the leaves of plants, when growing in hothouses and conservatories, well washed and cleaned, in order that they may perform their healthy functions.

The passage of vapour through the pores of the leaf is an imperceptible process, which is constantly going on, and the existence of it is ascertained by its effects. Woodward and

Botany. Hales made various experiments on the amount of exhala-The latter found that a common Sun-flower, 3½ feet high, weighing 3 lb., with a surface of leaves equal to 5616 square inches, exhaled 20 ounces of liquid in the course of a day; a Cabbage plant, with a surface of 2736 square inches, was found to exhale, on an average, 19 ounces; a Vine of 1820 square inches, from 5 to 6 ounces; and a Lemon-tree of 2557 square inches, 6 ounces per day. He remarked that Evergreens exhaled less than plants with deciduous leaves, and he associates this with their capability to endure the cold of winter. The exhalation from leaves, according to Henslow, depends chiefly upon the effect of light on the vital energies of the plant.

Garreau made a series of experiments on the exhalation of leaves, by enclosing a living leaf between two bell-jars, one applied to the upper, and the other to the under surface, and ascertaining the quantity of liquid exhaled, by means of chloride of calcium which absorbs water with great rapidity. He found that the exhalation from the lower surface of the leaf was usually double, and even triple or quadruple, that of the upper surface. The quantity of water exhaled has a relation to the number of stomata. The exhalation is greater at the line of the ribs, or at the part of the epidermis where there is least fatty or waxy matter. The secretion of this matter in abundance during the warm days of summer, may tend to prevent the plants being injured by rain and by the heat of the sun. By impeding exhalation, it tends to retain the moisture which is necessary for the functions of the leaves.

In some plants, when water is supplied abundantly, there is a sort of distillation of liquid from the leaves. Arendt noticed this in a stalk of the Nettle when immersed in water. The liquid passed upwards in the grooves on the upper surface of the petiole, followed the ribs of the leaves, and then dropped from the apex of the leaves. From the extremity of the leaves of Richardia africana (Calla æthiopica) a watery fluid has been observed to drop in considerable quantity. The amount varies at different periods of the day, being most copious after mid-day. It ceases with the development of the spathe and organs of reproduction. A similar watery secretion has been noticed in other Araceous plants, such as Arum, Colocasia, and a plant called Caladium distillatorium; the water in these instances flows from an orifice near the point of the leaf, upon the upper surface, in which terminates a canal running along the margin of the leaf, while smaller canals, running along the principal ribs, open into the marginal one. Williamson found that from each healthy leaf of the latter plant about half-a-pint of liquid dropped during the night. Water also half-a-pint of liquid dropped during the night. drops from the margins of the leaves of Canna indica, angustifolia, and latifolia. In the hollow leaves of plants, such as Nepenthes, Sarracenia, Dischidia, and Cephalotus, a quantity of watery exhalation accumulates. Voelcker analyzed the liquid in the pitcher of Nepenthes, and found it to consist of water, containing in solution malic acid and a little citric acid, chloride of potassium, carbonate of soda, lime, and magnesia.

The exhalation of watery fluid from the leaves of plants influences the climate of a country. Humboldt remarks, that plants exhale water from their leaves, in the first place, for their own benefit, but that various important secondary effects follow from this process. One of these is, maintaining a suitable proportion of humidity in the air. Not only do they attract and condense the moisture suspended in the air, and borne by the wind over the earth's surface, which, falling from their leaves, keeps the ground below moist and cool; but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by the transpiration from their leaves, surround themselves with an atmosphere constantly cold and moist. They also

shelter the soil from the direct action of the sun, and thus Botany. prevent evaporation of the water furnished by rains. In this way they contribute to the copiousness of streams. When forests are destroyed, as they are everywhere in America by the European planters, with an imprudent precipitation, the springs are entirely dried up, or become less abundant. In those mountains of Greece which have been deprived of their forests, the streams have disappeared. The inconsiderate felling of woods, or the neglect to maintain them, has changed regions noted for fertility into scenes of sterility. The sultry atmosphere and the droughts of the Cape de Verd islands are attributed to the destruction of forests. Dr Cleghorn states, that in large districts of India, climate and irrigation have rapidly deteriorated from a similar cause, and that the government are now using means to avert and remedy the mischief. In wooded countries, where the rains are excessive, as in Rio Janeiro, the climate has been improved by the diminution of the trees. Gardner says, that since the axe has been laid on the dense forests surrounding the city of Rio Janeiro, the climate has become dry. In fact, so much has the quantity of rain diminished, that the Brazilian government was obliged to pass a law prohibiting the felling of trees in the Corcovado range. Müller states that the cultivation of grain, which has so completely transformed one part of the wilderness of Australia, has already exercised a most beneficial influence on the increase of rain.

It is necessary to keep up the correspondence between the fluid given off by the leaves and that taken up by the roots. If the former exceeds the latter, the leaves become languid and fall off. This is one cause why plants growing in the rooms of dwelling-houses succeed badly. The atmosphere is too dry, and the exhalation from the leaves is not compensated by the fluids taken up by the roots. This cannot be remedied by an extra supply of water, for the roots are not capable of taking up the additional quantity required. Hence the use of Wardian Cases in preventing the loss caused by transpiration, and thus enabling the plants to live even in a warm and dry room.

b. Exhalation of Gaseous Matter.—Vegetable Respiration.

The leaves of plants give off gases, the nature and quantity of which vary according to the circumstances in which the plants are placed, and their state of vigour or decay. Hence leaves produce important effects on the atmosphere, and we shall find that they are employed as the means of keeping up its purity. In the year 1771, Priestley observed that plants were able to grow in air vitiated by the breathing of animals, and that they soon restored such air to its original purity. Percival confirmed these observations, and showed that air containing so much carbonic acid as to prove destructive to animal life, was rendered fit for respiration after plants had grown in it.

Ingenhousz examined the subject more fully, and made an extensive series of experiments. In air that had been so far depraved by respiration as to extinguish a lighted candle. he placed a plant of Peppermint, and then exposed the vessel for three hours to the sun, at the end of which time the air again supported flame. When a Nettle was put into a similar portion of impure air during the night, the air was not improved; but when exposed to the sun for two hours, its original purity was restored. Such was also the case with plants of Mustard. When similar portions of the same impure air were confined in vessels with similar plants, and respectively placed in sunshine and shade, the air exposed to the sun recovered its purity in a few hours, while that in the shade continued impure. Ingenhousz also per-formed experiments with immersed leaves, and found that they purified the air in the course of a very few hours in sunshine

Botany.

Senebier also instituted a series of experiments which proved the production of oxygen gas by plants exposed to the direct rays of the sun. He considered the oxygen as derived from the decomposition of carbonic acid; and he thought that plants in a healthy stated on ot give out carbonic acid in darkness. Ellis, De Saussure, Daubeny, and others, have corroborated these statements more or less fully. Aquatic plants appear to surpass all others in their power of decomposing carbonic acid. In some lakes in volcanic countries, where carbonic acid rises in great quantity through the water, vegetation is very vigorous, and the separation of oxygen goes on rapidly. Schleiden mentions that there is a rich vegetation round the springs in the valley of Göttingen, which abound in carbonic acid.

Physiologists still differ in regard to the actual amount of change produced in the air by leaves during the performance of their functions. Some maintain that oxygen is given off by the leaves during the day, and a moderate quantity of carbonic acid is exhaled by a process of endosmose during night; others say that carbonic acid is exhaled by plants in greater or less quantity at all times, and that during the day it is decomposed so as to give out oxygen; while a third set of authors state that no carbonic acid is evolved by leaves in a healthy state, and that their true function is one of deoxidation, or rather decarbonization, which consists in the fixation of carbon and the elimination of oxygen.

The first of these views was for a long time generally adopted, but some recent experiments have tended to throw doubts upon it, and to confirm the views of Senebier. Mohl still supports this view. He says plants have a double respiration—one consuming carbonic acid and exhaling oxygen by day in the green-coloured organs, and one connected with a consumption of oxygen and a formation of carbonic acid in the green organs by night, and in those not green, by day and night. If we wish to speak of a respiration in plants, he says, this oxygen-consuming breathing deserves the name far more than the exhalation of oxygen by the

green organs connected with the nutrient processes. The second view was propounded by Burnett, who considers the constant exhalation of carbonic acid both by day and by night as true vegetable respiration, while the decomposition of carbonic acid during light, accompanied with the evolution of oxygen, is regarded by him as a process of digestion; respiration thus going on at all times, and consisting, like that of animals, in the separation of carbon, while digestion only goes on during light. He has been supported by Carpenter, who says that the respiration of vegetables is not an occasional process, but one which is constantly going on during the whole life of the plant-by day, by night, in sunshine, and in shade—and consists in the disengagement of the superfluous carbon of the system, either by combination with the oxygen of the air, or by replacing with carbonic acid the oxygen that has been absorbed from it. If the function is checked the plant soon dies, as when placed in an atmosphere with a large amount of carbonic acid, and without the stimulus of light which enables it to decompose the acid gas. Garreau has also recently adopted these views. Henfrey says a distinction is to be drawn between the process of respiration in which the liberation of superfluous oxygen takes place, leaving the other elements combined in an assimilated or organic condition, and that process in which the assimilated matter is again chemically altered by the oxidation of a certain amount of carbon, which is liberated as free carbonic acid by plants unprovided with leaves, but under most circumstances decomposed again by green plants. He thinks that carbonic acid is given off by living plants as a vital process even during light, and he suggests that the re-absorption of the evolved acid gas during the day has disguised the fact in most previous experiments.

The third view of vegetable respiration has been brought Botany. prominently forward of late years by Mr Haseldine Pepys. From careful experiments, conducted during several years, he is satisfied that leaves which are in a state of vigorous vegetation, always operate so as to keep up the purity of the air, by absorbing carbonic acid, and disengaging oxygen; that this function is promoted and accelerated by the action of light; that it continues during night, although more slowly; and that carbonic acid is never disengaged when the leaf is healthy. He also finds that the fluid abundantly exhaled by plants during their vegetation is pure water, and contains no carbonic acid; and that the first portions of carbonic acid gas contained in an artificial atmosphere are taken up with more avidity by the plant than the remaining portions. The giving out of carbonic acid by leaves is attributed to disease, or to a change in the healthy state of the tissues; and in many experiments, the abnormal condition of the plant may perhaps account for the appearance of carbonic acid. In some of Mr Ellis's experiments, the decaying condition of the leaves gave rise to a fallacy in the re-Cloez and Gratiolet confirm Pepys' observations. They state that oxygen is disengaged rapidly in solar light, insensibly in diffused light, and not at all in darkness, and that in the latter case no carbonic acid whatever is given off by plants.

From all that has been stated, it would appear that an absorption of carbonic acid by the leaves of plants and an elimination of oxygen takes place during daylight, and that this process ceases in a great measure during the night. The exhalation of carbonic acid by healthy leaves is still doubtful, and the appearance of this acid gas may in many of the experiments be traced to an abnormal condition of the leaves. The great function of the leaves thus seems to be deoxidation, by means of which they are instrumental in keeping up the purity of the atmosphere. This function of plants is antagonistic in its results to animal respiration; for while the latter takes oxygen from the atmosphere, and replaces it by carbonic acid, the former removes carbonic acid, fixes carbon, and gives out oxygen. The processes of respiration and combustion are pouring into the atmosphere a large quantity of carbonic acid gas, while the active leaves of plants are constantly removing it, and, under the action of light, substituting oxygen. While plants thus get carbonaceous food, the air is by them kept in a state fitted for animal life.

As the decomposition of carbonic acid is only carried on vigorously during the day, it follows that an accumulation of it will take place in the atmosphere during darkness. Saussure found, from a mean of fifty-four observations made in a country district, that the proportion of carbonic acid in the atmosphere during the night was to its proportion in the day-time as 432 to 398; or in other words, the carbonic acid in the atmosphere was diminished nearly 10 per cent-during daylight. It is said also that during summer, when animal life is more active, the proportion of carbonic acid is greater than in winter, as 7.13 to 4.79 parts in 10,000. The usual quantity of carbonic acid in the atmosphere, before being drawn into the kungs, is about 1-2500th; in that returned from the lungs it is about 1-25th, or it has increased 100 times in quantity. So long as plants are kept in a vigorous and healthy state, they do not give off any carbonic acid. If, however, they are kept long in the dark they begin to fade; the green colouring matter called chlorophyll is not produced as it ought to be; the plants are blanched or etiolated, and in fact get into a state of disease. In such circumstances no oxygen is given off, but, on the contrary, carbonic acid is produced.

Experiments have been made by Draper as to the particular rays of the spectrum which are concerned in the decomposition of carbonic acid by the green parts of plants. They were made with a series of tubes half an inch in

Botany. diameter and six inches long, which were arranged so that the coloured spaces of the spectrum fell on them. In these tubes water impregnated with carbonic acid and a few green leaves of Poa annua were placed. In the tube that was in the red space a minute bubble of gas was sometimes formed, sometimes none at all; that in the orange contained a considerable quantity; in the yellow ray a very large amount was found, comparatively speaking; in the green a much smaller quantity; in the blue, indigo, and violet, and the extra-spectral space at that end, not a solitary bubble. Hence he drew the conclusion that the light-giving rays and those nearest the yellow have the greatest effect in the decomposition.

It has been stated that plants, when blanched, give off carbonic acid. Morot says that in partially etiolated plants, when exposed to the direct rays of the sun, the yellow portion of the tissue gave out carbonic acid, while the green parts gave out oxygen. Plants having no green leaves exhale carbonic acid. Thus Lory found, from thirty experiments, that Orobanches in every stage of their growth, whether exposed to light or not, absorb oxygen and give out carbonic acid. Lory took two parts of the same weight, one of Orobanche Teucrii, and the other of the leafy stalk of Teucrium Chamædrys, on which it was parasitic, and placed them in two jars of the same capacity, filled with six volumes of air to one of carbonic acid. Both were exposed to light from 9 A.M. until 3 P.M. of the succeeding day, and at the end of that time the air in which the Teucrium was placed contained no trace of carbonic acid, while that in which the parasitic Orobanche was placed yielded a large quantity of carbonic acid and a diminished amount of oxygen.

3. Influence of Leaves on Vegetable Secretions.

By means of the processes of absorption and exhalation which are carried on by leaves under the influence of air and light, the contents of the cells and vessels are elaborated and fitted for the production of various important secretions. To the action of the leaves must be traced in a great measure the elaboration of the azotized and unazotized compounds, to which allusion has already been made. When the functions of the leaves are interrupted by non-exposure to light, or by the attacks of disease, and when plants are deprived of their leaves by injuries of various kinds, their secretions are either wholly stopped, or they become altered in their nature. When leaves are blanched by being excluded from air and light, they lose their properties, their fragrant oils and resins are not developed in a proper manner, chlorophyll is not formed, nor is woody matter produced. Potatoes grown in the shade become watery, and produce little starch in their tubers.

The importance of leaves in the production of timber is universally acknowledged. If they are prevented from performing their functions properly, by being kept in darkness or in the shade, wood is imperfectly formed; and if the leaves are constantly stripped off a tree, no additions are made to its woody layers. Some troublesome weeds with underground woody stems may be enfeebled and ultimately extirpated by repeatedly cutting off their whole foliage. The difference of the wood in crowded and properly thinned plantations, depends in a great measure on the growth and exposure of the leaves. Wood grows more rapidly, and the zones or circles are larger, when there is free exposure. Hence the necessity of judicious planting if we wish to have good timber. When a tree forms large circles of woody matter, and thus grows rapidly, it has been found that the quality of the timber is better than when the same species forms small circles and grows slowly.

While in the cultivation of trees, shrubs, and ordinary flowering plants, the object of the gardener is to allow the

leaves to perform their functions perfectly, there are certain Botany. cases in which he endeavours to interrupt these functions, and to produce an unnatural condition, by which the plants are rendered more suitable for domestic purposes. All are familiar with the fact that blanching deprives the leaves of their green colour, and prevents them from acquiring their usual qualities. This depends on the effect of darkness in arresting the formation of chlorophyll or the green colouring matter, and in hindering the production of various secretions. In the case of Asparagus and Sea-kale, gardeners succeed by artificial etiolation (blanching) in preventing the plants from producing woody tissue—cells and thin-walled vessels being alone formed, which are delicate in their texture. The tenderness and succulence of the heart of the cabbage are due to the outer leaves obstructing the access of light. In Celery the effect of blanching is to deprive the plant not only of the woody tissue, but also of certain other secretions which render it in its ordinary condition unpalatable. It is thus distinctly proved that leaves owe their green colour to the action of light, and that it is only when light and air are supplied freely, that they can form the secretions which are required for the vigorous and normal growth of the plant.

4. Effects of Various Gases upon Leaves.—Wardian

In considering further the functions of the leaves, it is of importance to notice the effects produced upon them by different gases. The atmospheric air, with its oxygen, nitrogen, carbonic acid, and ammonia, is the gaseous mixture best fitted for the growth of plants. Certain gases in their unmixed state are poisonous to plants, while others do not seem to produce any deleterious effects further than the retardation of growth caused by the exclusion of atmospheric air. Saussure found that a plant of Lythrum Salicaria flourished for five weeks in hydrogen gas, and the Messrs Gladstone ascertained that nitrogen, oxygen, and nitrous oxide were innocuous. Plants would not of course continue to be vigorous in such atmospheres, inasmuch as they are deprived of the carbon which is necessary for them, and which can only be procured from carbonic acid.

Plants, when exposed to light, will thrive in an atmosphere containing a considerable amount of carbonic acid, but they cease to perform their functions in an atmosphere composed of carbonic acid alone. Daubeny found that Ferns and Lycopodiums, which are the plants most nearly allied to those of the coal epoch, can at the present day exist without injury in an atmosphere containing at least 5 per cent. of carbonic acid, and he thinks that this in some degree supports Brongniart's hypothesis as to the cause of the enormous production of carbon by the plants of that epoch. While plants in bright light can live in an atmosphere containing 5 to 10 per cent. of carbonic acid, Daubeny ascertained that the addition of a larger per-centage caused injurious effects.

In the atmosphere of towns, more especially those in which chemical and other manufactories exist, there are many gaseous and other matters present which interfere in a marked degree with the growth of plants. Every cultivator knows the difficulty of growing Roses and many valuable garden flowers in such situations. Drs Turner and Christison were led to examine the influence of gases on plants, on account of having been called upon to give evidence as to the effects of a black-ash manufactory on the vegetation in its neighbourhood. They found that many gases, even in minute quantity, injured and destroyed the leaves of plants, some of the gases acting as irritant poisons, others as narcotic poisons. The former destroyed the texture of the leaves and altered their colours, while the latter killed the leaves without producing any local effects on the textures. Sulphurous acid gas, which is very com-

Botany. monly met with in the atmosphere of towns was found to be exceedingly deleterious. Where four or even only two cubic inches were introduced, along with a young Mignonette plant, into the air of a glass jar, capable of containing 470 cubic inches, the leaves of the plant became greenishgray and drooped much in less than $2\frac{1}{2}$ hours; and, though then taken out and watered, it soon died altogether. In some of the experiments, the proportion of the acid gas was a ten-thousandth only, the quantity being one-fifth of a cubic inch, and yet the destruction of the leaves was complete in 48 hours. This proportion of the gas, although destructive to plants, is hardly or not at all discoverable by the smell. The effects of other irritant gases, such as hydrochloric and nitric acid, on the leaves of plants were also well marked. The former destroyed the whole vegetation of a plant of considerable size in less than two days, even when diluted with 10,000 parts of air.

Acid gases attack first the tips of the leaves and then extend to the stalks, and it is found that when the quantity is not great the parts not attacked generally survive, if the plants are removed into the air. Narcotic gases act very differently. Thus, Drs Turner and Christison found that $4\frac{1}{2}$ cubic inches of sulphuretted hydrogen in 80 volumes of air, in the course of 24 hours, caused several of the leaves of a plant to hang down perpendicularly from their stalks in a flaccid state, without injuring their colour; and though the plant was then removed into the air, the whole stem soon began to droop, and the plant died. When 6 cubic inches of the gas were mixed with 60 times their volume of air, the leaves began to be affected in 10 hours; they became quite flaccid, but did not appear changed in colour. When the leaves had once drooped the plants did not in any instance recover when removed into the air.

The effects produced by ammonia, cyanogen, carbonic oxide, and common coal gas, are in many respects similar to those now described, viz., a drooping of the leaves without alteration of colour, and the death of the plant even though removed into the air. The phenomena, when compared with what was observed in the instances of sulphurous and hydrochloric acid, would appear to establish, in relation to vegetable life, a distinction among the poisonous gases nearly equivalent to the difference existing between the effects of the irritant and narcotic poisons on animals. The gases which rank as irritants in relation to animals seem to act locally on vegetables, destroying first the parts least supplied with moisture. The narcotic gases, including under that term those which act on the nervous system of animals, destroy vegetable life by attacking it throughout the whole plant at once—the former probably only abstracting the moisture of the leaves, the latter acting by some unknown influence on their vitality.

The experiments just detailed show the importance of attending to the nature of the atmosphere in which plants grow. The blighting effects of the air of large cities are owing to the gases contained in the smoke, and unless means are taken for guarding against these, it is not to be expected that town vegetation can be luxuriant. The common gas used in houses is also prejudicial to vigorous growth, and this combined with the dry atmosphere of rooms is the cause of plants not succeeding well in private dwellings. The transpiration from the leaves in such circumstance is very great, and it is impossible to make the roots take up sufficient moisture to supply the loss. Hence the leaves fall off and the plants become sickly.

With the view of enabling plants to grow in the atmosphere of towns, notwithstanding the fuliginous matter and gases with which it is loaded, Mr N. B. Ward invented closely-glazed Cases, in which he succeeded in cultivating tender plants, even in one of the most populous and smoky localities of London. One of these Cases is represented in Figure 143. It consists of a strong box or trough, a, made

of well-seasoned wood, containing earth. The bottom of Botany.

the box is covered to a moderate depth with gravel and broken bricks, over which the soil is spread, composed of fibrous loam, sand, and peat. The nature of the soil may be varied according circumstances, and the box may be divided into compartments containing soils of different kinds. The soil is well watered, and the superfluous wa-



ter is allowed to run A Wardian Case, made by Messrs Drummond and freely from two holes Son, Canonmills, Edinburgh.

in the bottom of the box. After draining fully, the holes are tightly closed with corks, and the glazed roof or cover, b, is fitted on carefully in a groove round the upper part of the box. This glazed cover may be formed in various ways. It is frequently made of zinc, with large panes of glass, the upper one being curved.

Plants in these Cases are enabled to stand great changes of temperature without being injured, and they are protected from noxious matters in the atmosphere, besides having always sufficient moisture. Ferns and Lycopodiums, in an especial manner, succeed in such Cases. Those ferns which require much moisture and shade, such as Trichomanes radicans, can be grown successfully. The atmosphere, however, can be varied as regards moisture and dryness, and thus can be suited to different tribes of plants. The cases are well fitted for rooms or dwelling-houses, inasmuch as they prevent the excessive exhalation which so generally injures plants grown in these circumstances. The Cases have been applied most successfully to the transport of living plants, and many valuable productions have thus been introduced into different countries.

5. Coloration of Leaves.

The green colour of leaves depends on the production of chlorophyll, which is only developed under the agency of light. The leaves in the young bud are of a pale yellowish hue, and assume their green tint in proportion as they are exposed to light. The change of colour takes place more or less rapidly, according to the intensity of the light. The leaves of French Beans, which sprung white out of the earth, were observed by Senebier to become green in one hour under exposure to very bright sunshine. Plants, when grown in darkness, have pale leaves, which become green on exposure to light. It is said that an etiolated plant, when exposed to light, becomes green at the end of twentyfour hours, even under water. Diffuse daylight, and even the light of lamps, will cause a green coloration, but the intensity of the colour is much less than in full sunshine.

Experiments have been made in regard to the effects of the different rays of the spectrum in the production of the green colour of leaves. Senebier ascribed it to the violet rays, and Ritter and Wollaston to the chemical or tithonic rays, which are next the violet. Hunt thinks that the blue rays are the most active in this respect, while Morren, Daubeny, Draper, and Gardner, say that the yellow rays, or those having the greatest illuminating power, have the greatest effect in producing chlorophyll, as well as in deoxidation. The subject requires further elucidation.

In temperate climates the leaves during the period of

Botany. their diminished activity exhibit changes of colour which its natural state, but when it is in darkness, as well as when Botany. give rise to the yellow, brown, and red autumnal tints. These colours seem to depend on different states of oxidation in the chlorophyll. Hunt thinks that the brown colouring of the autumnal leaves is due to the rays called by Herschel parathermic, which can scarcely be said to have a defined place amid the calorific radiations, but which are usually most strongly manifested in the red rays. A slight tint of green was found to stop these parathermic rays, and on that account glass stained green with oxide of copper has been used in glazing the Palm-House at Kew.

Variegation in leaves is produced either by an alteration in the green chromule or chlorophyll, or by the presence of air in certain foliar cells. Sometimes a single group of cells contains the yellow product of the decomposition of the chlorophyll, as in Phalaris arundinacea picta, a variety which appears in a dry soil, and disappears in a wet one; or as in variegated varieties of Holly. At other times the epidermis separates itself from the cells lying under it in particular places, and the layer of air lying between these appears like a bright silvery spot, as in Begonia argyrostigma and Carduus Marianus. Treviranus states that in Monocotyledons the variegations form bands parallel to the veins; in Dicotyledons, such as Carduus Marianus, the white is produced in the veins, while in such as Aucuba japonica, the yellow spots are distributed without order. He states also that variegation is sometimes visible on the upper surface of the leaves, and not on the under. Variegation, according to Morren, has its seat deeper in the leaf than what is called spotting. The latter is confined to the cuticle or skin, while the former extends to the parenchyma or cellular tissue below.

6. Irritability and Contractility of Leaves.

Certain leaves display evident movements under the influence of light, heat, and a stimulus either of a mechanical or chemical nature. The effects of light and darkness are frequently very marked in causing the elevation and depression of leaf-stalks, and the expansion and folding of leaves. The changes which take place in leaves during darkness were included by Linnæus under what he called the sleep of plants. During darkness leaves often hang down, and, in the case of compound leaves, there is also a folding of the leaflets, either in an upward direction, as in the sensitive Mimosas, or downwards, as in Tephrosia caribæa.

Very obvious movements occur in the leaves of many species belonging to the natural orders Leguminosæ, Oxalidaceæ, and Droseraceæ. Among Leguminous plants may be noticed species of Mimosa, Robinia, Æschynomene, Smithia, Desmanthus, and Neptunia; in the family of Oxalidaceæ, many species of Oxalis exhibit a certain degree of irritability, but it is chiefly observed in the pinnate-leaved Biophytum sensitivum; while among Droseraceæ the leaves of Dionæa muscipula have a remarkable irritability, and those of the species of Drosera also exhibit traces of it. In some plants the movements are most marked in the young state. The movements exhibited by the leaves of plants may be divided into-1. Those which depend upon the periodical returns of day and night; 2. Those, which, besides being influenced by light and darkness, are also occasioned by any external or chemical agency; 3. Those independent, to a certain extent, of external influences.

In Mimosa pudica and sensitiva, which usually receive the name of Sensitive plants, the motions of the leaves are very conspicuous. They are influenced by light and darkness, and they are exhibited on the slightest touch. In these plants the leaf, as represented in Figure 144, is a compound bipinnate one, having four partial leaf-stalks proceeding from a common petiole. The small pinnules or leaflets are expanded horizontally when the plant is in the light and in

the leaves are touched or irritated, the pinnules fold upwards, so as to bring their upper surfaces into contact, and at length the petiole is depressed, so that the entire leaf falls down. When the whole leaves are thus folded and depressed the plant appears as if it were withered and dead. When light is introduced, or when the irritation is removed. the leaflets gradually unfold, and the leaf-stalk rises. In the ordinary state of the plant these motions go on daily. If two of the leaf-



Fig. 144. Branch and leaves of Sensitive plant (Mimosa pudica), showing the petiole in its erect state, a, and in its depressed state, b; also the leaflets closed, o, and the leaflets expanded, d.

lets at the extremity are touched, or are irritated by heat from a lens, or by electricity, without agitating other parts, they fold upwards, and a similar movement takes place in the adjoining leaflets in regular succession from the apex to the base of the petiole. The irritation is also communicated to the neighbouring partial petiole, the leaflets of which fold in a reverse order, namely, from base to apex. The movement may be propagated until the partial petioles converge and fall down; and, finally, the general leaf-stalk is depressed. If the lower leaflets are first irritated, the foldings take place from the base to the apex of the petiole; if the middle leaflets are touched then the foldings occur on each side. The stem itself seems not to be directly concerned in the motions. It may be injured in various ways without causing contractions to take place. A section may be made of it with a leaf attached, and yet the leaflets may remain expanded. Artificial light from six lamps, according to De Candolle, caused the expansion of the leaves; and Zantedeschi states that the lunar rays also affect the motions.

The action of the wind, or any general agitation, causes the simultaneous folding and depression of the leaves; but the quick repetition of an irritation exhausts the sensitiveness towards it. It appears that the plants may become accustomed to a weak stimulus. The more vigorous the plant, and the higher the temperature to which it is exposed, the more sensitive it is. The leaf of the Mimosa is sensitive of various kinds of stimuli, such as shaking, wounding, burning, contact of irritating fluids, electric and galvanic shocks. Many chemical stimuli cause the leaves to fold. Thus the vapours of prussic acid, of chloroform, and of ether,



Fig. 146. Fig. 145. Leaves of Venus's Fly-trap (Dionæa muscipula), which exhibit evident irritability. The leaf consists of two parts, a lamina or blade \(\), and a petiole or leaf-stalk, \(p \). The two halves of the blade are anited by a sort of hinge, \(a \), and there are on each of them three hairs, which, when touched, cause the folding of the laminæ in the way represented at \(\) and \(b \).

146. A portion of the branch and leaf of the moving plant of India (Bedysarum or Desmodium gyrans). The leaf is impari-pinnate, and often pinnately, trifoliolate. The large leaflet or pinna, \(a \), the smaller leaflets, \(b \), of which there are either one or two pairs.

are found to produce this effect; and in such cases the irri-

Botany. tability of the leaves is either destroyed, or, at all events, a considerable period elapses before it is restored.

The Yellow-water Sensitive plant (Neptunia plena), found in the East and West Indies and in South America, exhibits irritability in its petioles and leaflets. The leaves of Venus's Fly-trap (Dionæa muscipula), an American marsh plant, are provided with a jointed blade (Fig. 145), on each half of which are placed three hairs, with swellings at their base. When these hairs are touched or irritated in any way, the two halves of the leaves close. Flies and other insects are often found inclosed in the leaf, and hence the name given to the plant. It is said that the Sundews (Drosera) of our marshes also exhibit a certain degree of contractility, but this has not been distinctly proved. Their leaves (Fig. 107) are provided with viscid glandular hairs, to which insects are often found adherent, while the leaves are partially folded.

In the case of Hedysarum (Desmodium) gyrans, a native of the East Indies, the phenomena of leaf-motions are very remarkable. The leaf, as represented in Figure 146, is unequally pinnate, having a large leaflet or pinna α , at the extremity of the stalk, and two pairs of small pinnæ b, placed laterally. The large leaflet exhibits oscillatory lateral movements, as well as the ordinary sleep movements, in an upward and downward direction. During the day it rises and appears to have slow motion from one side to the other, so that it often is seen in an oblique position as regards the stalk; during the night it is depressed and motionless. The little pinnæ, on the other hand, constantly exhibit a jerking motion, by which they first approach to each other, and then retire, the length of time required to complete their movements being about three minutes when the plant is vigorous and exposed to bright light. The leaflets exhibit motions even in darkness, although to a less extent. Other species of Hedysarum exhibit similar movements.

The cause of these phenomena is obscure. Some have supposed that they are to be ascribed to the presence of a peculiar nervous system in plants. But there is no evidence of the existence of such a system, and the motions do not require that we should have recourse to such a theoretical explanation. All may be accounted for by changes in the contents of the cells. In the case of the sensitive Mimosas, there are evident cellular swellings at the base of the small leaflets, as well as the base of the petioles. These swellings, when touched directly, communicate motion to the leaves. They consist apparently of two kinds of cells, some of which display contractility, and others distensibility. When in their ordinary state these functions are balanced; but when mechanical or chemical stimuli are applied, a change in the cell-contents takes place, accompanied with a derangement of equilibrium. When the swellings at the base of the leaflets are touched gently on the superior surface, then the liquid contents of the upper contractile cells are sent into the distensible inferior ones, and the leaflets fold upwards. This change, however, is not effected by touching cautiously the lower surface of the swellings. Again, in the swelling at the base of the petiole, the reverse is the case, for there the lower cells are contractile, and the upper distensible, and the movement caused is in a downward direction. Touching the upper side of the intumescence at the base of the petioles does not give rise to the movement. If a portion of the lower side of the swelling is removed, then the balance between its resistance and the expansive tendency of the cells on the upper side is destroyed, and the petioles remain depressed. Any irritation applied to one part of the leaf is propagated by means of the vascular system to another part, and more especially it is communicated to the distensible portion of the cellular swellings just mentioned.

In the daytime, and under the influence of light, according to Fée, the fluids drawn to the surface of the plant are kept in equilibrium by rhythmical evaporation. There

is a constant renewal of fluids to supply those which have Botany. been transpired. A blow or wound, or the application of cold, interrupts the equilibrium, the circulation is deranged, and liquids pass quickly from the cells into the vessels, and thus cause distension. During the night the sap is feebly drawn to the surface, and thus a change takes place in the relative contents of the different cells and vessels. The phenomena are thus referred to changes in the fluid contents of the cells and vessels caused by certain vital actions. Mohl refers the movements partly to the distension of the cells, and partly to different states of tension in the tissues, and he considers the movement of irritability as not identical with the sleep movement. He says that the articulations are composed of numerous parenchymatous cells containing chlorophyll, each also exhibiting in its interior a larger or smaller globular mass of a substance strongly refracting light. The parenchymatous tissue, he says, exhibits a considerable distension. If a flat portion is cut longitudinally out of the middle of the joint, and afterwards this portion is cut lengthways into thin strips, the cellular tissue forming the sides of the strips immediately expands about one-fifth longitudinally, while the vascular bundle in the middle continues as before. Hence, he says, the vascular bundle appears to be too short in proportion to the turgescent mass of cellular tissue of the articulation, while the latter is compressed in the direction of the longitudinal axis in the uninjured part. In the ordinary state of the plant, the expansion of the cellular tissue of the upper side of the articulation maintains the equilibrium with the cellular tissue forming the under side, and thus curvation is prevented. But if the cellular tissue is cut away down to the central vascular bundle on the upper side of the articulation of a leaf still attached to the plant, the cellular tissue of the lower side having now lost its antagonist can pursue its expansion, and the leaf becomes at once pressed upwards at a sharp angle—the reverse occurring when the cellular tissue of the under side is removed.

In the case of Hedysarum gyrans and other species, the movements are probably referable to changes in the contents of the cells and vessels, not directly induced by mechanical irritation, and only partially influenced by the stimulus of light and heat. In Venus's Fly-trap (Dionæa muscipula) the irritation of the hairs is apparently communicated by means of vessels to the cells between the two halves of the leaf-blades, in such a way that distension takes place in the lower cells, and thus the leaves close. The object of these various movements is not known.

7. Defoliation, or the Fall of the Leaf.

Leaves continue to perform their active functions for a certain length of time, and are then replaced by others. In temperate climates these functions go on vigorously during spring and summer, but towards the end of autumn they become languid. In the ordinary trees of this country the leaves fall off during winter, a latent bud having originated in their axil whence new leaves arise in spring. In warm climates the dry season often causes a similar exuviation of the leaves. This is observed in the Brazilian forests called The times of the appearance and of the fall of the leaves vary in different countries, and from them may be deduced conclusions as to the nature of the seasons.

The fall of the leaf has not received the attention it deserves from physiologists. The reason frequently given for this phenomenon is the choking up of the cells and vessels of the leaf by deposit of earthy and saline matters, in consequence of the process of absorption in autumn not keep ing pace with the exhalation of watery fluid. There is no doubt that mineral substances do accumulate in the leaves in autumn, but there seems to be no proof that this is the sole cause of their fall. When autumn approaches, it

Botany. is found that a gradual separation takes place between the leaf-stalk and the stem or the axis to which it is attached. This is not a mere accidental occurrence, but is a process for which regular provision is made. According to Inman a process of disjunction goes on from the time the leafstalk is fully formed until the leaf has ceased to perform its

> In cold climates various causes operate in causing defoliation. As the light and heat diminish there is a cessation of the functions of cells and vessels, evaporation takes place from the surface, inorganic matters accumulate in the tissues, the leaf becomes dry, its attachment to the stem is loosened. and then it either falls by its own weight, or is detached by external agencies of different kinds. Dr Fleming states, that winter is not the immediate cause of defoliation. Many leaves fall before the approach of winter, others perish in spring. He divides trees in reference to the duration of their leaves into three classes:—1. Those in which the leaves cease to perform their functions when the bud is complete. 2. Those in which the leaves continue to perform their functions until new ones appear the following season. 3. Those in which the leaves continue to perform their functions for several years.

> The leaves of the first class are Deciduous, and they seem to be connected with the ripening of the bud. When this takes place, these leaves change their colour and perish. In Willows, even in midsummer, many of the branches become naked from the fall of such leaves. In trees having two evolutions of buds in the season, as the Beech, the leaves produced in spring fall sooner than those which are developed on the summer shoots. Leaves of the second class Dr Fleming calls Annual. These continue till new leaves are produced, and are cast off in the order of their development. In Evergreen trees and shrubs the leaves of one season continue their functions until those of the next season are produced. The leaves of the third class Dr Fleming calls Persistent. Their duration, does not seem to be regulated by the perfection of the bud, nor by the development of new leaves. They continue their functions for several years. This is the case with ordinary Evergreen Firs. In these plants the leaves of various years seem to be required for the complete formation of the stem and its secretions. On the same tree, may be seen leaves two, three, or more years old.

> The sap absorbed by the roots, and which contains various inorganic matters in solution, reaches the leaves, and is thus exposed to air and light. There is a large transpiration of watery fluid, and the inorganic matters not required for the organism and secretions of the plant are stored up in the leaves, forming at times incrustations on the walls of the cells. The quantity of ash left after burning leaves varies at different periods of the plant's growth. Vernal leaves contain a small amount of ash, while autumnal ones leave a large quantity when burned. The latter contain from 10 to 30 times more ashes than the wood of the same plant.

V .- GENERAL CIRCULATION OR MOVEMENT OF THE SAP.

Plants are not provided with a circulating system like that of animals, and they do not exhibit movements of fluids to and from a common centre. Liquids are diffused throughout the whole plant by the action of cells and vessels having a different chemical constitution and different functions. One cell takes the juice from another, and acts by diffusion on the others. The cells of the rootlets imbibe by endosmose fluid matters which are carried into the stem, and the cells of the leaves, by their exhaling functions, aid in promoting a general movement of sap throughout the whole

It is not easy to make experiments on the motion and course of the sap, both on account of the minuteness of the

vegetable tissues, and the unavoidable injury which must Botany. be inflicted on them in any attempt to observe these living ' actions under the microscope. We cannot, as in animals, put ligatures on vessels, nor by an injecting apparatus send coloured matters into them. Endeavours, however, have been made to trace the course of the sap by causing the roots to absorb solutions of substances which can be easily detected by chemical reagents at different parts of their progress. Thus a weak solution of acetate of lead has been employed, which can be detected by iodine, sulphuretted hydrogen, and other tests; also a solution of ferrocyanuret of potassium, which can be tested by chloride of iron, or by sulphate of the peroxide of iron. The last has been used recently by Hoffmann in his experiments, and he finds the blue colour produced by the action of salts of iron on the ferrocyanuret a good means of tracing the course of the sap. As the Prussian blue thus formed is insoluble in water, a little care in dissecting enables us to avoid the spreading of the colour to unaffected parts.

It may be remarked in general, in regard to these experiments, that very different results followed, according as the absorption took place by the uninjured roots, or by the cut surfaces of plants. In the latter instance, the fluids were found in vessels which they did not enter in the former case. In cellular plants the sap seems to move through all parts, and is not confined to any definite set of cells. In vascular plants it appears in general that the sap enters the cells and woody vessels (and perhaps the intercellular spaces); and that the spiral vessels and those allied to them, such as annular and scalariform vessels, very generally contain air when the sap enters slowly. But when there is a rapid movement of sap either from the root upwards or from the leaves downwards, especially in Dicotyledons, then the spiral vessels take up fluids as well as air. It seems probable that the spiral vessels and their allies are receptacles for gaseous matter formed in the course of the movement

In truly cellular plants, as Fungi, the course of the circulation has no accurately fixed boundaries, and presents no anatomical peculiarities. The fluid is found to proceed both forwards and laterally in the cells and intercellular spaces, proceeding most rapidly in those parts where the tissue is most lax. In plants such as Lichens, where the tissue is dense, and in which there is not much fluid, the sap passes with great slowness between and through the cells. In the case of mosses possessing leaves, the fluid was found to pass through the stem and fruit-stalk, and in the leaves it moved most rapidly in a peculiar layer of cells along their margin and not in the midrib. Probably the condensed cells and vessels of the midrib are concerned in the conduction of fluids from the leaves in a downward

In Ferns it was observed that the scalariform vessels and closed spirals contained air, and that they did not take up any of the solution of the ferrocyanide. If the petiole of the frond is cut across and inserted in the solution, then the latter passes into the scalariform vessels, driving out the air. The leaf of the Fern, when dipped in the liquid, absorbs it, but it does not pass into the scalariform vessels. In Ferns there did not appear to Hoffmann to be any path for descending juices, and this is probably connected with their mode of growth, which is by additions to their summit (acrogens). The streaked vessels in Ferns seem to be destined exclusively for gaseous matters, while the fluids absorbed from the earth first ascend within the loose cellular tissue in the vicinity of those vessels, and are from them diffused throughout the remainder of the tissues after suitable elaboration. In Monocotyledons the solution of the ferrocyanide ascended chiefly through the elongated cells surrounding the spiral vessels, and the latter contained, in ordinary circumstances, air in their interior.

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In regard to the course of the sap in Dicotyledons, numerous experiments have been made. Walker, Burnett, and others made incisions into the bark and wood of trees in spring and summer, and marked the points where the sap made its appearance. In this way they endeavoured to trace the course of the fluids in the stem. Walker concludes, from his experiments, that the spring sap begins to flow at the root, that it ascends slowly upwards, and bleeds successively as it ascends to the very extremity of the tree; that there is no descent of sap until after the development of the leaves. Burnett cut notches in the trunks of various trees in spring, at different heights in each tree, from one to six feet from the ground; and in every instance the sap was seen distinctly exuding from the lowest side of the lowest section first, and progressively rising to the others day by day. The chief current was axial in the first instance, and afterwards the sap entered the branches. To the progress of the sap in the direction of the axis he attributes the early develop-ment and vigour of terminal buds. Mohl states that when a ring of bark is taken off, the flow of sap to the parts above it is not interrupted; but if a portion of the wood is carefully removed without injury to the bark covering it, then the portion of the plant above the wound dries up at once.

Hoffmann bored holes in the stems of trees, such as the Sycamore, and inserted quills with the inner ends cut off obliquely, and the orifices looking upwards—the quills being cemented in their place. He made experiments with the spring sap, by inserting the roots of plants in a solution of the ferrocyanuret of potassium, and testing the fluid at different heights as it was discharged in drops from the quills. He found that the exudation of the sap in spring occurred obviously earlier in the lower than in the upper part of the stem, and that the ascent of the fluid was confined to that side of the stem which corresponded to the absorbing root.

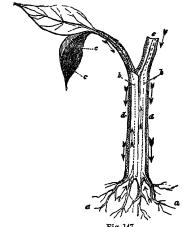
In spring, it appears that the sap, as it increases in quantity, besides filling the cells and vessels of the wood, also enters the spiral vessels. This is the time when the plant bleeds freely on being wounded. As the leaves expand, transpiration of fluids takes place, and then the spiral vessels contain air. In some climbing plants, this state of fulness in the spirals, as well as in the wood, continues permanently. After the leaves expand, in ordinary trees the conduction of sap takes place through the newer woody vessels and cells, and not through the fibro-vascular tissue. The circulation of the sap during summer, when the leaves are most active, differs from that in spring, in the circumstance that the trees do not bleed when wounded. In summer, as in spring, there exists a rapid ascent of crude sap; but in addition to this, there is a descent of the elaborated fluids from the leaves to all parts of the plant. Hoffmann states that there is also a descent of unelaborated fluids after every shower of rain.

Some authors believe that the chief channels by which the sap ascends are the intercellular canals, which are more or less continuous from one end of the plant to the other, and that from them it passes to the other parts, each cell and vessel taking from the general circulation what is required for its growth and nutrition. In this view the cells and vessels would be regarded as secreting organs, acting in various ways on the general mass of crude sap, and separating from it by a chemico-vital action different liquid and gaseous matters. The recent experiments of Hoffmann do not support this theory of sap movement, and the general opinion of physiologists appears to be that in its upward progress the sap passes through the newer pleurenchyma, as well as through the intercellular spaces, until it reaches the leaves, where it is elaborated. The different layers of wood convey sap in different quantity, the youngest being those chiefly concerned in the process. The conveyance of sap is not carried on by the old layers of wood when they become hardened by deposits. Hence trees with a large amount of hard wood, and a moderate quantity of sap wood, dry readily,

while trees, like the Birch, with a large quantity of alburnum, have sap movements even in the central layers of wood.

While such is the way in which the sap of Dicotyledons ascends, it is not easy to trace the mode of its after-diffusion. The usual opinion is, that after undergoing changes in the leaves and other green organs, it descends in the direction of the bark, and is thence conveyed to all the active cells and vessels of the stem. Experiments similar to those already detailed were made by Walker and Burnett as to the descent of the sap. When incisions were made in the bark, after the sap had reached the leaves, it was found that the upper portion of the cut was first moistened apparently by liquid from the upper part of the stem. If a complete ring of bark is cut off, then the growth of the portion below the wound ceases, the thickness of the stem is not increased, and, in the case of the potato, according to Mohl, no tubers are formed. At the same time the part of the stem above the wound increases much, and, in the case of trees, a thick layer of wood is formed. It would thus appear that there is a descent of elaborated sap from the leaves towards the bark, and that from this it is diffused through the rest of the tissue. Rainey thinks that the descent is through the vessels, and not the cells nor intercellular spaces; and Schultz considers the laticiferous vessels as those through which the elaborated sap descends.

Thus, as represented generally in Figure 147, the sap in



Ideal section of the stem of a Dicotyledon, showing the general course of the sap, as indicated by the arrows. The roots, a, absorb liquids, which pass through the newer pleurenchyma and intercellular spaces, b, reach the leaves, c, c, and after elaboration descend towards the outer part of the trunk, d, whence they are diffused in various directions; c marks the section of a branch.

a Dicotyledonous tree describes a sort of circle not in determinate vessels, but by a definite path, through different parts of the plant; passing upwards from the roots, a a, through the newer woody tissue, bb, reaching the leaves, cc, and after elaboration descending towards the exterior of the trunk, d d, whence it is diffused in various directions, both internally and externally. An absorption of water, containing various matters in solution, is constantly going on through the extremities of the rootlets. This crude sap is carried forward through the cells, vessels, and intercellular passages, by a force which acts by propulsion. The stimulus of light, acting on the cellular tissue of the leaves, or on green stems when no leaves are present, enables these parts to elaborate the organic compounds which are necessary for vegetable nutrition. The leaf-action may be reckoned one of at traction or suction. The diffusion of the elaborated matters constitutes the descent of the sap. Gaseous matters are also carried up with the sap.

Various causes conspire in originating and keeping up the movement of the sap. During winter, when vegetation is arrested, the cells of perennial plants are filled with albuminous and starchy matters. The conversion of starch into

CHAPTER III.

REPRODUCTIVE ORGANS OF PLANTS.

Botany.

*Plate

CXXXV.

I.-ANATOMY OF THE REPRODUCTIVE ORGANS.

I.—REPRODUCTIVE ORGANS OF FLOWERING PLANTS.

The flower or Floral organs concerned in the production of seed, containing the young plant, are called Organs of Reproduction. In Dicotyledons and Monocotyledons they are usually obvious, and hence these plants are called Phænogamous or Phanerogamous (φαίνειν, to show, or φανερός, conspicuous, and γάμος, marriage), while in Acotyledons they are obscure, and hence the plants are called Cryptogamous (κρυπτός, concealed, and γάμος, marriage), the former being Flowering plants, the latter Flowerless.

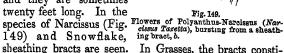
1. The Inflorescence.

This term designates the arrangement of the flowers on the flowering stem or branch. Flowers are produced from flower-buds, as leaves are from leaf-buds. These two kinds of buds have a resemblance to each other as regards the arrangement and the development of their parts; and it sometimes happens, from injury and other causes, that the part of the axis which, in ordinary cases, would produce a leaf-bud, gives origin to a flower-bud. It will be afterwards shown that. morphologically considered, the flower is to be looked upon as a shortened branch bearing parts analogous to leaves. The flower-bud contains either one or many flowers.

Bracts.—Like leaf-buds, the flower-buds arise either from the extremity of an axis, and are then terminal, or they are produced from the axil of leaves called Bracts. These bracts are sometimes like the ordinary leaves, as in many species of Speedwell, Periwinkle, and Pimpernel, where they bear single flowers, and in the common Bugle, Dead-nettle, and some species of Veronica, where they produce several flowers. They have the colour of leaves in such instances, and consist of cells and vessels, similarly arranged, in the form of parenchyma, ribs, and veins, with epidermis and stomata.

Bracts, however, in many plants, as regards colour, size.

and form, present a different appearance from leaves. In Amherstia nobilis, and in some species of Salvia, they are large, and of a fine scarlet colour, so as to give a marked character to the flowers. In Palms, and in species of Arum,* the bracts are large and sheath-ing, and are called Spathes; they inclose numerous flowers, supported on a common succulent stalk, called a Spadix. In some South American Palms, such spathes inclose upwards of 200,000 flowers, and they are sometimes



sheathing bracts are seen. In Grasses, the bracts constituting the outer covering of the spikelets of flowers are called Glumes (Fig. 150, gl).

In the case of numerous flowers on a common stalk, the bracts are often numerous also, and are arranged in a whorl or *Involucre*, as it is called. An assemblage of involucral bracts, called phyllaries, is seen in composite flowers, such as *Plate the Daisy, Dandelion,* and Marigold (Fig. 151), and in CXXIV. Umbelliferous plants, such as Hemlock.* In some Umbelli-*Pl. CXX.

Botany. sugar in spring will at once determine an endosmotic action in the cells. The cells of the root, with their delicate walls, allow the fluids from the roots to pass readily by imbibition. A physico-chemical endosmotic action takes place, by which the fluid is propelled upwards. As the sap is constantly parting with its fluid contents, more especially when it reaches the leaves, the fluid in the upper cells is thickened, and consequently the thinner fluid below passes in by endosmose. In addition to this, there are vital actions going on in the cells and vessels, which give rise to a constant in-

terchange of ingredients.

Schacht says the property which certain cells have of absorbing and elaborating one substance more abundantly than another, produces an ascending and a descending current. It is possible that each cell may direct the substances it holds in solution upwards, laterally, or downwards, according to the demands of the neighbouring cells. The current of sap will consequently be directed according to the wants and the degrees of vital activity of cells having different functions. The active processes of cell-formation going on at the extremity of the stem powerfully promote the ascent of nutritive juices. As the cambium of the vascular bundles extends from the extremity of the root to the apex of the stem, there is a constant transmission of fluids from cell to cell. As new cells are constantly formed at the extremity of the stem, by means of which azotized and other matters are consumed, there is a constant demand for a supply from below. exhalations going on in the leaves naturally give rise to a constant flow of fluids to supply the place of those which have been carried off. The capillary action of the intercellular canals may also aid in the movement, in proportion as watery fluid is removed from their extremities.

The various physical, chemical, and vital causes operating in the movement of the sap may be thus enumerated: Endosmose acting as a vis a tergo or propelling power,

and commencing in the cells of the root; chemico-vital actions causing changes in the contents of the cells and vessels; capillarity in the intercellular canals; and a vis a fronte or attracting power depending on the transpiration from the leaves. Heat and light materially promote the movement of the sap.

The force with which the sap ascends in the stem was measured by Hales by means of an apparatus such as is represented in Figure 148. A bent tube, f d b, was firmly attached to a stem, a, the top of which had been cut off, and the force of the sap was estimated by the rise of the mercury previously introduced into the tube, so as to fill the curvation between e and f. The force of the sap in one experiment was equal to 38 inches of mercury, which Hales states is nearly five times greater than the force of the blood in the crural artery of a horse, and seven times greater than the force of the blood in the crural artery of than the force of the blood in the crural artery of a does not find the crural artery of the blood in the same artery of a does not find the same artery of a does not find the carrier of a does not

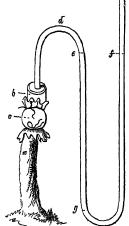


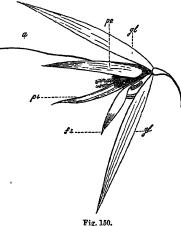
Fig. 148.

than the force of the blood in the same artery of a dog. Brucke found that in a Vine, the spring sap, having a specific gravity of 1 0008, raised a column of mercury to the height of $14\frac{1}{2}$ inches, and therefore exerted a pressure equal to that of a column of water 195 inches high. In another experiment sap of specific gravity 1.0009 raised the mercury to the height of 172 inches.

Rotany. feræ there are two rows of bracts in each head of flowers. -one, denominated the general involucre, at the base of the large umbel; the other the partial involucre, or involucel, at the base of the smaller umbels, or umbellules. *Pl.CXIX. In Fool's Parsley* (Æthusa Cynapium), the involucre consists of three deflexed leaflets. The bracts connected with the

flowers, in the catkins of the Poplar, of the Willow, the Walnut, and other amentiferous (catkin-bearing) plants, are called Scales.

Bracts sometimes fall off when the flowers expand; at other times they continue during flowering, and, in certain instances, they form part of the fruit. The cup (cupula) of the Acorn (Fig. 152, a), and the husk of



the Hazel-nut, are formed by bracts; So also are the flower. Spikelet of Oat (Avena satura) laid open, showing the bracts, gl, gl, which are denominated Glumes; pl, the outer pale or glumellule, with a dorsal amm, apl, pl, the inner pale; fs, an abortive flower.

scales of the Hop-fruit, of the Fir-cone, and of the Pine-

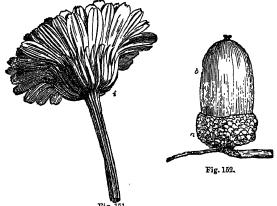


Fig. 151. Head (Capitulum) of Marigold (Calendula), showing a congeries of flowers, inclosed by rows of bracts or phyllaries, i, at the base, which are collectively called an Involucre.

152. Fruit of the Oak (Quercus pedunculata), showing a collection of bracts, a, forming the cup (cupula) of the acorn, b.

Bracts are said to be *empty* when they do not give origin to flowers. Thus, in Salvia Horminum, the top of the flowering axis ends in a series of coloured empty bracts, and in the Pine-apple plant the fruit is terminated by a crown of leaves, which are to be considered as empty bracts, terminating the axis. The outer row of scales in the involucre of some compound flowers consists of empty bracts, which occasionally produce buds, as in the case of the Hen-andchickens daisy. In Cruciferous plants, such as Wallflower, and in the Borage tribe, such as Forget-me-not, bracts are very rarely developed, and hence they are called ebracteated.

When an axis bearing numerous stalked flowers arises from a bract, there are sometimes smaller leaves, called Bractlets or Bracteoles, at the base of the small flowerstalks. When bracts or bractlets are placed, so as to be close to the outer envelope (calyx) of the flower, there is occasionally some difficulty in determining what parts are to be referred to each of these organs. In the Mallow tribe the outer calyx (epicalyx) seems to be of this nature. When bracts adhere to the flower-stalk and become decur-

rent, as in the Lime-tree (Fig. 153), they appear like Botany. winged branches, giving origin to the inflorescence.

Flower-stalk.—The axis bearing the flower or flowers is called the floral axis. It is a branch coming from a flower-bud. The term Peduncle is that usually given to a

stalk supporting a single flower, or numerous flowers, which are either sessile (applied closely to the peduncle) as in the catkin, or are placed on stalks called Pedicels. When the peduncle proceeds in a straight line from the base to the apex of the whole inflorescence, it is often called the Rachis, or axis of inflorescence. A peduncle arising from a stem, either subterranean or close to the ground, and bearing a solitary flower, as in the Primrose, or bearing nu-

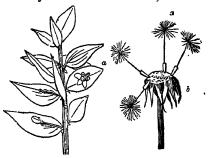


merous stalked (pedi-cellate) flowers, as in the Cowslip, Narcissus (Fig.

149), or numerous sessile flowers, as in the Daisy and Dandelion, is called a Scape or Radical peduncle. In the female flower of Vallisneria (Fig. 22, b), the scape is spiral, and uncoils, so as to allow the flowers to appear above the surface of the water in which the plant grows.

The peduncle is usually rounded like a branch, but this

is by no means its invariable form. Thus, in various species of Butcher's - broom (Fig. 154), and Epiphyllum, it is a broad leaf-like (phylloid) expansion. In the Cashew-nut* the pedicels supporting single flowers beshortened and



*Plate CXVI.

single flowers become succulent, and are used as food. When the peduncle bears numerous flowers, in place of being elongated, it sometimes is shortened and comes slightly convex.

thickened, especially at its apex, so as to form a broad flattened disk, as in the Thistle and Dandelion (Fig. 155), a conical projection, as in the Daisy, a concave surface, as in Dorstenia (Fig. 156), or a hollow fleshy pear-like body, as in the Fig (Fig. 157). The peduncle is transformed, in some instances, into tendrils or spines, at other times its apex is hollowed out, so as to form part of the calyx, as in Eschscholtzia,* or of the fruit, as in Hovenia. Flower-stalks, bearing hairs in place of flowers, occur in the Wig-tree (Fig. 158).

The arrangement of the flowers on the peduncle or floral axis exhibits considerable variety. The simplest kind of inflorescence (floral arrangement) is that in which single flowers are supported on flower-stalks, as is seen in the Gentianella, and in the common Periwinkle, the Pimpernel, and Fumitory. In these instances there is a difference in the

CXIII. fig. 7.

Botany. mode of floral development. In the Gentianella (Fig. 159) when the floral axis elongates, they form a raceme. If the Botany

F1g. 156.

Fig. 157.

Fig. 158.

the flower, b, with two leaves at its base, terminates the general or primary flowering axis, a; in the Fumitory (Fig. 160) the floral axis elongates,

producing leaves, while the flowers are borne on secondary axes or stalks, which are axillary and lateral. In the former case the axis is arrested in its growth, and the inflorescence is Definite or Determinate; in the latter the axis is progressive, and the inflorescence is Indefinite or Indeterminate. These plants illustrate, in their simplest forms, two marked forms of Inflorescence, which it is necessary to bring more fully under notice.

Indeterminate or Indefinite Inflorescence.—The simplest form of this inflorescence is that in which the flowers arise singly from the axil of ordinary leaves, which, in this instance, serve the purpose stance, serve the purpose of bracts, while the axis goes on elongating and bearing leaves at its apex. In place of a single flower, however, there are frequently several flowers produced on a floral axis in this kind of inflores-

cence; as is seen in some species of Speedwell, in which there arises from the axil of a bract a cluster of flowers expanding in an ascending series from below upwards. As the flowers in the indefinite inflorescence are produced like buds in the axils of leaves, they are denominated Axillary; and, when numerous, they follow the ordinary law of leaf development —the lowest (i. e., those next the primary axis), expanding first when the floral axis is elongated (Fig. 160), or the outermost when the axis is depressed or abbreviated (Fig. 151). The expansion of the flowers, in such cases, is denominated Centripetal, in consequence of proceeding in a progressive manner towards the centre or apex.

Axillary flowers, on elongated and shortened axes, present different forms of inflorescence, according as the flowers are stalked or sessile, the stalks simple or branched, and equal or unequal in length. When the primary floral axis (peduncle or rachis) lengthens and bears equally stalked (pedicellate) flowers, each originating from a bractlet, a Raceme is produced, as in the Hyacinth, Currant, and Fumitory (Fig. 160). In this instance, the lowest flowers, i.e., those next the primary axis, are first expanded, and the others follow in succession from base to apex. When the raceme has the lower flowers supported on longer stalks than the upper, in such a way that all form nearly a level top, as in the Hawthorn, and some species of Cerasus (Fig. 161), a Corymb is formed. In Cruciferous plants the flowers, when first produced, frequently appear as a corymb, and





Fig. 159. Fig. 160.

Fig. 159. Flowering stem of Gentianella (Gentiana acaulis). The plant produces a single flower, and it is called uniforal. The termination of the axis, n, bears two leaves or bracts. c. The flower, b, with its calyx and corolla, terminates the axis. This is the simplest form of definite inflorescence. If other axes are produced in such a case, they arise from the axil of the bracts, c. and the flowers expand after the central one, b, or in what is called a centrifugal manner.

Each axis ends in a solitary flower.

... 160. Peduncle or floral axis of Funitory (Fumaria officinalis), bearing numerous flowers (multifloral). Each flower is attached to the rachs or floral axis by a short stalk called a pedicel, arising from a small floral leaflet or bractlet.

primary axis of a raceme is shortened, so that the floral stalks all proceed from apparently the same point, form-

ing nearly equal radii, as in the Cowslip, an Umbel is produced. In the indefinite umbel, the outermost flowers, i.e. those of the circumference, expand first. The simple Raceme, Corymb, and Umbel, may become compound by the stalks of the flowers branching. In the case of the umbel, the branching takes place by the secondary stalks coming off from a point like radii of a circle, in the same way as the primary ones did (Fig. 162). When bractlets occur at the base of the primary stalks, or, in other words, at the base of the primary umbel, they are arranged in a whorled manner, and form an Involucre, and such is also the case with the bractlets at the base of the secondary flowerstalk or secondary umbel. The secondary, or partial umbels,

are called Umbellules, and the verticillate bractlets* receive the name of Involucel. In some instances, as in Fool's Parsley, there is no general involucre, but simply an involucel (Fig. 163, b b); while, in other cases, as in Fennel, neither involucre nor involu-



Fig. 161.

Simple indefinite corymb of a kind of Cherry (Cerasus Mahaleb). A multiforal peduncie, p, arises from a bract, and bears pedicellate flowers, the lower pedicels being longer than the upper, so that the flowers form nearly a flat surface above. The lowest flowers expand first, and hence the order is centripetal.

*PLCXX

Fig. 162.

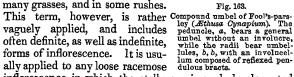
cel are developed.
Compound umbels are frequent in

Botany. *Plate

CXX.

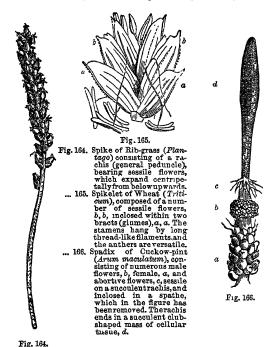
Umbelliferous plants, such as Hemlock, * Carrot, and Parsley.

In compound inflorescences there occurs a combination of these forms. Thus, the primary divisions may be racemose, or cofymbose, or umbellate, while the secondary are of a different nature. A raceme in which the secondary branches assume the form of a corymb, or a corymb in which the secondary branches are racemose, is called a Panicle, a form of inflorescence met with in many grasses, and in some rushes.



inflorescence in which the stalks are irregularly elongated and branched. When the panicle is shortened, as regards its secondary branches, and forms a compact cluster resembling a bunch of grapes, as in Lilac and Horse-chestnut, it is called a Thyrsus.

In the instances of inflorescence which we have noticed, the flowers are all supported on stalks either of the same or different lengths. When the flowers are sessile, i.e., without stalks, different forms of the indefinite inflorescence arise. A raceme, with sessile flowers, becomes a Spike, as in Plantago (Fig. 164). In grasses the flowers are arranged in small spikes called Spikelets (Locustæ), as seen



in Figure 165, and these spikelets are themselves arranged either in a panicled form, as in Oats, or in a spiked form as, in Wheat. The latter may be called a compound spike, consisting of a series of small spikes sessile on a common rachis. Occasionally, as in Egyptian wheat, several compound spikes proceed from the top of the stalk or culm. A Spadix is a succellent spike, inclosed in a sheathing bract called a Spathe, as in the Cuckow-pint* (Fig. 166), and Æthiopian Calla, where it is simple, and in Palms, where it is branching and compound. A Catkin, or Ament, is a

167), the Walnut, the Hazel, the Birch, the Poplar, and in many other trees which are hence called Amentiferous. Catkins bearing sterile flowers only, generally fall off early, and in one piece. Some restrict the term catkin to such deciduous forms of inflorescence; while others include also the fertile scalv spikes of Hazel, of Birch, and of Willow. The catkin is sometimes branching, i.e., produces numerous separate catkins on a common axis, as in the male flowers of the Fir. The Cone of the Pine, Spruce, Fir, and other cone-bearing plants, is a female spike of flowers with hard scales covering naked seeds, while the Strobilus of the Hop is a similar kind of spike with membranous

of the fruit.

spike having scaly bracts. It occurs in the Willow (Fig. Botany.



Fig. 167. scales covering seed-vessels. Catkin (Amentum) of Willow, bearsome of these modes of inflorescence determine the nature of the fruit.

Catkin (Amentum) of Willow, bearing male flowers, each of which arises from a scale (Squama), or, or, other words, a scaly bract. There are numerous flowers and bracts in the catkin.

In the Spike, the Spadix, and the Catkin, the floral axis is elongated. Other cases occur in which sessile flowers are produced on a shortened axis. The Head (Capitulum) is a congeries of sessile flowers, supported on a more or less flattened axis (receptacle), and expanding centripetally. In the American Button-bush the heads are globular, in some species of Teazel elliptical, while in Scabious, and in Composite plants, as Sunflower, Dandelion, Thistle, Burdock, and Marigold (Fig. 151), they are somewhat hemispherical, with a flattened, slightly hollowed, or convex disk. In the latter class of plants, besides the general bracteal envelope, called the involucre, there are frequently chaffy and setose bracts at the base of each flower. In Dorstenia (Fig. 156) the receptacle of the flowers varies from a flattened disk to one in which the edges are incurved and turned upwards. When this incurvation of the receptacle is complete, so as to form a hollow cavity bearing the flowers inside, the inflorescence is like that of the Fig (Fig. 157). By this mode of formation the flowers at the circumference are turned towards the apex, while the real centre remains next to the stem of the plant.

Determinate or Definite Inflorescence.—In this inflorescence, the flowers, in place of arising from axillary buds, are considered as represented by terminal buds, beyond which the axis does not extend. The simplest form is that in which a single floral axis is produced, terminated by a solitary flower, as in Gentianella (Fig. 159), with two opposite leaves, c, at the base of the inflorescence. When such an inflorescence branches, it is by the production of axillary buds, whence arise floral axes, terminated, as the first axis, by solitary flowers. The axes are thus arrested in their development, and do not grow in an indeterminate manner. This kind of inflorescence is very commonly associated with opposite leaves, but it occurs also in plants with alternate leaves, as Lint.*

If such a plant as Gentianella, with opposite leaves, produces additional flowers, it does so in a descending series, that is to say, the buds produced by each of the opposite leaves on the stem (Fig. 159, c), and bearing solitary flowers, expand after the flower terminating the primary axis, and successively later as we proceed downwards. Thus, the expansion of the flowers is centrifugal, i.e., farther and farther from the central terminal bud of the primary axis, and later as regards time. A racemose or spiked inflorescence of this kind would be at once distinguished by the upper flowers being first expanded, and not the lower, as in the indefinite

*Pl. CXV. fig. 2.

Botany. raceme and spike. The order in which the flowers expand determines the nature of the inflorescence. Attention must be paid to the axis terminating in a single flower, to the bract which it gives off laterally, and to the flower-bud produced between the bract and the axis.

When the different floral axes in the definite inflorescence come off close to each other, and are much shortened, there is often apparent confusion in the arrangement, and it is only by noticing the development of the flowers in the different clusters that we can pronounce on the nature of the inflorescence. The branched kind of definite inflorescence is seen in the *Cyme*. This is a corymbose inflorescence, more or less branched, forming a cluster of flowers, which is either flattened at the top, or has a rounded contour. It is illustrated in the Elder, the Hydrangea, and the Laurustinus. It appears like a combination of the umbel and corymb, but is known by its centrifugal floral expansion.

The mode in which the cyme is formed may be studied in the common Spearwort, and other species of Chickweed. In them, as shown in Figure 168, there is a solitary flower, a, which terminates the primary axis, and has two opposite leaves, b, at its base. Each of these leaves (bracts) gives origin to flower-buds, which form axes, c c, ending in solitary flowers. Each of these secondary axes in their turn bear opposite bracts, or leaflets capable in the same way of forming tertiary axes, with solitary flowers, and so on until the plant is exhausted, or the axes produced have no leafnodes. This division, by pairs of axes, forms a spreading, loose, dichotomous (dividing by pairs, δίχα, in two ways, and τομή, a section) cyme. If three whorled leaves develop axes, the cyme becomes trichotomous (dividing by threes). Sometimes the two bracts on the axis do not produce flower-buds, and then the primary axis, with its single flower, is alone present, with two empty bracts on the stalk, as seen in the Heart's-ease (Fig. 169, b) which produces a unifloral cyme.

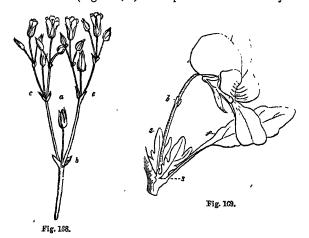


Fig. 168. Dichotomous cyme of Mouse-ear Chickweed (Cerastium). The primary floral axis ends in a solitary flower, a, which expands first. The axis bears two bracts, b, each of which gives origin to secondary axes, each ending in a solitary flower, and bearing two bracts, c, which in their turn give rise to unifioral tertiary bract-bearing axes, and so on. When there bracts are produced, and three axes, the cyme becomes Trichotomons. When the axes are much shortened, and the flowers are brought nearer to each other, the formation of the cyme is rendered obscure.

169. Unifioral cyme of the Pansy (Viola tricolor). The primary axis bears a single flower, and below it are two bracts, b, indicating the points where secondary axes would appear if present. The bracts are empty. The leaf is marked f, s s, stipules.

At other times the primary axis produces a solitary flower, and only one of the bracts developes a flower-bud, as in the common Bind-weed, in which we meet with bifloral cymes, and also unifloral cymes.

If the flower-buds on one side of a dichotomous cyme are the only ones developed, it becomes unilateral, and often turns round in a peculiar way, so as to resemble a snail, or the tail of a scorpion, and hence it is denominated helicoid

or scorpioid. The terms gyrate and circinate are also some- Potany. times applied. The same thing occurs also in alternateleaved plants, where each leaf or bract produces one flower, and a flower-bud which elongates into an axis between the first flower and the bract. In such cases the flowers seem to be placed opposite the leaves, and when the leaves dis-

appear, or are abortive, as in many of the Borage tribe, it is difficult to determine whether the inflorescence is a one-sided (unilateral) raceme, or a series of single-flowered axes, produced in a racemose manner. The appearance of the helicoid cyme is represented in Figure 170, in the case of the Forget-me-not; on the axis a leaf, c, gives origin to a flower-stalk, ending in a solitary flower, a; there are no bracts developed on this primary floral axis, but two racemose cymes, b b, are given off, each of which curls up in a circinate manner. These cymes are formed by a series of single-flowered axes, which are produced in a secund manner, i.e., only on one side. The

ner, i.e., only on one side. The theoretical formation of this inflorescence is given in Figure 171, where the primary floral axis, 1, ends in a solitary flower, and so do the other axes from 2 to 10. The small dotted lines indicate the points where floral leaves (bracts) occur. The expansion of the

flowers is centrifugal. The flower of axis 1 expands first;

Fig. 170.

this axis gives origin to a flower-bud forming axis 2; in its turn axis 2 expands its solitary flower, and gives rise to axis 3, and so on. Thus, the inflorescence is composed of a series of unifloral axes produced from each other, and not alternating to right and left, but always developed on one side, forming a broken line, which has a tendency to return upon itself. In the diagram ten unifloral axes are shown, each bearing a solitary flower. When the bracts are abortive, as in the

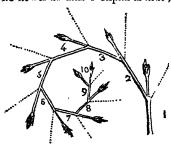


Fig. 171.

Fig. 171.

Diagram to illustrate the formation of a scorpioid cyme. The first axis, 1, ends in a solitary flower. On one side of this axis a node is produced, which gives rise to the secondary axis, 2, bearing a solitary flower, which is developed after 1. This axis in its turn produces a floral node, giving rise to a tertiary underal axis, 3, and 30 on, up to 10. At the same time the inflorescence becomes curved, as the development of the axes takes place on one side. The non-developed nodes are marked by dotted lines opposite the points whence the floral axes arise.

Borage tribe, the nature of the inflorescence is not detected at first sight. The formation of the different axes between the previously expanded flower and the bract, indicates the nature of the inflorescence. When the internodes of such a floral axis are shortened, and the bracts disappear, some anomalous inflorescences are produced, as in Solanaceæ.* The appearance of a peduncle opposite a leaf leads often to a correct conclusion in regard to the morphology of the inflorescence; in the same way as has been already noticed in the case of the tendrils of the Vine, which are leaf-buds producing separate axes, in a centrifugal manner.

*Plate

Botany.

In some kinds of cymose inflorescence the flowers are sessile on an elongated axis, forming a cymose spike; in other instances they are nearly sessile, and form a rounded head or short spike, called a Glomerulus, as seen in species

of nettle, and in the Box. Sometimes stalked flowers arise from the same part of the axis, in the form of a cluster, called a Fascicle, as a *Pl. CXIV. in the Mallow* (Fig. 172), and in species of Pink. In the case of Labiate plants, as Mint, and Deadnettle (Fig. 173), the flowers appear to be in whorls, but n reality they arise



in two clusters or fascicles, called Verticillasters, which are cymes bearing a few nearly sessile

flowers, expanding centrifugally. Each cluster is produced from one of the opposite leaves. What are properly called whorled flowers are seen in the Common Mare's-tail (Hippuris vulgaris), in which each leaf of the whorl produces a single flower.

Mixed Inflorescence.—There are certain kinds of inflorescence in which there is a combination of the definite and indefinite forms. These have been called Mixed. They are by no means uncommon in the Vegetable Kingdom, and they require to be studied carefully. In Composite plants, the branches bearing the heads of flowers (capitula) are often developed centrifugally, while in the individual heads the expansion is centripetal. The general inflorescence, in such a case, may be said to be definite, while the partial inflorescence is in-

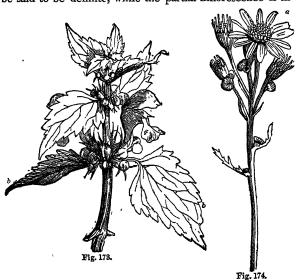


Fig. 173. Flowering stalk of the White Dead-nettle (Lamium album). The bracts, b, are like the ordinary leaves of the plant, and produce clusters of flowers in their axil. The clusters are called Verticallasters, and consist of flowers which are produced in a centrifugal manner, the central one expanding first. Hence the inflorescence is definite. The flowering stalk continues, however, to elongate in an indefinite manner.

is definite. The nowering stalk continues, now ever, to enoughe in an indefinite manner.

174. Flowering stalk of a kind of Groundsel (Senecio). The flowers are in heads (capitula), and open from the circumference inwards in an indefinite centripetal manner. The heads of flowers, on the other hand, taken collectively, expand centrif ugally—the central one, a, first. Each head of flowers terminates a separate axis. They form together a definite corymb. The inflorescence is called mixed.

definite. Thus, in Figure 174, the central head a, of flowers

is expanded, while the others are only partially so; the in- Botany. florescence is mixed, and the whole puts on the aspect of a corymbose cyme, with the flowers in each head centripetal. In Labiate plants (Fig. 173) the general inflorescence is centripetal, while the verticillasters are centrifugal.

The Flower and its Different Parts.

a. Symmetry and Morphology of the Flower.

The term Flower, in botanical language, is not confined to the mere showy parts in which the gay and brilliant hues reside, but embraces all the organs, however inconspicuous, which are concerned in the production of seed. These organs, or parts of the flower, must all be considered as modifications, or, as it may be more properly expressed, analogues of leaves. In their structure and arrangement they are similar to the foliar organs, and they follow the same laws

When a student, of development. therefore, has acquired a knowledge of the anatomy and arrangement of leaves, he is prepared to enter upon the consideration of the floral organs.

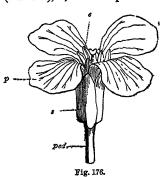
When the flower is complete it consists of four whorls (verticils), placed alternately within each other. The two alternately within each other. internal are the Stamens and Pistils, which are the essential organs of reproduction, and the two external are the Calyx and Corolla, constituting the floral envelopes, or protective coverings. In Figure 175, an ideal section of a complete flower is given, each whorl consisting of five parts, which are arranged alternately. In Figures 176 and 177 the

parts of the flower are represented; the calycine whorl (calyx), s, the corolline whorl (corolla), p, the staminal whorl (stamens), e, and the pistilline whorl (pistil), sti, being all



Fig. 175.

Diagram of a completely symmetrical flower, consisting of four whorls, each consisting of free parts. The outer row is the cally formed of five peats, the second is the corolla of five petals, alternating with the sepals; the third is the andrecolum, consisting of five stamens, alternating with the petals; the central whorl is the gynocium, consisting of five carpels, alternating with the petals; the central whorl is the gynocium, consisting of five carpels, alternating with the stamens. Fig. 175.



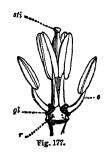


Fig. 176. Flower of Wallflower (Cheiranthus Cheiri). The stalk of the flower is called the pedunole, ped; the calyx, s, consists of four sepals; the corolla, p, is formed of four petals, arranged crosswise; the stamens, e, constitute the androecium or staminal whorl, and in the centre is the pistil.

17. The Essential organs of reproduction of Wallflower. The stamens, e, are tetradynamous, i.e. four long and two short, with glands, gl, at their base, and are inserted into the receptacle or torus, r; the pistil is in the centre, and the summit of it, or the stigma, is marked sti.

inserted into a common receptacle, r, which may be considered as the termination of the peduncle, ped, or flow. -

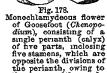
The Calyx is the outer covering (Fig. 176, s), formed of whorled leaves, called Sepals, which are generally of a greenish colour. The Corolla is the next covering, composed of whorled leaves, called Petals (Fig. 176, p), often showy, arranged alternately with the sepals. The calyx and the corolla are sometimes included under the common name of Perianth or Perigone ($\pi \epsilon \rho \iota$, around, $\ddot{a} \nu \theta o s$, flower, and youn, offspring), especially in cases where both are similar in appearance, as in the Tulip. A flower with a

Botany. single perianth (Fig. 178) has a calyx only, while one with a double perianth may be considered as having both calyx

and corolla. Some restrict the term perianth to cases where the envelope surrounds a staminiferous flower, while perigone is applied to the envelope of a flower having both stamens and pistil,

or a pistil only.

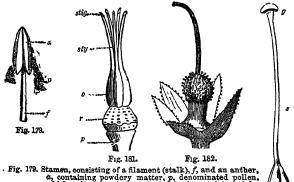
The Stamens (Fig. 177, e) are placed within the petals, with which they alternate. Each stamen consists of a peternate. Each stamen consists of a peculiar folded leaf, called the Anther Fig. 179, a), either sessile (unstalked), or supported on a stalk, denominated a Filament (Fig. 179, f), and containing powdery matter called Pollen (Fig. 179, p), which is discharged through ing powdery matter called Pollen (Fig. 179, p), which is discharged through



slits or holes. The whole staminal whorl, taken collectively, is styled the Andrœcium (ἀνηρ, male, and ὀικίον, habitation).

The Pistil is the central organ (Fig. 180), below and around which the other floral whorls are arranged. It consists of one or more folded leaves, called Carpels (καρπὸς fruit), either separate (Fig. 181), or combined (Fig. 180), and collectively forming the pistilline whorl, which is denominated the Gyncecium (γυνή, female, and οικίον, habitation). The parts distinguished in the pistil are the Ovary (Fig. 180, o), which is the lower portion inclosing the Ovules destined to become seeds, the Stigma (Fig. 180, g), a portion of the loose cellular tissue, uncovered by epidermis, which is either sessile on the apex of the ovary, as in the Poppy, or is separated from it by a prolonged portion called the Style (Fig. 180, s). The essential organs must be present, in order that seed may be produced, but the floral envelopes may be wanting, and still the reproductive functions may be performed. When both calyx and corolla are present, the flower is Dichlamydeous (δìs, twice, χλαμὺς, a covering), when the corolla is wanting, the flower is Monochlamydeous (µovos, one), and when both are wanting, it is Achlamydeous (a, privative).

All the organs of the flower are attached to the extremity of the flower-stalk, and the part on which they are situated has received the names of Thalamus, Torus, and Receptacle (Figs. 177, 180 r). The different organs are verticillate leaves, produced at nodes which are placed close to each other, without the intervention of marked internodes. Each organ forms one or more whorls, and the parts of each whorl are



. Fig. 179. Stamen, consisting of a filament (stalk), f, and an anther, a, containing powdery matter, p, denominated pollen, which is discharged through slits in the two lobes of the

which is discharged through shift in the Not Note of the overy, o, containing ovules, the style, s, and the capitate stigms, g. The pistil is placed on the receptacle, r, at the extremity of the peduncle.

181. The graceium (pistil) of Columbine (Aquilegia uniqueris), situated on the receptacle, r, which occupies the summit of the peduncle, p. The pistil consists of five carpels, each of which has an ovary, o, containing ovules, a style, Fig. 180. sty, and a stigms, stig.

182. Calva and pistil of Fraxinella (Dictamnus Frazinella). The pistil consists of several carpels, which are elevated on a stalk prolonged from the receptacle. The stalk is called Gynophore or Thecaphore.

placed alternately in relation to those of the whorls next it.

In certain instances the internodes are lengthened, and thus Botany. the different whorls are separated from each other, just as in verticillate leaves. Thus, in some plants of the Caper tribe, there is an enlarged, rounded, disk-like receptacle (anthophore, and popen, to bear), bearing the petals, from the centre of which arises a stalk or internode (androphore, aup, stamen), bearing the stamens, and finally, another lengthened internode (gynophore, ywn, pistil) bearing the pistil. In some cases the pistil is stipitate, or supported on a stalk which proceeds from the centre of the receptacle. This is seen in the Caper-plant, in the Passion-flower, in some of the Chickweed order, and in Fraxinella (Fig. 182).

In the Geranium, the part of the receptacle bearing the pistil is prolonged in the form of a long beak-like (rostrate) process, to which the styles are attached (Fig. 183, a). In

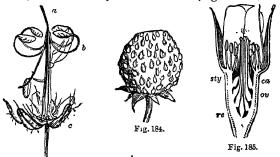


Fig. 183.

Fig. 183. The calvx and beak-like process of Geranium, with the parts of the pastl (the carpels) curled upwards, so as to scatter the seed; a, the extremity of the restrum or beak, whence the name crane's bill is derived); b, the carpels curled up by means of the styles which are attached to the beak; c, the calvx.

184. Fruit of the Strawberry (Fragaria vesca), consisting of an enlarged succulent prolongation of the receptacle, bearing on its surface numerous carpels, which are often erroneously called seeds. The calvx is seen at the lower part.

185. The fruit of the Rose cut vertically. The receptacle, rc, lines the interior of the calvx, ca, and the carpels with their ovaries, oz, and the styles, sty, are attached to it. The stamens and petals are seen at the upper part, attached to the calvx.

the Strawberry (Fig. 184) the receptacle, after giving origin to the calyx, corolla, and stamens, becomes enlarged and succulent, bearing the parts of the pistil on its surface, and constituting what is commonly called the fruit. The sacred Bean of India and of the Nile (Nelumbium), has a large topshaped (turbinate) receptacle inclosing the pistils. In the fruit of the Rose the portion of the receptacle (Fig. 185, re), bearing the parts of the pistilline whorl, ov, is adherent to the inner surface of the calyx, ca. In some monstrous specimens of Avens and Rose there is occasionally an unusual development of the central part of the receptacle, so that the pistilline leaves become arranged alternately on an axis which ends in an abortive flower-bud.

The leaves and the different parts of the flower are considered by botanists as homologous (δμόλογος, having an agreement). In other words, they are constructed on the same plan, and the forms which they assume depend on the nature of the functions which they are required to perform. Leaves being concerned in nutrition and in the assimilation of food, assume an arrangement and colour fitted for these purposes, and have all their parts developed in conformity with the functions allotted to them. The parts of the flower, on the other hand, are concerned in the function of reproduction, and in their structure and development are fitted for the office which they have to perform. The parts of the flower originate in the same way as the leaves, in the form of simple cellular projections from the axis. The appearances which they afterwards present depend on organogenic (organ-producing) laws of development—the arrangement of the cells and vessels, and their contents, being modified in each special organ.

The leaf is considered as the Type of all. This idea was started by Linnæus, and was afterwards more fully brought forward by Goethe. In speaking of the parts of the flower

Botany. as metamorphosed or modified leaves, it must not be supposed that we mean that these parts have, at any period of their existence, been true leaves. All that is implied in the statement is, that both are formed on the same general plan, that both are arranged upon the same principle, and that one law pervades their morphology. The cell from which the leaf is formed is no doubt very different as regards the organogenic law impressed upon it from the cell which gives rise to a sepal, a petal, a stamen, or a carpel. Nevertheless, when we examine the parts scientifically, we perceive certain homologies in form and structure belonging to the one set of organs which are represented in the other. This morphological view of the organs of the flower associates them with the leaves in a very interesting manner, and enables us to give a philosophical exposition of the harmonies subsisting between them.

In passing from leaves to flowers, there are certain intermediate organs called bracts, which are merely altered or modified leaves, producing flower-buds at the part where they emerge from the stem. From these we proceed to the flower-stalks, which are branches bearing flower-buds in place of leaf-buds. The outer whorl of the flower has generally more or less of the appearance and colour of leaves, and, in many instances, the leaflets produced on the flower-stalk pass by insensible gradations into sepals. Between sepals and petals there are transition forms, as seen in the White Water-Lily, the Magnolia, and many plants where the colour of both is similar. The petals, in their turn, sometimes become narrowed and altered, so as to pass into stamens, as in the White Water-Lily, where it is scarcely possible to say where the different whorls end. It is very rare to find the stamens passing into the pistil. In the case of monstrosities, however, produced by cultivation, the pistil undergoes such changes as to prove that it is formed on the same type as the rest. Occasionally all the parts of a flower, as in some monstrous specimens of Dutch Clover, are converted into leaves.

When sepals are changed into petals, petals into stamens, or the latter into carpels, the alterations are said to be in the ascending series, and it is called a case of ascending or progressive metamorphosis. By cultivation, and other causes, this series of phenomena is sometimes reversed. Thus, in the double cherry, the pistil is frequently altered, so as to appear in the form of one or more leaves (Fig. 186, a and b); and in double flowers the stamens are changed more or less completely into petals. In Figure 187 is exhibited

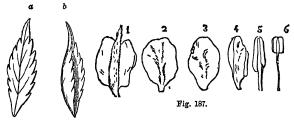


Fig. 186.

Fig. 186. The carpel of the double-flowering Cherry. In this plant the fruit is abortive, and in its place one or more leaves are produced. The carpellary leaf is either expanded, a, or folded, b. This shows that the fruit of the Cherry is formed on the same type as the leaf.
... 187. Transformations in the stamen of the Rose. The complete stamen, b, is altered gradually, passing through the states represented at 5, 4, and 3, until it becomes a complete petal, 2, and the petal at 1 begins to assume the appearance of a sepal, with a strongly-marked midrib prolonged beyond the apex.

the series of changes through which a stamen of the Rose passes, from the normal state, 6, until the complete petal, 2, is formed, and this, in its turn, becomes altered, as seen in 1, so as to resemble a coloured sepal, with a prominent and projecting midrib. In some cultivated flowers the petals assume a green colour, so as to resemble the calyx, which, in its turn, often appears like true leaves. This is called retrograde metamorphosis. In certain cases the

floral axis, in place of bearing flowers, produces whorls of Botany. leaves. The alteration in such instances is either complete, or there is a partial change of the organs, some of them remaining unaltered. It sometimes happens that, from the centre of the flower, a leaf-bearing axis is prolonged at the expense of the pistil. All these cases prove the general law of development in leaves and flowers to be in reality the same, and they point out the means of explaining many of the anomalous appearances presented by the flower.

The parts of the flower being thus considered as modified leaves, we naturally look for a similar mode of arrangement. As leaves are alternate, opposite, and verticillate, we may expect the parts of the flower to be arranged in the same manner. We might conceive a flower, as in the ideal representation in Figure 188, to be formed of a sepal, c, a petal, p, a stamen, s, and a pistil, f; each of the parts alternating with that next to it, and separated by an internode, and all arising from a single bract, b. In plants such as Hippuris, with one stamen, and one pistil, and an abortive calyx, such may be reckoned the tendency, although, from non-development of certain parts, the flower becomes incomplete. We generally find that the parts of the flower are arranged in twos, threes, fours, or fives.

When the parts of a flower appear in pairs, they may be considered as formed of opposite decussate leaves. In Figure 189, there is an ideal representation of such a flower, with its bracts, b, its sepals, c, petals, p, stamens, s, and carpels, f, separated by marked internodes. If the internodes in Figures 188 and 189 were taken away, or very much shortened, we would then have the arrangement usually seen in the flower. These diagrams also illustrate what occurs in the case of some plants, where the different floral whorls are distant from each other. When the parts of a flower are arranged in threes, fours, or fives, they may, if placed in a circle at the same level, be regarded as verticils, or, if at different levels, as following a spiral arrangement.

A flower is said to be Symmetrical when each of its whorls consist of an equal number of parts, or when the parts of any one whorl are multiples of that preceding it. Thus, a symmetrical flower may have five sepals, five petals, five stamens, and five carpels, or the number of any of these parts may be ten, twenty, or some multiple of five. In Figure 175 there is a diagram of a symmetrical flower, with five parts in each whorl, alternating with each other. In

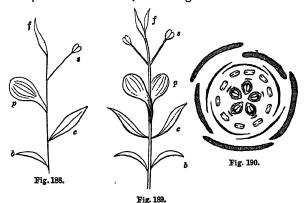


Fig. 189.

Fig. 189. An ideal representation of a flower arising from a bract, b, and formed by a single sepal, c, a single petal, p, a single stamen, s, and a single carpel, f; the parts being alternate, and separated by internodes.

189. An ideal representation of a dimerous flower, formed of two parts in each whorl. The bracts, b, the sepals, c, petals, p, stamens, s, and carpels, f. The parts of the flower are decussate, and thus follows a law of alternation. Each whorl is separated by an internode. If the internodes were removed the whorls would be closely applied to each other, as in ordinary flowers.

190. Diagramatic section of a symmetrical pentamerous flower of Stone-ore (Scdam), consisting of five sepals externally, five petals alternating with the sepals, ten stamens in two rows, and five carpels containing seeds. The dark lines on the outside of the carpels are glands.

Figure 190 there is a section of a symmetrical flower of

Botany.

Stone-crop, with five sepals, five alternating petals, ten stamens in two rows, and five carpels. Figure 191 shows a flower of Heath, with four divisions of the calyx and corolla, eight stamens in two rows, and four divisions of the pistil. In Figure 192 there are three divisions of the calyx, corolla, and pistil, and six stamens in two rows. In all these cases the flower is symmetrical. Flowers in which the number of parts in each whorl is the same are Isomerous (isos, equal, and $\mu \acute{e} \rho os$, a part); when the number in some of the whorls is different, the flower is Anisomerous (auros, unequal). When the parts of any whorl are not equal to, or some multiple of the others, then the flower is Unsymmetrical. This is seen in Veronica as given in Figure 193, where there are four divisions of the calvx, four of the corolla, and only two stamens, and two parts of the pistil.

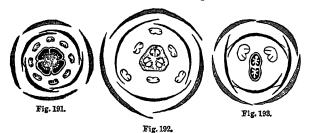


Fig. 191. Diagram of the flower of Heath (Erica), having four sepals, four divisions of the corolla, eight stamens in two rows, and four divisions of the pistal. The flower is tetramerous, complete, symmetrical and recorder.

sions of the pisth. The lower is tetramerous, complete, symmetrical, and regular.

192. Diagram of the symmetrical trimerous flower of Fritillary, having three divisions of the two outer whorls, and of the pisth in the centre, and six stamens in two rows.

193. Unsymmetrical flower of Speedwell (Veronica). The two outer whorls consist of four parts each, while the two inner have only two parts.

Symmetry, then, in botanical language, has reference to a certain definite numerical relation of parts. A flower in which the parts are arranged in twos is called *Dimerous* ($\delta \iota s$, twice, and $\mu \acute{e} \rho os$, a part), the symmetry being Binary, and the arrangement marked thus $\sqrt[4]{\cdot}$. When the parts of the floral whorls are three, the flower is Trimerous ($\tau \rho is$, thrice), and the symmetry being Ternary or Trigonal, is marked ... When the floral pieces are in a series of four, the flower is Tetramerous (τέτρα, four times), its symmetry being Quaternary, and marked . A Pentamerous (πεντε, five) flower, marked \$\sqrt{\psi}\$, has Quinary or Pentagonal symmetry. The symmetry which is most commonly met with in the vegetable kingdom is trimerous and pentamerous—the former occurring generally among Monocotyledons, the latter among Dicotyledons. Tetramerous symmetry occurs also among Dicotyledonous plants, and the numbers 2 and 4 prevail in the reproductive organs of Acotyledons.

The parts of the flower are, generally speaking, arranged so that those of one whorl are alternate with those of the next whorl. Thus, the petals alternate with the sepals, and the stamens with the petals. When the numbers in any series, such as the stamens, are multiplied, and the flower is still symmetrical, then the organ is found to consist of a definite number of whorls alternating with each other. Thus, in diagram 192, the stamens are six in place of three, and they are arranged in two alternating whorls—the parts of the outer whorl alternating with the petals, and with those of the inner series. The pistilline whorl is more liable to changes than the other parts of the flower. It frequently happens, that when it is fully formed, the number of its parts is not in conformity with that of the other whorls. In such circumstances, however, a flower is still called symmetrical, provided the parts of the other whorls are normal.

The various parts of the flower have a certain definite relation to the axis. The terms superior and inferior have reference to their position. Thus, in axillary tetramerous flowers (Fig. 191) one sepal is next the axis, and is called superior or posterior; another next the bract, is inferior or

anterior, and the other two are lateral; the petals (when Botany. present) being alternate with the sepals, are so placed, that





Fig. 194.

Fig. 194. Diagram of flower of Rose, showing one division of the calyx superior or next the axis, and two inferior or next the bract. The petals are arranged alternately with the calycine segments, and hence two of them are superior, and one inferior.

... 195. Diagram of flower of Sweet-pea (Lathyrus), showing five parts of the calyx of which two are superior, one inferior, and two lateral; five parts of the corolla, of which one is superior, two inferior, and two lateral; en stamens in two rows; one carpel, in consequence of four being undeveloped.

two are posterior, and two anterior; while the four stamens are arranged like the sepals. In a pentamerous flower it happens, that either one sepal is superior, two inferior, and two lateral, as in the calyx of Rosaceæ (Fig. 194); or two are superior, one inferior, and two lateral, as in the calyx of Leguminosæ (Fig. 195). The reverse, of course, by the law of alternation, is the case with the petals.

A flower normally consists of four whorls, calyx, corolla, stamens, and pistil, and when these are all present, the flower is *complete*. When each whorl consists of the same number of parts, or of a multiple of the parts, successively alternating with one another, we have seen that the flower is symmetrical. When the different parts of each whorl are alike in size and shape, the flower is regular. The absence of any of the whorls renders the flower incomplete. Want of correspondence in the number of the parts of the whorls causes want of symmetry, as has been already shown, while differences in the size and shape of the parts of a whorl makes the flower irregular, as in the papilionaceous flower represented in Figure 195.

In their earliest stage of development all the parts of the floral whorls are regular and symmetrical, consisting of similar minute cellular papillæ arising from the axis. The alterations in their regularity and symmetry depend on changes taking place during their growth. These alterations are traced to the adhesion of one part to another, the union of different whorls, irregular growth, complete suppression of one or more parts or whorls, degeneration or degradation, multiplication of parts, and chorisis or deduplication.

A flower becomes incomplete by the non-development, or by the transformation of one or more whorls. It becomes irregular by one or more parts of a whorl being enlarged or diminished in size, and by irregular cohesions; and it becomes unsymmetrical when some of the parts of one or more whorls are suppressed, so that their numerical relations do not correspond. The consideration of all the changes which the parts of plants undergo, or, in other words, the permanent deviations from what may be considered as their normal state, is included under the term Teratology (τέρας, a monster, and λόγος, discourse). Every alteration in the organs of the flower may be traced to the morphological laws to which we have already alluded. In treating of the separate floral whorls, notice will be taken of the changes which they undergo; in the meantime some general remarks will be made on the causes to which these changes are referred.

Union or adhesion of the floral whorls, or of the parts composing them, gives rise to various changes in form and symmetry. The adhesion is sometimes very irregular, so that certain parts are more completely united than others. Many forms of irregular flowers are due to this cause. The non-

#Plate

fig. 2.

Botany. development of whorls gives incompleteness to the flower. The absence of the corolline whorl renders a flower Apetalous or Monochlamydeous, the absence of both the calycine and corolline whorl makes the flower Naked or Achlamydeous. The suppression of the stamens, or of the pistil, renders the flowers *Unisexual*. The non-appearance of a whorl deranges the relation of the different parts, and destroys their alternation. Thus, in the apetalous flower of the Nettle, the stamens, in place of being alternate with the whorl on their outside, are opposite to it, and this relation of parts leads to the detection of the suppressed whorl.

Various parts of the flower are apt to become abnormal, or degenerate by Transformations of different kinds. Some of the parts may be converted into scales or into hairs. The floral leaves of the catkin of the Willow, and those of the Hop, are membranous scales, while those of the Cone are hard scales; the Wig-tree (Fig. 158) produces hairs instead of flowers on some of its peduncles, and the calvx of the Dandelion,* and other compound flowers, assumes the form of hairs, which remain attached to the fruit. In double flowers the stamens and pistils degenerate by being converted into

Sometimes the parts of a flower are increased in number by the growth of additional parts, or by the splitting of organs during their development. This latter process is called Chorisis (χώρισις, separation), and seems to account satisfactorily for the appearance of certain anomalous parts which do not follow the law of alternation. This chorisis consists in the formation of two parts out of one, the separated parts being either placed one in front of the other by transverse chorisis, or side by side by collateral chorisis. The lamina of a petal may be split in such a way that a scale is produced on part of it, as seen in Lychnis. Stamens may be divided so that two standing collaterally are produced in place of one; in this way some account for the abnormal state of the stamens in cruciferous flowers, such as Stock and Wallflower. In these plants, while the calyx and corolla consist of four parts, the stamens are six (Fig. 177), owing, it is said, to collateral chorisis of two of them. The flowers are thus considered normally tetramerous. In the Fumitory there are two sepals, four petals in two rows, and six stamens. The latter consist of two perfect stamens, and four incomplete, which are considered as being produced by collateral chorisis of two stamens. In this way the flower would be normally dimerous. When the parts of contiguous floral whorls are opposite to each other, in place of being alternate, the occurrence may be accounted for, either by suppression of a whorl, or by chorisis.

b. The Flower-Bud.

The various parts of the flower, consisting of the floral envelopes and the essential organs of reproduction, are contained in the flower-bud. They appear at first in the form of small cellular mammillæ, or prominences, the parts of each verticil being equal and separate. In their development (organogeny) they follow the same order as leavesthe extremities of each of the parts being first formed, and irregularities, caused by adhesion and other causes, occurring only during the progress of growth. In general the whorls are developed successively, from the calyx to the pistil; but, in some instances, the petals are retarded in their growth, so that the stamens are completed before them.

The terms Prafloration (pra, before, and flos, flower) and Æstivation (æstivus, pertaining to summer) are used to express the arrangement of the different parts of the flower in the flower-bud. The relation of these parts to each other is similar to that which occurs in the leaf-bud, and which has been considered under præfoliation. The same terms are also used to express the nature of many of these arrangements. As regards each leaf of the flower, it

is either spread out, as the sepals in the bud of the Lime- Botany. tree; or folded upon itself (conduplicate), as in the petals of some species of Lysimachia; or slightly folded inwards or outwards at the edges, as in the calvx of some species of Clematis, and of some herbaceous plants; or rolled up at the edges (involute or revolute); or corrugated and crumpled,
PI. CXII. as the petals of the Poppy.

The position of the parts of the flower relative to each other, in the bud, gives origin to the terms valvular, contortive or twisted, and imbricated. In the first two the parts are placed at the same level, in a circular manner, while in the latter they are at different heights, and follow a distinctly spiral order. æstivation is Valvular, or the parts are arranged in a valvate manner (Fig. 196), Diagram to illustrate valvate when they are so applied as to be in sestivation, in which contact at their edges without any folding. They are in a circular verticil. When



Fig. 196.

the parts of the verticil are slightly folded inwards at their edges the æstivation is Induplicative (Fig. 197), when folded







Fig. 198.

Fig. 197. Diagram to illustrate induplicative or induplicate estivation, in which the parts of the verticil are slightly turned inwards at the

which the parts of the verticil are singlify turned inwards at the edges.

198. Diagram to illustrate reduplicative or reduplicate astivation, in which the parts of the whorl are slightly turned outwards at the edges.

199. Diagram to illustrate contortive or twisted astivation, in which the parts of the whorl are overlapped by each other in turn, and are twisted on their axis.

outwards Reduplicative (Fig. 198). When the parts of the

corolla are united they are occasionally folded in a plaited

In Contortive æstivation the parts are in a circle, or apparently so, and one edge of each is directed inwards, so as to be overlapped by the contiguous part, while the other edge covers the margin of the part adjacent on the other side; each part also is, as it were, twisted on its axis, and the whole whorl exhibits a convolute appearance (Fig. 199). It is well seen in the unexpanded petals of Malvaceous plants,* in the corolla of Cyclamen, and in that of many Apo-*Pl. CXIV. cynaceæ, which were called Contortæ by old authors.

The æstivation called Imbricated or Imbricative embraces those bud arrangements in which the parts are placed at different heights so as to overlie each other, and form a more or less evident spiral cycle (Fig. 200). When the parts of a floral whorl are five, as is the case in many Exogens, it is often found that there are two parts wholly on the outside, two completely internal, and one intermediate, overlapped at one edge by one of the outer parts, whilst its other edge covers one of the inner parts (Fig. 201). This is Quincuncial or Spiral imbrication, and is the normal arrangement in pentamerous flowers, corresponding with the arrangement in leaves. In personate flowers, as Frogsmouth, a variety of imbricated æstivation occurs, called Cochlear, in which the second part of the cycle, in place of being external (as in the ordinary quincuncial arrangement), becomes wholly internal. When imbricated æstivation occurs in trimerous flowers, there is one part outside, one inside, and one intermediate, the arrangement being 1, as in When the flower is tetramerous, there are two outer parts and two inner parts; this being analogous to what occurs in opposite decussating leaves. In pea-like

Botany. blossoms it is usual to find a modification of imbricated

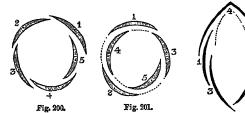


Fig. 202.

Fig. 200. Diagram to illustrate imbricative or imbricated estivation, in which the parts are arranged in a spiral cycle, following the order indicated by the figures 1, 2, 3, 4, 5.

201. Diagram to illustrate the quincuncial estivation, in which the parts of the flower are arranged in a spiral cycle, so that 1 and 2 are wholly external, 4 and 5 are internal, and 3 is partly external and partly overlapped by 1.

202. Diagram of a papilionaceous flower, showing vexillary estivation, 1 and 2 the alse or wings, 3 a part of the carina or keel, 4 the vexillum or standard, which, in place of being internal, as marked by the dotted line, becomes external, 5 the remaining part of the keel.

The order of the cycle is indicated by the figures.

æstivation, called Vexillary, in which the large petal called the vexillum, and which is superior or next the axis, overlaps the rest (Fig. 202). In some instances, as in the Judastree, the vexillum is included between the lateral petals (alæ), as represented by the dotted lines, 4, Figure 202. The different verticils of the flower have not always the same æstivation. In the Mallow tribe the calyx is valvate, while the corolla is twisted; in St John's Wort the calyx is imbricated and the corolla twisted; in the Rock-rose the three inner sepals are twisted in one direction, while the petals are twisted in an opposite direction.

c. The Floral Envelopes. * The Calyx or Outer Floral Envelope.

The Calyx is the outer floral envelope, and is composed of a whorl of leaves called Sepals. These leaves have usually the structure and appearance of ordinary leaves, as regards the distribution of their cells and vessels. They are frequently of a greenish hue, having chlorophyll in their cells, and stomata on their lower (outer) epidermal covering. When not green the calyx is said to be coloured, as in Columbine, Monkshood, Larkspur, Fuchsia, and Indian cress. It is not common to find the individual sepals divided. Sepals are usually sessile leaves, having no stalks. They are either distinct from each other, as in Wallflower, or they are combined, as in the Melon. When the sepals are of the same size and form, the calyx is regular, when not so it is irregular.

When the sepals are separate the calvx is Polysepalous. Polyphyllous, or Dialysepalous (πολύς, many, διαλύειν, to separate), the number of sepals being marked by the Greek numerals prefixed. Thus, disepalous means a calyx with two distinct sepals; trisepalous with three; tetrasepalous with four; pentasepalous with five; hexasepalous with six: or the Greek word phylla, meaning leaves, is used, and a disepalous calyx is denominated diphyllous, and so on. When sepals are united by adhesion, they form a Gamosepalous or Gamophyllous (γάμος, union) calyx (Fig. 203), terms

implying union of sepals or leaves, and thereforepreferable to monosepalous and monophyllous, which mean literally one sepal or leaf. This adhesion of sepals varies in extent, and thus gives rise to the terms entire, when the union is complete, and there are no divisions at the top, toothed, cleft, and partite, when the divisions are mere toothings, or extend to the middle, or to near the base. Thus, a gamosepalous calyx (Fig. 203), may be five-toothed (quinque-dentate), five-cleft (quinquefid), or five-partite (quinque-partite), the number of divisions usually indicating the number of sepals of which the calyx is composed. In an entire gamose-



Fig. 203. Gamosepalous, five-toothed (quinque-den-tate) calyx of Campion(Lych-

palous calyx the venation assists in the determination of the Botany. number of sepals.

When the union of the sepals is not equal in all the parts, the calyx has an irregular form, as in Labiate flowers (Fig. 204). In the latter case the calyx is two-lipped (bilabiate), the upper lip being composed of three sepals, one of which is either arched or stands out from the rest in a marked manner, and the lower lip being formed of two sepals. The united parts of a gamosepalous calyx form the tube, the free portions at the apex are the lobes or segments of the limb, and the orifice of the tube is the throat (faux).

The tube of a gamosepalous calyx frequently adheres more or less completely to the other whorls, especially to the



Fig. 204. Bilabiate gamosepalous calyx of the Dead-nettle (Lamium), It is composed of two lips, the upper lip formed by three sopals, the lower by two. One of the upper sepals stands prominently out from the

rest.
.. 205. Callyx of Madder (Rubia), adherent to the pistil, its limb appearing in the form of a rim. The callyx is called obsolete.
.. 206. Feathery pappus attached to the fruit of Salsafy (Tragopogon porrifolius). The callyx adheres to the fruit, and its limb is pappose.

pistil. In the latter instance the calyx remains persistent, and forms part of the fruit, as in the Gooseberry. In such instances the limb of the calyx often becomes degenerate, and is either absent, or appears in the form of scales or pointed projections, or of a circular rim (Fig. 205), or of pappus, as in Composite flowers (Fig. 206). In the adherent calyx of Valerian, the limb is at first a ring, but ultimately expands in the form of hairs, and hence is called

The calvx may continue persistent, and yet be separable

from the fruit, as in Henbane,* and in the Peruvian Winter-cherry and other species of Physalis (Fig. 207), where it increases after the flower has withered, and surrounds the fruit like a bladder. It sometimes continues in a withered state, as in the Heath, and is called marcescent. The term superior is applied to the calyx or perianth when it is so united to the fruit as to appear to arise from its summit, as in Melon, and Iris. In the Rose (Fig. 185) the tube of the calyx bears numerous carpels on its concave surface, and the limb at the summit is divided into five segments.

In place of being persistent, the calyx is frequently deciduous, falling off immediately after the flower expands, as in Crowfoot. In the

Fig. 207.

Fig. 207.

Bladder-like calyx of the Winter Cherry (Physalis Alkekengi), laid open to show the mode in which it surrounds the fruit without adhering to it. The calyx is persistent, but not adherent. It enlarges after the flower withers, and is called accrescent.

Poppy* (Fig. 208) the two sepals are detached before the *Pl. CXII. anthesis or the opening of the flower, and they are said to be caducous. In Eschscholtzia,* the calyx is composed *Pl.CXIII. of sepals united together, and joined by an articulation to fig. 6. the thalamus; as the flower expands, they give way at the joint, and fall off in the form of a candle-extinguisher. By the irregular development of one or more sepals, the spurred (calcarate) calyx of Larkspur and of Indian Cress is produced, as well as the hooded or helmet-shaped (galeate) calyx of Monkshood. In Grasses and Rushes the perianth

*Plate

CXXVIII. fig. l.

to find the calyx wholly absent. This, however, occurs in some of the Euphorbias,* in which the flowers are naked (achlafigs. 2 and mydeous), as shown in Figure 209. In these plants there is a series of bracts which at first sight appear to be the calyx; but they are really an involucre inclosing several distinct flowers (Fig. 210). In the Strawberry, Potentilla, and Mallow, the calyx consists of two alternating whorls, the exterior of which has been called Epicalyx, and is by some considered a row of bracts. An epicalyx is also seen in the Carnation. When there is only one floral envelope present, as in Goosefoot (Fig. 178), it belongs to the calycine

whorl, whatever may be

its form or colour.

* Plate

CXXXII.

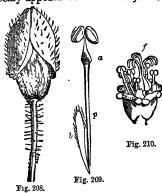


Fig. 208. Caducous calyx of Poppy (Papa-ver). It is composed of two sepals, which fall off before the petals

which fall off before the petals, which fall off before the petals expand.

209. Male flower of Spurge (Euphorbia), consisting of a single stamen, a, without any envelope. The flower is hence called Achlamydeous. The peduncle, a, has a brack, b, at the base, and is united to the flower by a joint at a.

210. Calyx-like (Calyciform) involucre of Euphorbia, unclosing numerous male flowers, and one female flower, f, with three forked styles. The individual flowers are really naked or achlamydeous, in consequence of the floral envelopes being suppressed.

† The Corolla or Inner Floral Envelope.

The Corolla is the inner envelope of the flower, and is composed of a whorl of leaves called Petals (πέταλον, a lamina or leaf), which alternate with the sepals, as seen in Figure 175, and are frequently equal to them in number (isomerous), or some multiple of them. The petals differ from the sepals in being rarely green. They usually exhibit showy colours, and are often odoriferous. Structurally they are composed of cellular and vascular tissue, the latter being spiral vessels and delicate tubes. The epidermis of petals does not in general exhibit stomata, but it sometimes displays beautiful hexagonal and radiating markings under the microscope. It is usually smooth (glabrous), but occasionally coloured hairs occur on it, as in the Bogbean. Petals originate in cellular projections, which are either connected by a ring of cellular tissue, or are separate, according as the parts are ultimately to be united, or to remain distinct. Even when the petals become irregular in after growth, they are equal in the first instance. Some petals continue to increase in size after the flower has expanded.

The forms of petals vary. Sometimes they resemble sessile coloured leaves, as in Crowfoot (Fig. 211); at other

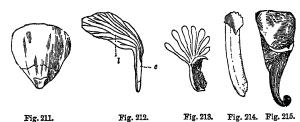


Fig. 211. Petal of Crowfoot (Ranunculus), without a claw, and thus resembling a sessile leaf. At the base of the petal a nectariferous scale is seen.

212. Unguiculate or stalked petal of Wallflower (Cheiranthus Cheiri), c, the claw or unguis; l, the blade or lamina.

213. One of the lateral petals of Mignonette (Reseda). Its blade is cut into numerous segments, and has been called laciniated.

214. Tubular petal of Hellebore (Helleborus), formed by folding and adhesion, in the same manner as pitchers.

215. Horn-like hollow petal of Columbine (Aquilegia vulgaris), formed by folding and adhesion of the edges.

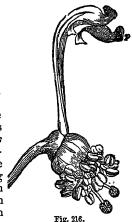
times they are separated into two portions, as in the Wall-

Botany. assumes a glumaceous or scaly appearance. It is very rare flower (Fig. 212), one narrow, c, forming the claw, and the Botany. other broad, I, constituting the limb or lamina. Petals being like leaves, exhibit varieties in their outline or circumscription. In some plants they are split at the apex. so as to be bifid or trifid, or cut into numerous segments (Fig. 213). When a small portion of their apex is deficient they become emarginate and obcordate, and when lobed at the base they are cordate. The apex of petals is sometimes prolonged in the form of a narrow thread, as in Strophanthus, or it ends in a point, which is either straight or

inflexed, as in Umbelliferous plants.* Some petals are folded, *Pl. CXXL so as to assume a tubular or pitcher-like form, as in the fig. 1. Hellebore* (Fig. 214), a spurred form, as in Columbine *Pl. CX. (Fig. 215), Violet, and Larkspur,

a gibbous form, as in Fumitory, or a horn-like aspect, as in the petals under the helmet-shaped sepals of Monkshood (Fig. 216). These anomalous petals sometimes assume a normal form, as in a variety of Columbine, in which the spurs disappear.

When the petals are separate (free and distinct) the corolla is Polypetalous or Dialypetalous (πολύς, many, and διαλύειν, to separate), and the number of the petals is indicated by prefixing the Greek numerals to the term petalous, in the same way as in the case of the sepals; thus, in Figure 217, the corolla is pentapetalous. In the Vine (Fig. 218), in which the corolla is polypetalous, the petals in their early state are united together by their apices, and afterwards separate and fall



Two peculiar horn-like stalked potals, p, of Monkshood (Aconium Nopellus). They are sitted under the helmet-shaped (galeate) coloured sepal, and they consist of a grooved stalk supporting a hollow spurred petal.

off. When the petals are united, the corolla is Gamopetalous or Monopetalous (γάμος, marriage or union, μόνος, one), and the number of its parts is marked by the venation, or by the divisions of the apex, just as in the case of the calyx. Thus, in Figure 219, the corolla consists of five petals united, their number being ascertained by the lobes at the apex, as well as by the midribs. The united portion is called the tube, the divisions are called lobes, and the orifice is the throat (faux). The term limb is often given to the expanded and free part of a gamopetalous corolla.

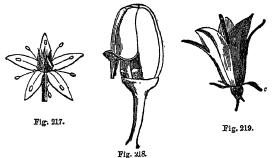


Fig. 217. Polypetalous or Dialypetalous corolla of Biting Stonecrop (Sedum acre). It is composed of five separate petals, and hence is pentapetalous.

- petalons.

 218. The flower of the Vine (Vitis vinifera) in the young state, showing the union of the petals at their upper part, and the mode in which they separate before they fall off.

 219. Regular gamopetalous bell-shaped (campanulate) corolla of Harebell (Campanula rotundifolds). It is composed of five petals united, The ovary is inferior, and is united to the calyx, c.

Some varieties of polypetalous corollas deserve notice. Of the regular forms may be mentioned the rosaceous, as in the Rose and the Strawberry (Fig. 220), in which there are spreading petals, without claws or with very short

the apex to the base, as in the Lily; caryophyllaceous, where

the petals have long, narrow, tapering claws, inclosed in the calyx, as in the Carnation and Pink; cruciferous or cruciate, in which there are four petals, usually with claws (Fig. 212) and arranged in the form of a cross, as in Wallflower (Fig. 176).

Among the irregular forms of polypetalous corollas we may notice the papiliona-ceous (butterfly-shaped) corolla,* as seen in the Pea (Fig. 221), consisting of five parts, differing in size and shape, the upper, st, called *Plate ceous (butterfly-shaped) corolla, * as seen in CXVII. the Pea (Fig. 221), consisting of five parts,

the standard (vexillum), the lower, car, called the keel (carina), formed of two partially-united petals, and the two lateral, a, called wings (alæ). These parts are separately represented in Figure 222, a being the vexillum, b the carina, and c one of the alæ.

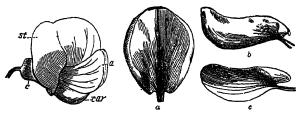


Fig. 222.

Fig. 221. Flower of Pea (Pisum sativum), showing a papilionaceous corolla, with one petal superior, st. called the standard (vexillum), two inferior, $c\alpha$, called the keel (carina), and two lateral, α , called wings (alse). The cally is marked c.

... 222. Parts of the papilionaceous flower of Broom (Sarothamnus scoparius).
a. The vexillum or standard cordate at the base; b, the carina or keel, composed of two petals partially united in a boat-like manner; c, one of the also or wings.

In Monocotyledonous plants the coloured perianths are often polyphyllous, and there is a peculiar irregular kind

which is met with among Orchids. It may be called the Orchideous perianth, and consists of six parts, one of which, called the Labellum, presents many remarkable forms. It is shown in Figure 223, which represents an Orchis, with its labellum, *l*, and a spur, s. The labellum Fig. 223. varies much in form. In Cypripedium it is hollow, like a slipper, and is called calceolate.

Gamopetalous corollas are also divided into regular and irregular forms. In the former the parts are equal in size, and equally united, while in the latter they are unequal in these reFig. 223.

Irregular polyphyllous spurred perianth of Orchis. It consists of six parts, one of which, *l*, called the labellum, differs much from the rest, and gives a peculiar character to the flower A spur, *s*, extends backwards from the labellum. The ovary, *o*, is inferior, *i.e.*, below the divisions of the perianth.

... 224. Regular gamopetalous funnelshaped (infundibuliform) corolla, *a*, of Tobacco (Nicotiana Tabacum). It is composed of five petals united. The calyx, *b*, consists of five sepals united. Fig. 223.

spects. Regular forms are bell-shaped (campanulate), that is, shaped like a bell, and swelling out regularly from base to apex, as in the Harebell (Fig. 219); funnel-shaped (infundibuliform), in which the tube is narrow below, and expands towards the summit, as in Tobacco (Fig. 224); tubular, or nearly uniformly cylindrical, as in some composite flowers; salver-shaped (hypocrateriform), when the limb or lobed portion spreads out at right angles to the tube, which is long, as in Auricula and Primrose; and wheel-shaped (rotate), when a salver-shaped corolla has a

Botany. claws; the liliaceous, where the petals gradually taper from very short tube, as in Forget-me-not (Fig. 225). There Botany.





Fig. 225.

Regular gamopetalous wheel-shaped (rotate) corolla of Forget-me-not (Myo-sotis), consisting of five petals united, with a very short tube. a, corolla entire; b, corolla laid open to show the short tube, the five stamens at tached to the corolla, and the five scales on the petals alternating with the

are also intermediate forms, as in Comfrey, in which the corolla is campanulately-tubular, presenting a combination of the bell-shaped and tubular forms.

Irregular gamopetalous corollas are seen in the lipped (labiate and bilabiate) forms (Fig. 173), in which the union of the petals takes place in such a way as to produce an upper and lower portion, with a gap (hiatus) between them, like the mouth of an animal (Fig. 226). The upper lip is usually com-

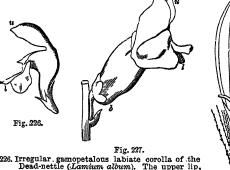


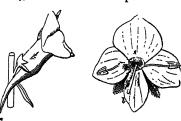
Fig. 226. Irregular, gamopetalous labiate corolla of the Dead-nettle (Lamium album). The upper lip, u, is composed of two petals united, the lower lip, l, of three. Between the two lips (abia) there is a gap (hiatus). The throat is the part where the tube and the labiate limb join. From the arching of the upper lip this corolla is called ringent.

... 227. Personate corolla of Frogsmouth (Antirrhinum majus), showing the gibbous base, b, of the corolla. The lower lip, l, is pushed up on the upper, u, leaving a chink (rictus).

... 228. Irregular gamopetalous ligulate flower of Ragwort (Senecio). It is a tubular floret, split down on one side, with the united petals forming a strap-like projection, L. The lines on the flat portion in dicate the divisions of the five petals. From the tubular portion below, the bifd style projects elightly. The terete fruit (achænium), a, is surmounted by pilose pappus, which is the metamorphosed calycine limb. The flower is female, having no stamens.

posed of two petals, the lower of three. The same form is met with in the calyx (Fig. 204), but the number of parts in the

lips is reversed. A labiate corolla or calyx, with the upper lip much arched, like a helmet (galea), is said to be ringent (Fig. 226). Sometimes the upper lip is very short and nearly wanting, as in Bugle. When



the lower lip is approximated to the upper, so as to leave only a chink (rictus), with a projecting portion below it, -10d the nalate the upper sin Bugle. Fig. 229. Fig. 230. Fig. 230. Irregular gamopetalous personate flower of Snapdragon (Linaria), with a long spur, o (calcar), at the base. 280. Irregular gamopetalous wheel-like corolla of Speedwell (Peronico). The irregularity consists in the different sizes of the lobes of the corolla, especially the lower lobe, t, which is smaller than the rest.

corolla is denominated masked (personate), as seen in Frogsmouth (Fig. 227). In Calceolaria there is a peculiar irregular corolla with two hollow lips. When a tubular corolla is split down on one side (Fig. 228), as in the florets of the

CXXIV.

fig. 2.

* Plate

* Plate

fig. 4.

strap-shaped (ligulate). * Plate

The lower part of some gamopetalous corollas, such as Valerian and Frogsmouth (Fig. 227 b), projects in the form of a bag or sac, and is called saccate or gibbous. Sometimes the projecting part assumes the form of a spur (cal-car), as in Red Valerian, and Snapdragon (Fig. 229). In some gamopetalous corollas there is a very slight irregularity of form. Thus, in Digitalis* the corolla has a somewhat campanulate form, but its development is not equal; the Speedwell (Fig. 230) has a form nearly rotate, but the lobes are unequal; the Bugloss has a funnel-shaped

corolla with a curved tube. In some gamopetalous corollas with a single spur, it happens occasionally, that what are called Pelorian varieties occur in which five spurs are produced. This occurs in common Snapdragon frequently, as well as in species of Frogs-Fig. 231. One of the glumes of Wheat (Triticum), seen in profile. These mouth.

In Grasses and Sedges the arrangement of the parts of the flower is peculiar. In place of verticillate leaves forming the flower, there are alternate scales or glumes. The flowers of grasses usually occur in

spikelets* (Fig. 165), which consist of one or two glumes, a, CXXXVII. covering several flowers, b. In Wheat each spikelet con-

Fig. 281.

Fig. 232.

Fig. 231. One of the glumes of Wheat (Traticum), seen in profile. These glumes are bracts or floral leaves which constitute the outer covering of the spikelet.

232. External (outer) palea or glumella of the flower of Wheat. It is a glumaceous scale marked with two rubs on each side of the midrib.

with two ribs on each side of the midrib.
... 283. Internal (inner) palea or glumella of the flower of Wheat. It is thinner and more membranous than the outer glumella, its edges are folded inwards, and its apex is bifid.

Fig. 233.

sists of two glumes, having the form represented in Figure 231, and inclosing flowers which are composed of scales (paleæ or glumellæ), delineated in Figures 232 and 233—the former being the outer, and the latter the inner pale or glumella, which are placed at different heights in an alternate manner. In the

manner. In the flower of the Oat Fig. 234. Fig. 235.

flower of the Oat Fig. 234. Flower of Oat (Avena sativa), with the two glumes, and the outer glumella or palea removed. The inner glumella, the inner one, pi, is seen with two scales (lodiculæ or squamæ), sq, at the base, inclosing the essential organs of reproduction. In Fig. 235.

Carices the male flowers are borne on scales, and so are the female, as shown in Figure 235, in which the scale, s, is placed on one side. Within the scale the female flower is situated, having a peculiar bag-like covering, u, termed perigynium.

Abnormalities in the Corolline Whorl.—The parts of the corolla are frequently adherent to those of the calvx. and any change taking place in the latter also causes an alteration in the former. Some of the petals are occasionally suppressed, and sometimes the entire corolla is wanting. The latter occurs normally in apetalous monochlamydeous flowers, such as Chenopodium (Fig. 178); and it also

Botany. Dandelion,* and in the white florets of the Daisy, it is called occurs accidentally. Petals, which are in general coloured, sometimes become green. A corolla, normally gamopetalous, is sometimes divided into separate petals. Flowers become double by the multiplication of the parts of the corolline whorl. This arises in general from a metamorphosis of the stamens. Union of separate flowers (synanthos, σὺν, together, and $dv\theta$ os, flower) occasionally occurs, and the adhesion which thus takes place causes various changes in

> Connected with the inner surface of the petals, there are placed occasionally appendages in the form of scales* or *PI.CXXV.

filamentous processes. These are considered as being modified petals, and they are usually traced to transverse chorisis, in consequence of their being placed opposite to the petals. In many of the Borage order, such as the Comfrey (Fig. 236), Forget-me-not (Fig. Forget-me-not (Fig. 225, b), as well as in the Chickweed tribe, and in the Crowfoot(Fig.211), petaline scales or lamelize of this nature are observed, which, like many other processes connected with the flower, received, in the days of Linnæus, the days of Linnæus, the

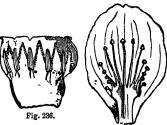


Fig. 237.

name of Nectaries. Peculiar changes in an inner row of petals and in the stamens may also give rise to corolline appendages, as, for instance, the beautiful fringes of the Passion-flower, the crown of the Narcissus (Fig. 149), and the glandular scales of the grass of Parnassus (Fig. 237).

d. Essential Reproductive Organs.

These organs constitute the inner whorls (verticils), and originate, like the floral envelopes,

from the thalamus or torus (the upper part of the axis or peduncle), in the form of minute cellular processes. In their development they resemble leaves, but in general they differ much more in their appearance from the leaves than the floral envelopes do. The essential organs are the stamens and pistil, as shown in Figure 238, where there are five stamens arising from the thalamus,

stamens arising from the thalamus, and surrounding one pistil. The stamens constitute the Androccium, and the pistil the Gynœcium.

These organs are necessary to form a perfect flower, and without them no seed is produced in flowering plants. When, by cultivation, a serial organis (stamens and pistil) of the Vine (Vitite vinifera). There are five simens, with introres two-look anthers, a. Between the anthers at their base are scales forming the dist. The ovary is large, style short, and stigma unidied.

they are changed into floral envelopes, the flower cannot perform its proper functions. These organs are not, however, always present in every flower. When both are present in the same flower, it is Bisexual, Hermaphrodite, or Monoclinous (μόνος, one, and κλίνη, bed), and is marked . When one of the organs only is present, the flower is Unisexual or Diclinous, and is marked 5 2; being called Staminate, male or sterile, when the stamens alone are developed, as indicated by the mark &; and Pistillate, female or fertile, when the pistil only is produced, as indicated by the mark 2. Unisexual Plants, such as the

Botany.

Botany. Hazel and Arum (Fig. 166), in which the staminiferous and pistilliferous flowers are on the same individual, are denominated Monæcious (μόνος, and ὀικίον, habitation), and are marked 5-9; unisexual plants, such as the Willow and Hemp, in which the staminiferous and pistilliferous flowers are on separate individuals, are denominated Diæcious (δις, twice, and δικίον, habitation), and are marked 5:2. In the case of Palms it often happens that, while some flowers are staminate and others pistillate, there are others which are perfect or hermaphrodite; on this account such plants are called Polygamous (πολύς, many, and γάμος, marriage), and are marked 호 5 오 . In all cases in which one of the whorls of the essential organs is absent, it is considered as depending on suppression or non-development; and this view is confirmed by the fact that, in many unisexual flowers, the rudiments of the suppressed organ may be seen, and that in certain circumstances it is developed.

* Andræcium or Staminal Organs.

The stamens are placed immediately within the petals, When there is one whorl the stamens are usually equal in number to the petals, and alternate with them (Fig. 175). When the stamens are twice as many as the petals, they are in two whorls, alternating with each other (Figs. 191 and 192). When there are more than two whorls, each successive verticil alternates with that preceding it. When, in place of being alternate with the petals, the stamens are opposite to them, as in the Primrose, the abnormality is considered as depending, either on the suppression of an outer row, or on transverse chorisis of the petals, or vertical chorisis and union of the stamens.

In cases in which the stamens are not equal in number to the petals, the abnormality may be traced to suppression of a certain number, to abortion, adhesion, or chorisis. In Cruciferous plants there are four sepals, four petals, and six stamens, four of which are longer than the others (Fig. 177). It is supposed that in this case each pair of long stamens is in reality one which has been split by lateral chorisis. This is confirmed by finding teeth only on one side of the filaments of these stamens, while in the two shorter ones teeth exist on both sides, and also by the fact that partial adhesions between them are sometimes seen, as in Streptanthus, and that some cruciferous plants have only four stamens.

A perfect stamen consists of two parts, the Filament (Fig. 239, f), representing the petiole of the leaf, and the Anther

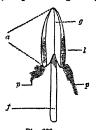




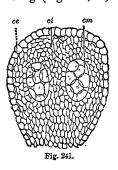
Fig. 239. Stamen with its filament, f, anther lobes, a, connective or union of the lobes, g, suture or line of dehiscence, l, which is longitudinal and lateral, pollen or antherine fertilizing powder, p p.
... 340. Vertical section of the young anther or Meion (Cucumis Melo). It communications in the communication of the communication of the communication of the communication of the communication.
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(Fig. 239, a) analogous to the blade, containing minute cells, in the form of Pollen (Fig. 239, pp). The filament, like the petiole, is sometimes wanting, and the anther is then sessile. The filament is usually articulated to the thalamus, so that the stamen falls off after performing its functions; but in some instances it is persistent and not articulated.

In the filament cellular tissue exists in a condensed form, surrounding a central bundle of spiral vessels, which represents the fibro-vascular system of the petiole. It has a thin epidermal covering, which sometimes presents stomata. Cellular prolongations also occur in the form of hairs, as in

the Virginian Spiderwort (Tradescantia), Anthericum, and Botany. Verbascum, where the stamens are called stupose, and in ' Anagallis tenella, where the hairs have a beautiful knobbed appearance.

The anther, like the lamina of the leaf, is developed before its stalk. It consists originally of a cellular mammilla, containing a mass of thin-walled cells (Fig. 240, ce and ci). In the progress of growth larger cells are produced in the interior (Figs. 241 and 242, cm), forming four separate clusters, each of which is surrounded by a special cellular covering (Fig. 242, cl). These larger cells are destined



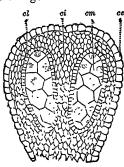


Fig. 241. Vertical section of an anther lobe of the Melon in the progress of growth, showing two large central cells, cm, filled with smaller nucleated cells. The outer epidermal layer, ce; the inner cells, ci, being partially absorbed.

242. Vertical section of an anther lobe of the Melon, showing the two large central cells filled, with other cells, containing polen, cm.

The latter are called mother pollen cells. The two large cells in the centre are now surrounded by a special covering, cl, which constitutes ultimately the endothecium, or inner lining of the anther. The parenchyma, ci, is being absorbed. The outer epidermis, ce, constitutes the exothecum, or outer covering of the anther. The endothecum, and the cells between it and the exothecum, usually contain spiral fibres.

for the formation of pollen, and the four places at which their development commences may be seen on a transverse section of a very young anther. These clusters of pollen cells increase in size, and gradually cause absorption of the surrounding parenchyma. It generally happens that two of the adjacent clusters of pollen cells unite by obliteration of their special covering at one side, and thus ultimately two pollen cavities are found in the anther, in place of four.

In its fully developed state, the anther presents two lobes (Fig. 239, I), like the two halves of the blade of the leaf; these lobes being united by a partition, called the Connective (Fig. 239, g), representing the midrib, and consisting of cells and spiral vessels. Each anther lobe has one or two cavities, which are receptacles of the cellular grains of pollen. These cavities correspond to the large cells seen

in Figure 242, cm, with their special covering, cl, which forms the inner lining of the anther case, called Endothecium (ἐνδον, within, θηκίον, a box or loculament). This lining exhibits elastic spiral fibres, which probably assist in bursting the outer epidermal covering of the anther called Exothecium (E\xi_0, without), corresponding to the cells marked ce in Figures 241

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Fig. 243.

and 242. In the cells of the endothecium, as the anther approaches to maturity, the membrane becomes sometimes obliterated, so that the delicate fibres alone are left, as is seen in the Melon (Fig. 243), and in Cobæa. These spiral fibres appear also to fill up the space between the two coverings in many full-grown anthers.

Thus the anther represents the lamina of a leaf, with its two halves divided by a midrib, surrounded with a double epidermal covering, the inner being fibro-cellular, and containing cellular tissue which assumes the form of pollen. When there are four cavities (loculi or thecæ as they are called) in the anther, they may be considered as represent-

Botany. ing the two halves of the leaf, each with its upper and lower stratum of cells. This division into four is seen in the young state of anthers, and is considered as the normal state. When it remains in the fully developed anthers they are called quadrilocular or tetrathecal (Fig. 244).

owing to obliteration of some of the partitions, only two loculi remain, as is very generally the case, the anther is bilocular or dithecal (Fig.

It happens occasionally that, by the suppression of one lobe, as in Gomphrena, or by the disappearance of the partition between the two lobes, the anther becomes dimidiate, or onethe divergence of the base of the anther lobes, and their complete union at the apex, render them onecelled (unilocular, monothe-

men). Hippuris.

many). Poppy.

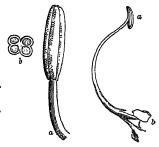


Fig. 244. Fig. 245. celled. In the Mallow tribe Fig. 244. Quadrilocular or Tetratheeal anther of the flowering Rush the divergence of the base (Butomus umbellatus). The anther entre, a, with its flament; section of anther, b, showing the four loculi.

245. The distractile connective of Sage (Salva), bearing a single sessile anther lobe, and an abortive one, b.

cal); while in Labiate plants, by the turning of one of the lobes, a union takes place by their bases, so that they form one cavity. The long connective of the Sage and other species of Salvia separates the anther lobes, so that each appears a monothecal anther (Fig. 245), one of which, a, contains pollen, while the other, b, is abortive.

The stamens vary in number, and names are given to flowers accordingly. Thus,-

1 stamen is Monandrous (μόνος, one, and ἀνὰς, male or sta-

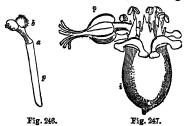
2 stamens is Diandrous (dis, two). Veronica. 3 stamens is Triandrous (egsis, three). 4 stamens is Tetrandous (τετράς, four). Alchemilla. 5 stamens is Pentandrous (afert, five). 6 stamens is Hexandrous (¿ξ, six). Tulip. 7 stamens is Heptandrous (ἐστα, seven). Tries 8 stamens is Octandrous (ἐστὰ, eight). Heath. Trientalis. 9 stamens is Enneandrous (ἐννία, nine). Butomus. 10 stamens is Decandrous (δίαα, ten). Saxifrage. 12 stamens is Dodecandrous (δώδεκα, twelve). Asarum.

20 stamens is Icosandrous ("12001, twenty). Strawberry. Numerous and indefinite stamens is Polyandrous of (making,

In the common Mare's-tail there is only one stamen in each flower, while in Cereus nycticalus 400 have been counted. The number of the stamens determines some of the classes in the Linnar artificial system of classification.

In the case of Euphorbia, flowers are met with, consisting

of a single stamen (Fig. 246), and others consisting of a single pistil. These, when inclosed in one common involucre, or bracteal envelope (Fig. 247, i), seem to be stamens and pistils in the same flower. in the same nower. But on examination it is seen that a joint occurs at a part of the supposed filament (Fig. 246, a), indicating its connection with the peduncle, p, and so also in the



case of the pistil. In some of the species of Euphorbia a proper floral envelope appears at the joint indicating the

true nature of the organ. The flowers represented in Botany. Figure 247 are therefore naked or achlamydeous male and female flowers on one plant, which is therefore said to be monœcious.

The position of the stamens is normally within the petals, and outside the pistil. They arise from the part of the peduncle below the latter, and hence they are Hypogynous, which means under the pistil (υπο, under, and γυνή, female or pistil). But, as in all other parts of the flower, adhesions take place by which changes in apparent position are produced. Thus the stamens, in place of being free and truly hypogynous, sometimes adhere to the tube of the calyx, becoming Perigynous (περί, around), which means surrounding the pistil; while at other times they adhere completely to the ovary, and appear to arise from the top of it, and are hence called Epigynous (ἐπὶ, upon). When the stamens adhere still more completely to the pistil, the union extending above the ovary, they become Gynandrous (γυνη, female, and ἀνηρ, male), as in Orchis, and in Birthwort (Fig. 248), and form with the pistil a column in the centre of the flower.



In place of adhering to the contiguous organs, the stamens may be distinct from them, but united to each other either by their anthers or by their filaments. When the filaments are combined into one mass, more or less completely, the flowers are Monadelphous (μόνος, one, and άδελφὸs, brother), as in the Mallow (Fig. 249); when in two sets or bundles they are Diadelphous, as in Fumitory, and in some papilionaceous flowers, in which the bundles are often unequal, nine stamens being united in one set, and only one (which is superior) in the other (Fig. 250); when in three sets they are Triadelphous, as in St John's Wort; and when in more sets Polyadelphous, as in the Castor-oil plant (Fig. 251). The numerous stamens in the Mallow and St John's Wort, and Castor-oil plant, are by some traced to collateral chorisis, or repeated divisions of the stamens. Sometimes the filaments are united by means of an interposed membrane (a sort of crown), as in the Pancratium. When the stamens are united by their anthers, the flowers are termed Syngenesious or Synantherous (oùr, together, γένεσις, origin, ἀνθηρα, anther), as in Compositæ (Fig. 252), in Violet, and in Lobelia.

Stamens are often shorter than the corolla, and are then said to be included; but at times they elongate and extend beyond it, when they are exserted. In some flowers we find certain stamens constantly longer than others. Thus, in many Labiate flowers (Fig. 253), and in Frogsmouth, we meet with two long and two short stamens, the flowers being Didynamous (ois, twice, and ouvajus, superiority), and in Cruciferous flowers there are four long and two short (Fig. 177), the flowers being Tetradynamous (respás.

four, δύναμις, superiority). Stamens in general stand regu-Botany. larly round the pistil, but occasionally their upper portions

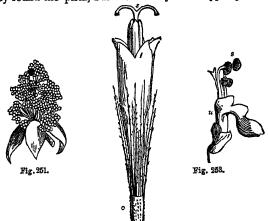


Fig. 252.

Fig. 252.

Fig. 251. Male flower of Castor-oll plant (Ricinus communis). The perianth is reflexed, and the stamens are seen in numerons clusters, united by their filaments. The flower is polyadelphous. The different clusters are branching, owing to the filaments being united up to different heights.

252. Regular gamopetalous tubular corolla of one of the flowers of Ragwort (Senecto). The single-seeded ovary, o, is united to the tube of the calyx, while the limb of the latter is seen above the ovary in the form of hairs (pappus) surrounding the corolla. In the centre of the flower above are seen the syngenesious stamens forming a tube, through which the style passes before it ends in a bifid stigma, s.

stigma, s.

253. Irregular gamopetalous labiate flower of Germander (Teucrium), seen in profile. The upper lip, u, is short, and the didynamous stamens, s, are much exserted beyond it.

are curved to one side of the flower, and they become declinate, as in the Amaryllis and Horse-chestnut.

The filament is slender and cylindrical, or slightly flattened. It is curved and elastic in the Pellitory (Fig. 254)



Fig. 255. Fig. 256.

Fig. 255. Fig. 256.

Fig. 254. Stamen of Pellitory (Parietaria), with its two-lobed anther, and elastic curved filament.

255. Stamen of Borago officinalis). The anther lobes, s, are pointed, the filament is appendiculate, i.e., is furnished with an appendage, a, in the form of a long slightly-curved process.

256. One of the authers of Asclepias, showing the filament, f; anther, a, containing pollen masses, and the peculiar staminal appendages, p.

257. Adnate anther of Barberry (Berberis unigaris). The lobes of the auther open by hinged valves.

and in the Nettle, petaloid in the White Water-Lily, and in Indian Shot and Ginger, broadened at the base in Campanula, thickened in Barberry (Fig. 257), with appendages in Borage (Fig. 255) and Asclepias (Fig. 256). The filament is attached to the anther lobes, either by adhering along their whole length on one side, called the back, and the anther is then adnate, as in Magnolia, Crowfoot, and Barberry (Fig. 257); or it extends only to the base of the lobes, which are firmly fixed to it, and the anther is innate, as in Carex (Fig. 258), or its apex is attached to a single point of the anther, which then swings easily about, and is called Versatile, as in Grasses (Fig. 165).

The anther presents a groove or depression between its lobes, indicating the place where the septum or partition is situated (Fig. 239, g). Each anther lobe also presents a line or furrow running from top to bottom, and placed more or less laterally. This is called the Suture, or line of dehiscence, and marks the place where the anther opens to discharge the pollen (Fig. 239, 1). The suture corresponds to

the edge of the leaf, and in innate anthers it is lateral, Botany. while in others its position is more or less distinctly on the face of the anther, or on the side opposite to the attachment of the filament. At the suture the epidermal tissue is thin, and the endothecium is wanting.

The face of the anther is usually directed towards the centre of the flower, in which case the anther is called Introrse, as in the Vine (Fig. 238); at other times it is directed towards the circumference of the flower, and the anther is Extrorse, as in the Meadow-saffron and in the Iris. The mode of opening or of dehiscence varies in different anthers. Sometimes the lobes split along the whole face, either in the centre or at the side, longitudinally (Fig. 239), at other times transversely (Fig. 259). Sometimes the slit

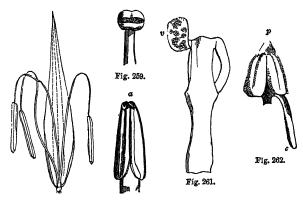


Fig. 258. Fig. 260.

Fig. 258. Male flower of a species of Sedge (Carex). It consists of a glume or scale supporting three stamens, with slender thread-like filaments, and innate anthers.

... 259. Stamen of Lady's Mantle (Alchemilla), with the anther opening

269. Stamen of Lady's Mantle (Alchemilla), with the anther opening transversely.
260. Stamen of a species of Nightshade (Solanum), showing the divergence of the anther lobes at the base, and the dehiscence by pores at the apex, a.
261. The stamen of the Barberry (Berberis vulgaris), showing one of the valves of the auther, v, curved upwards, bearing the pollen on its inner surface.
262. Two stamens of Pansy (Viola tricolor), with their two anther lobes, and the process, p, extending beyond them. One of the stamens has been deprived of its spur, the other shows its spur, c.

only takes place at the apex, so as to present two holes or pores, as in Rhododendron and Solanum (Fig. 260), or four pores, as in Poranthera, or two tubes, as in the Heath, or so as to form a separable lid, as in Gamboge. In the Barberry, each lobe of the anther opens by a single valve, which is rolled upwards (Fig. 261, v); and the same thing occurs in many Lauraceæ, in which, however, there are frequently four valves, that is, two to each lobe, corresponding to the antherine cavities.

The union of the anther lobes is effected either by a continuation of the filament (Fig. 257), or by a mass of cellular tissue with spiral vessels, called the Connective (Fig. 238). This extends to a greater or less height between the lobes, and is sometimes so narrow as to be inconspicuous, as in Euphorbia. Sometimes it reaches beyond them in the form of a cellular expansion, as in Magnolia, Violet (Fig. 262, p), and Asarum, or of a long feathery appendage, as in Oleander; while at other times it proceeds backwards in the form of a spur, as in the Violet (Fig. 262, c), and in the Heath. It divides into two branches occasionally, each bearing an anther lobe, as in Sage (Fig. 245), and then it is distractile.

The Pollen-is contained in the anther, and presents the appearance of a minute, usually yellow powder, which,



Pollen grains of Melon (Cucumis Melo) in various stages of development. No. 1, the grains in a young state, and free; No. 2, the grains farther advanced, and nearly ripe; No. 3, a pollen-grain in a ripe state, fully developed.

Botany.

Botany. when examined by the microscope, is found to consist of cellules (Fig. 263) of different forms, varying from 300th to That of an inch in diameter. Pollen-grains, when fully formed, are usually spherical, oval, or triangular (Figs. 267, 268, 269). In Podostemon the pollen is of an oblong shape, with an hour-glass contraction in the middle; while in Zostera it consists of long slender threads.

Pollen-grains are developed in the large cells seen in the early state of the anther (Figs. 241, 242, cm). Each of these cells is called a parent or mother cell (Fig. 264, cm). Its contents divide first into two, and then into four parts, each of which becomes covered with cellulose, so as to constitute an independent cell or pollen-grain (Fig. 264, p). These grains either burst through the parent cell and become free, or they remain united in fours or some multiple of four, as in many species of Acacia; or in large masses, such as those seen in Orchids (Fig. 265), and in Asclepias, where they constitute *Pollinia*. The remains of the partially destroyed mother cells sometimes remain in the form of threads.

Each pollen-grain has usually two coverings, the outer called Extine, being a firm membrane marked frequently

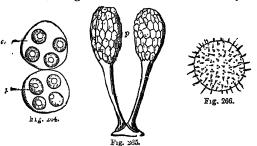


Fig. 264. Parent cells, cm, from the anthers of the Melon, each containing four grains of pollen, p. The parent cell divides first into two by a merismatic process, and then each of these parts subdivides into two, thus forming four cells. The grains of pollen are represented with nuclei in their interior.

with nuclei in their interior.

265. Pollinia, or pollen-masses, separated from the point above the stigma, with their retinacula or viseld matter attaching them at the base. The pollen-masses, p, are supported on stalks or caudicles. These masses are easily detached by the agency of insects.

266. Round ripe pollen of Hollyhock (Alexa), with its extine covered with prominent points.

with bands, reticulations, or rough points (Fig. 266); the inner, denominated Intine, being thin and capable of extension. The intine alone is present in Zostera. In the ripe pollen of the Fir (Fig. 267) the distension of the intine is such as to separate the extine into two hemispherical

In the interior of pollen-grains a minute granular matter exists called Fovilla, mixed with starch and oily matter. The fovilla granules vary from 4000th to 30000th of an inch in diameter. These display motions which are looked upon by some as molecular, or such as are seen under the microscope among minute particles suspended in fluid; while by others they are regarded as analogous to the phytozoic movements seen in the antheridia of Cryptogamic plants.



Fig. 269.

Fig. 267. Pollen of Fir (Pinus), in which, by the increase of the intine, the extine is separated into two hemispherical portions, marked by the dark spaces are acade end of the grains.

268. Rips rounded pollen of Cherry (Cerasus), discharging its fovilla through a tubular opening formed by the intine. There are other two points at which the intine is seen protruding.

269. Triangular pollen of Evening Primrose (Exothera), with one pollen tube, t. protruded. This tube is formed by the intine, which is also seen projecting at the other angles.

The surface of pollen-grains is often marked by grooves or folds, or by rounded markings. At these parts the extine is either deficient, or separates like a lid, as in the Passion-flower. When the pollen is moistened in water its grains absorb it and become enlarged, and the intine bursts at one or more points, sending out the fovilla (Fig. 268). When the pollen is scattered on the pistil, and is moistened on one side by the fluid of the stigma, the intine, in place of bursting, protrudes in the form of a tube called a pollentube (Fig. 269, t). The number of tubes protruded in different kinds of pollen-grains varies.

Transformations of Stamens.—Changes take place in the stamens by suppression and degenerations of various kinds. Whenever the stamens are below the number of the parts of the calyx, we may suspect that there has been some suppression. In many irregular flowers, such as Figwort and Dead-nettle, four stamens only occur, although the parts of the calyx and corolla are five. This depends on the suppression of one stamen, and in the case of Figwort we find a rudimentary stamen in the form of a staminodium attached to the corolla on the upper side. Again, in allied plants, such as Pentstemon, the fifth stamen is produced. stamens are suppressed in the case of pistilliferous flowers. In flowers with numerous stamens, such as Poppies, Roses, and Crowfoots, there are always some of the stamens abortive, for we do not find two flowers in which the number is the same. It seems to be a law in vegetable organography that the number of the floral organs is less constant the greater it is. Stamens in some plants have a great tendency to be changed into petals, especially in cultivation. When the anther is abortive the filament sometimes produces hairs in its place. In the case of Canna, where only one anther lobe is perfected, the filament becomes petaloid. It is probable that the peculiar gland-like scales of Parnassia are only an altered state of the stamens (Fig. 237). Occasionally the anthers are converted into carpels.

The Disk.—The organ which botanists call the Disk seems to be in many cases an alteration of some of the staminal whorls. This is more especially true of such cases

as Gloxinia and Gesnera, where the scales alternate with the developed row of stamens, and wherethe fifth stamen assumes the form of a scale. The Disk may be said to consist essentially of processes arising from the thalamus between the developed stamens and pistil. In the Orange the disk is in the form of a ring surrounding the base of the pistil; so also in Rue, where it is very large and conspicuous. In the Vine (Fig. 238), the disk-scales are evident. In the Tree Pæony (Fig. 270) the disk forms a dark red expansion which covers the follicles. In Umupper part of the fruit.



Fig. 270. Flower of Tree Pæony (Moutan officinalis), deprived of its corolla, and showing the disk in the form of a fieshy expansion covering the ovary.

belliferous plants,* the remains of the disk are seen at the *Pl.CXXL

† Gynæcium or Pistilline Organs.

** Pistil before becoming the Fruit.

The pistil is the verticil which terminates the axis of growth, and is placed in the centre of the flower. It is composed of leaves called Carpels or Carpidia (καρπὸς, fruit), from their connection with the fruit. These leaves are folded, so that their lower surface is external, and they are well seen in the Cherry, with double flowers, in which the organs of reproduction are more or less completely altered. In this plant one or more leaves (Fig. 271) occupy the place of the pistil. When there is a single carpel (Fig.

Botany. 272), the pistil is Simple, and the two terms (carpel and pistil) are synonymous; when there is more than one carpel, the pistil is Compound (Fig. 273, c). The carpels are either distinct or united; and it frequently happens, that by adhesion and obliteration, changes take place by which

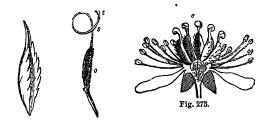


Fig. 272.

Fig. 271. Fig. 272. Fig. 272. Fig. 272. Fig. 272. Fig. 271. Folded carpellary leaf of the double-flowering Cherry. In place of fruit the plant produces leaves.

... 272. Fistil of Broom, consisting of overy, o, style. s, and stigma, t. It is formed by a single carpel. The terms pistil and carpel are here synonymous.

273. Vertical section of the flower of Meadow-sweet (Spiraza). The pistil is apocarpous, consisting of several distinct carpels, c, each with ovary, style, and stigma. The stamens are indefinite, and inserted into the calyx.

the number of the carpels is diminished, so that they do not equal the other whorls. It is rare to find the parts of the pistilline whorl symmetrical with the others. A flower, however, is still called symmetrical if the numbers of the three outer whorls are equal to or multiples of each other.

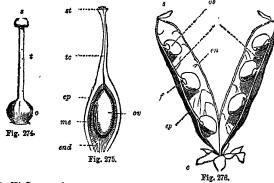


Fig. 274. Compound syncarpous pistil of Primrose (Primula). The five carpels of which it is composed are completely consolidated so as to appear one. The ovaries, o, the styles, t, and stigmata, s, are united. The flower is salled Monogynous, although in reality there are five parts of the pistil.

275. Pistil of Apricot (Pramus Armeniaca), cut vertically. The sollitary ovule, ov, is contained in the ovary, which consists of three coats, the inner, end, which corresponds to the upper epidermis of the carpellary leaf, and which finally becomes the hard stone of the Apricot. The middle, me, corresponding to the mesophyllum or parenchyma of the carpellary leaf, and which illulimately becomes the fieshy part of the Apricot; and the outer, ep, corresponding to the lower epidermis of the carpellary leaf, and which inhally constitutes the separable skin of the Apricot. The style is prolonged upwards, containing a canal, te, and ending in the stigms, st, consisting of loose cellular tissue uncovered by epidermis.

276. Pistil of the Pea (Pisum sattivum), laid open. It consists of a single carpel containing numerous ovules, eu, which are attached to the placenta, pl, or ventral suture in two rows, by means of umbileal cords (funicull), f. The wall of the carpel consists of three layers, the outer, ep, corresponding to the lower epidermis of the leaf. Between these two layers there is a small amount of cellular tissue like the parenchyma of the leaf. The parenchymators portion is not so much developed as in Figure 275. The calyx, e, is persistent. The style and stigma are marked s.

A pistil is called Apocarpous or Dialycarpous (ἀπὸ, separate, διαλύειν, to separate, and καρπός, fruit) when all the carpels are separate (Fig. 273); and Syncarpous (où, together or united) when they are combined into one (Fig. 274). The parts of a perfect pistil are the Ovary, containing ovules or rudimentary seeds, the Style, and the Stigma. These terms are rather vaguely used, as applying either to the parts of a single carpellary leaf, or to the parts of a pistil formed of more than one carpel, and in which the ovaries, styles, and stigmas are united completely. In Figure 275 the lower portion is the ovary containing the ovule, ov, the style is marked to, and the stigma st. The style is not always present, and, when absent, the stigma is Botany. sessile, as in the Poppy.*

The ovary of a simple pistil consists of the folded blade *Pl. CXII. of a single leaf (Fig. 276), and resembles it in structure fig. 2. The outer surface of the ovary (Figs. 275 and 276, ep) represents the lower epidermis of the leaf, sometimes covered with hairs, and, when green, exhibiting stomata; the inner surface (Fig. 275, end, and 276, en) represents the upper epidermis; between these surfaces are placed the parenchyma, and the vascular tissue consisting of woody, spiral, and dotted vessels of various kinds (Fig. 275, me). The midrib is on the outer or dorsal surface, and therefore is inferior, while the two edges of the leaf (Fig. 276, pl) are united at their inner part or face next the axis, and are superior.

The face of the ovary is called the ventral suture, while the back is called the dorsal suture. At the ventral suture there is a cellular growth called the Placenta (Fig. 276, pl), to which the ovules, ov, are attached often by a distinct cord, f. As each margin of the folded leaf or carpel forms a placenta, this organ is essentially double, and it sometimes shows its formation by appearing as two lamellæ (Fig. 276, pl). Along the placenta the ovules are placed in one or more rows. Sometimes they occupy a small part of the placenta, as in cases where they are reduced to one (Fig. 275) or two. The parenchymatous tissue sometimes becomes hard, as in the nut; at other times it is much developed, and forms a succulent covering, as seen in fleshy fruits (Fig. 275, me).

When the style exists, it is a prolongation of the cells and vessels of the leaf upwards, and represents the narrow portion of an acuminate leaf, folded so as to form a canal (Fig. 275, tc), with loose cells inside. It is terminated by the stigma (Fig. 275, st), which is a loose cellular portion divested of epidermis, and moistened with fluid, so as to detain the pollen-grains when scattered. The stigma is sometimes a mere point, at other times it extends along one or both sides of the style. It is to be considered as continuous with the placenta.

When the pistil is formed of a single carpel, it terminates the axis, and appears to be continuous with it. When the pistil is bicarpellary, that is, formed of two carpels, they are placed opposite to each other, and if they unite, it is by their ventral sutures. The carpels, in such a case, are usually placed so that one is superior, that is, next the axis, and the other inferior, next the bract of the axillary flower, as in the Figwort order. Sometimes, however, they are lateral, that is, to the right and left of the axis in a plane at right angles to the axis and bract, as in the Gentian order, and Cruciferæ. When the carpels are more than two, they follow the usual laws of alternation with the other parts of the flower. It is chiefly in apocarpous pistils that the alternation can be satisfactorily seen; for in syncarpous pistils the adhesion which takes place often obscures the arrange-

The number of carpels in an apocarpous pistil, or the number of separate styles in a syncarpous one (i.e., one in which the ovaries are united), is indicated in the following way:—A flower with a simple pistil or one style is Monogynous (μόνος, one, and γυνή, female); with two separate carpels or two separate styles, Digynous; with three, Trigynous; with four, Tetragynous; with five, Pentagynous; with six, Hexagynous; with seven, Heptagynous; with eight, Octogynous; with nine, Enneagynous; with ten, Decagynous; with twelve, Dodecagynous; with a greater number, Polygynous. These differences are employed by Linnæus in forming some of his Orders.

In an Apocarpous pistil, the carpels may be arranged in one circle (Fig 273), or in several (Fig. 277). In the latter case, the inner whorls alternate in succession with the outer. Sometimes they are placed on a flattened receptacle or thalamus, as in Marsh Marigold; at other times on an

Botany. elevated one, as in the Crowfoot (Fig. 277), and in the Strawberry (Fig. 184); while at other times they are placed on a concave one, as in the Rose (Fig. 185).

In a Syncarpous pistil, various degrees of adhesion take place. The carpels may unite merely at their inner angles, leaving marked external divisions, as in the Rue; or the ovaries may be completely united while the styles are separate, as in Flax (Fig. 278); or the whole may be conso-







Fig. 278.

Fig. 278. Apocarpous compound pistil of Crowfoot (Ranuculus), consisting of numerous separate uni-ovalar carpels, arranged in several rows on an elevated receptacle. The flower is polygynous. Each carpel consists of ovary, style, and sugma. Two of the stamens are left to show their insertion below the pistil into the thalamus. The stamens are hypogynous, and the plant belongs to Thalamifloræ.

278. Syncarpous pistil of Flaz (Lumm). It consists of five carpels, united by their ovaries, while their styles and stigmas, s, are separate. Hence, the flower is pentagynous.

279. Ovary or lower part of the pistil of the Lily (Lilium), cut transversely. There are three localements, indicating the union of three carpels, and the ovary is said to be trilocular. The divisions in the ovary, called septa or dissepiments, are formed by the sides of the carpellary leaves. Each septum is double, and the number of septa ocresponds with the number of the carpels. The ovules are placed collaterally, in pairs, in each localament, and are attached to a central placenta, formed by the union of the three ventral sutures.

lidated into one, as in the Primrose (Fig. 274). In rare cases the styles and stigmas are united into one body, while the ovaries are separate, as in the Labiate and the

Borage orders.

In syncarpous pistils, the number of carpels entering into their composition may be traced by observing the grooves or lobes of the ovary, by the number of styles and stigmas, and, when complete union takes place, by the venation, or by the divisions seen in the interior of the ovary. Thus, in the Lily, the syncarpous pistil is composed of three carpels united, and, by cutting across the ovary (Fig. 279), we observe three loculi containing ovules. The carpels are generally united in such a way, that partitions or dissepiments (septa), more or less complete, are seen on making a transverse section. These are formed by the union of the margins or sides of the carpellary leaves, each septum being essentially double or composed of the laminæ of two contiguous carpels. The septa of collateral carpels are therefore vertical, and equal to the number of carpels. There can be no true septum in a single carpel, but spurious divisions (phragmata) may be formed, either in a transverse manner by cellular processes proceeding from the walls of the carpel, as in Cassia Fistula and Desmodium; or in a vertical manner, by projections from the dorsal suture, as in Flax; or by prolongations of the placenta, as in Cruciferæ, where a replum is produced; or by a turning inwards of the ventral suture, as in some species of Oxytropis, or of the dorsal suture, as in Astragalus. In the Thorn Apple, the ovary, when cut transversely at the upper part, shows two cavities; but when the section is made at the lower part of the ovary there are four cavities formed by a spurious vertical septum.

When the partitions in the pistil extend to the axis, a transverse section shows a number of contiguous cavities or Loculaments (loculi), with the placentas in the centre bearing ovules (Fig. 280). A compound pistil of this sort composed of two carpels is two-celled (bilocular); of three, threecelled (trilocular), as seen in the Lily (Fig. 279); of four, four-celled (quadrilocular); of five, five-celled (quinquelocular), as in Campanula (Fig. 281); of many, without distinct reference to number, many-celled (multilocular or

plurilocular). In these cases the placenta is in the centre, but Botany. still connected with the walls of the ovary by means of septa.

When the partitions do not extend to the centre, all the cells or loculi communicate, and hence such a compound pistil is really unilocular, or has one cavity, as in the Poppy and Orchis (Fig. 282). In these unilocular syncarpous

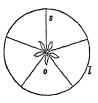






Fig. 280.

Fig. 280. Fig. 281.

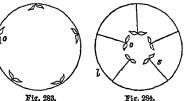
Fig. 280. Diagramatic section of a quinquelocular or pentathecal ovary, composed of five carpels, the edges of which are folded inwards, and meet in the centre. The ovules, o, are attached to a central placenta, formed by the union of the five ventral sutures. The five partitions, septa or dissepiments, s, are composed of the two sides of contiguous carpels. Dorsal suture, I.

281. Ovary of Bell-flower (Campanula), cut transversely. The placenta is in the centre, consisting partly of a prolongation of the axis in the form of a column, and partly of the true placentaries, bearing numerous ovules, arranged collaterally in pairs. The ovary is quinquelocular, being formed by five carpels, which are attached to the calyx, s. The back of each of the carpels corresponds to the midrib, s, of a sepal.

282. Unifocular or monothecal ovary of an Orchid (Orchis), cut transversely, showing three parietal placentas bearing ovules. The edges of the carpels are slightly folded inwards.

pistils there may be seen partitions proceeding to a greater

or less extent into the cavity of the ovary, and bearing placentas on their No edges. Such placentas are called Parietal, and their number indicates the number of united



number of united carpels. These placentas are sometimes nearly sessile on the walls of the ovary (Fig. 283), at other times they are supported on distinct parietal septa (Fig. 284). Suchare called 284). Suchare called support of the carpels of the carpels are applied to each other in a valvular manner.

185. 283. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels are applied to each other in a valvular manner.

284. Diagramatic section of a quinquelocular ovary is unilocular, and the compound ovary is unilocular, and the placentas and ovules, o. In the compound ovary, in which the edges of the carpels are parietal, and the ovules appear sessile on the walls of the ovary. Supplied to each other in a valvular manner.

284. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels bearing the placentas and ovules, o, are not folded inwards. The placentas are parietal, and the ovules appear edges of the carpels ovary, in which the edges of the carpels are applied to each other in a valvular manner.

284. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels are applied to each other in a valvular manner.

285. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels are applied to each other in a valvular manner.

286. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels are applied to each other in a valvular manner.

287. Diagramatic section of a quinquelocular ovary, in which the edges of the carpels are applied to each other in a valvular manner.

cases of parietal placentation, and are considered as showing the formation of marginal placentas, on the edges of carpellary leaves more or less completely folded inwards towards the axis. The ovules, in these instances, are analogous to buds on the margins of leaves, as seen in Bryophyllum (Fig. 141).

Cases occur in which the carpels are united so as to have

no apparent folding inwards of their edges, and in which the placentas are placed in the centre, quite separate from the walls of the ovary, as in the Chickweed and Primrose families. This is called Free Central placentation (Figs. 285 and 286). It is by some considered as being produced by the disappearance of

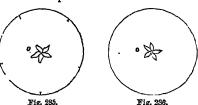


Fig. 285. Fig. 286.

Fig. 285. Diagramatic section of a compound unifocular ovary, formed by five carpels, the edges of which are very slightly folded inwards, as represented by short lines on the inner surface of the circle. The ovules, o, are in the centre, and not attached to the walls of the ovary.

286. Diagramatic section of a compound unifocular ovary, in which there are no indications of partitions. The ovules, o, are attached to a free central placenta, which has no connection with the walls of the ovary.

the septa, or by their rupture, at an early period of the growth of the ovary, so as to leave the placentas in the

Botany. middle. This view is strengthened by seeing in some of the Chickweed tribe septa in a very early stage of growth, and imperfect remains of these partitions on the wall of the ovary, even in an advanced stage (Fig. 285). some instances, however, especially in the Primrose tribe, no vestiges of septa are found, and no marginal ovules at any period of growth (Fig. 286). Hence this kind of free central placentation is supposed to be produced by a prolongation of the axis, and it is therefore denominated Axile—the leaves of the gynocium being looked upon as united in a valvate manner, and as being verticillate round the placentary axis, which bears ovules like leaf-buds. Those who adhere to the view of all placentas being formed on the margins of leaves, have endeavoured to account for cases of free central placentation like those of the Primrose, by considering the placenta as formed by chorisis from the edge of carpellary leaves, or by placentas produced only at the base of the carpel, and, after uniting together in the centre, becoming elongated and enlarged. On the other hand, some advocates of axile placentation not only apply this view to such cases as those of the Primrose, but to all cases of placentation whatever; and, in the case of parietal placentas, think that the axis divides into a number of cellular prolongations, which become attached to the edges of the carpellary leaves.

Marginal placentas are formed either by the edges of a single carpel, or by the edges of two contiguous carpels. The former takes place in apocarpous pistils (Fig. 276, pl), and in syncarpous pistils with complete septa (Fig. 287); the latter in syncarpous pistils with parietal placentas (Fig. 282). The placenta does not always bear ovules throughout its whole extent. Sometimes it is ovuliferous (ovule-bearing) only at or near its summit, Pistil of Meadow-saffron (ovule-bearing) only at or near its summit, Pistil of Meadow-saffron or in its middle or at its base. In such placentas the ovules are sometimes reduced to one, as in the Common Seablucenta in Composite plants. The placenta in some instances extends from the margin of the carpellary leaves over the whole inner surface of the ovary, as in the Flauweing Rush and in the White Water-Lily. The in the Flowering Rush, and in the White Water-Lily. The



Fig. 287.

spreading of the placenta over the surface may give rise to the appearance of ovules proceeding from the dorsal suture, especially when that is the only part of such a placenta which bears ovules.

The carpellary leaves forming the pistil or Gynoccial verticil are usually sessile, but cases occur in which they appear to be stalked so as to raise the ovary. Such an occurrence may be considered as depending either on a prolongation of the axis supporting the pistil, as seen occasionally in certain monstrosities of Rose and of Geum, or on the union of the petioles of carpellary leaves. In the Passion-flower, there is a distinct stalk or gynophore (yvv), temale, and φορέειν, to bear), bearing the pistil. The same thing takes place in some of the Caper tribe, as well as in Lychnis, in the Pink, and in Dictamnus (Fig. 182), where the stalk is short and thick.

When the pistil is free in the centre of the flower it is called superior, and the other verticils are inferior or hypogynous. It is often united to the calyx and the other whorls. When the adhesion between the ovary and calyx or perianth is complete, as in the Gooseberry, the ovary is said to be inferior. In such instances, the petals and stamens, which are attached to the calyx, appear to arise from the summit of the ovary, and are called Epigynous (en, upon, and yuvi, pistil). Between these two conditions, there are intermediate stages of adhesion, as seen in some Saxifrages, where the ovary becomes half-inferior.

In certain cases it has been supposed that the axis forms

part of the walls of the ovary by spreading out in a concave Botany. manner, in the same way as the expanded axis of Eschscholtzia* seems to form part of the calyx. In the Rose the *Pl. CXIII axis becomes united to the tube of the calyx (Fig. 185), fig. 7. and is prolonged so as to form a hollow cavity or disk, on the inside of which numerous separate carpels are placed.

The Style—is the prolonged apex of the carpellary leaf, and is not an essential part of the pistil. In some cases it seems to be a process from the placenta, as shown by Lindley in Babingtonia. It may, therefore, consist merely of cellular tissue, with spiral vessels, or it may also have woody

tubes and other vessels of the midrib and blade of the leaf entering into its composition. A canal traverses it (Fig. 275, tc), containing loose cells, called conducting tissue, which is continuous with the placenta. The style (Fig. 274, t) is situated at the proper apex of the leaf (apicilar), but, by changes in the direction of the apex, it frequently happens that the style appears to be lateral, as in the Strawberry, or even basilar, i.e., from the apparent base, as in Lady's-mantle (Fig. 288). In syncarpous pistils the styles are frequently united, so as to appear single (Fig. 274). When the carpels are placed round an enlarged axis, so that their apices are united to the summit of it, the styles, when united, appear to come from the axis of the plant, as in many of the Borage order, and in the Sage. The carpels are called in such cases Gynobasic (γυνη, pistil,



and βάσιs, foot). In the Geranium the styles are united to the prolonged axis or beak, from which they separate

when the fruit is ripe (Fig. 183).

The style in its form is generally rounded, but at times it becomes flat, like a petal, as in Indian-shot. In the Bell-flower there are peculiar hairs on the style, apparently connected with the application of pollen. The style in the pistil of Clematis is also hairy, so as to render the fruit caudate or tailed. A style, apparently simple, may be formed of several united. Frequently the divisions of such a style extend downwards for a certain length, showing the parts of which it is composed, and thus indicating the number of carpels. But there are cases in which the style, proceeding from a single carpel, actually splits into two parts, becoming forhed, as in Euphorbia. This splitting is accounted for by the circumstance that the style is in reality double, formed of two sides of the leaf.

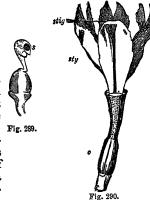
The Stigma—is a part of the pistil, composed of loose cells, which secrete a viscid fluid, and which are uncovered by epidermis. This organ is either sessile on the summit of the ovary, as in the Tulip and Poppy, or it is placed at the apex (Fig. 274, s), or on the side of the style. It may be said to be continuous with the placenta, differing from it in not bearing ovules. This connection with the placenta is evidently seen in cases where it can be traced along one or both sides of the style as far as the ovary. Being formed like the placenta, the stigma is essentially double, and sometimes shows a division on one side, as in Drosera and some Euphorbias. The half of one stigma occasionally unites to the half of that next it, thus giving rise to a peculiar abnormality in the relation of the parts.

Stigmas in a syncarpous pistil are either united or free. In the latter case their lobes or lamellæ indicate the number of carpels. The united stigmas sometimes become large and orbicular, as in Rock-rose, or capitate, as in Primrose (Fig. 274, s), or they radiate along a shield-like body, as in the Poppy.* In the Periwinkle the stigma is covered *PI. CXII with hairs, and exhibits a marked contraction in the middle like an hour-glass, with a broad rim below. In the Nettle the stigma is covered with hairs radiating from a point, and

Botany. is called penicillate. In the Violet (Fig. 289, s), the stigma has a hooded and

hooked appearance.

The name of stigma is sometimes erroneously given to parts of the style. Thus the upper petaloid portions of the style of the Iris (Fig. 290, sty) have been called stigmata, a term which ought to be restricted to the little slits at their apex (Fig. 290, Fig. 289. stig). So also the umbrellalike stigma of Sarracenia is in reality an expansion of the styles with the stigmata at their edges. In some stigmata, as those of Mimulus, the two lamellæ are irritable, and close when touched. In Orchids the stigma is sessile on the common column (gynostemium, $\gamma \nu \nu \dot{\eta}$, pistil, and $\sigma r \dot{\gamma} \mu \omega \nu$, stamen), and appears as a viscid space immediately below the anther lobes. at their edges. In some stiglobes.

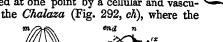


Transformations of the Pistil.—These are of frequent occurrence, and depend, generally, on abortion of a certain number of carpels, and on adhesions of various kinds. In the apocarpous pistils of Aconite, Nigella, Larkspur, and Pæony, we find on the same plant pistils composed of two, three, four, five, and six carpels. In some of the Brambles, Moquin-Tandon has seen all the carpels except one disappear, thus making the fruit resemble that of the Plum. In the case of Leguminous plants, there is usually only a single carpel, although the flower is pentamerous; this state has been traced to abortion of carpels, and the view is confirmed by finding plants in the same natural order with more than one carpel. Pistils of a succulent nature, such as those of the Sloe and Bird-cherry, sometimes assume the form of a pod, like that of the Pea. Occasionally stamens are changed into carpels, and at other times the carpels are transformed into stamens, and bear pollen.

The Ovule—is the rudiment of the future seed (Fig. 275, ov), and in its early state it appears as a minute cellular projection or mammilla of the placenta. It is analogous to a bud produced on the edge of a leaf, or to a bud formed on a branch in cases where the placenta is axile. The cells multiply until the ovule assumes a more or less enlarged ovate form, constituting what has been called the Nucleus, or the central cellular mass of the ovule (Fig. 291, n).

The ovular nucleus alters in the progress of growth, so as to be prepared for the development of the embryo plant in its interior. At the apex of the nucleus an absorption or obliteration of cells takes place, by which a hollow cavity is formed, which becomes lined with a thin cellular membrane (epithelium), and forms the sac in which the rudiments of the embryo first appear (Fig. 292, s). This embryo-sac is surrounded by a cellular layer derived from the nucleus (Fig. 292, n), to which the name of Tercine has been given. In some instances the tercine appears to be the only covering of the sac, as in the Mistleto. In most cases, however, other cellular layers are formed, which first appear in the shape of annular appendages at the base, and then gradually spread over the central mass. These ovular coverings are usually two, one next the nucleus, and first formed (Fig. 293, s), called the Secundine, and the other on the outside (Fig. 293, p), called the Primine. These two coats or coverings of the ovule are sometimes incorporated so as to appear one.

At the base of the ovule these coverings and the nucleus Botany. are intimately united at one point by a cellular and vascular process, called the *Chalaza* (Fig. 292, ch), where the





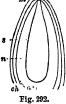




Fig. 291. Young ovule of Celandine (Chelidonium majus) before its coverings are developed. It consists of the nucleus, n, which at this stage of growth is naked. The base of the nucleus, where the nourishing vessels enter, is marked ch. This point is called the chalaza.

... 292. Orthotropous or Orthotropal ovule of Polygonum, showing the embryo-sac, s, in the nucleus, n, the different ovular coverings, the base of the nucleus or chalaza, ch, and the apex of the ovule with its foramen. m.

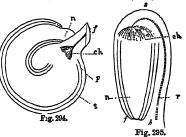
oase of the futeres of chalaza, or, and the apex of the overle with its foramen, m.

293. The ovule of Polygonum, with its nucleus, n, covered by the inner coats, s, or the secundine, and the outer coats, p, or the primine. The opening in the secundine, end, is called the endostome, that in the primine, ex, is the exostome. The point of the nucleus is seen projecting at the foramen. The end by which the ovule is attached to the placenta is marked f.

nourishing vessels enter from the placenta. At the apex of the ovule they leave an opening called the Foramen or Micropyle (μίκρος, small, and πύλη, a gate), through which the influence of the pollen is afterwards conveyed. This foramen extends through both ovular coats, the opening in the outer (Fig. 293, ex) being the Exostome (εξω, outside, and στόμα, mouth), and that in the inner (Fig. 293, end) being the Endostome (¿vôov, within). The foramen indicates the organic apex of the ovule, while the part connected with the placenta by means of the stalk (Fig. 293, f) called the Funiculus or Podosperm (ποῦς, a foot, σπέρμα, a seed), is the base or Hilum.

The relation which the hilum, the micropyle, and the chalaza bear to each other, varies in different ovules. In an Orthotropous (ὀρθὸs, straight) or straight ovule (straight as regards its axis), the chalaza is at the hilum, and the micropyle at the opposite extremity (Fig. 292). In such an ovule the chalaza, ch, is at the base, and the micropyle, m, at the apex, and no curvature nor inversion takes place either in the nucleus or in its coverings. In a Campylotropous (καμπύλος, curved) or curved ovule, the chalaza is still at the hilum, but the whole ovule is bent upon itself, so that the micropyle or apex approaches the hilum. This is shown in Figure 294, which exhibits a vertical section of the ovule of Wallflower; the nucleus, n, is curved on itself, and so are the primine, p, and secundine, s; the chalaza, ch, is at

the base of the ovule, and the foramen or apex is close to it. In an Anatropous (dva- $\tau \rho \epsilon \pi \epsilon w$, to subvert) or inverted ovule (Fig. 295), an inversion of the nucleus, n, takes place, so that its base, ch, is removed to the opposite close to the hilum. In this case the chalaza, ch, is at the apparent apex of the ovule, and its connection with the placenta is kept up by a cord, r, called the



hive to the opposite side from the hilum, Fig. 294. Campylotropous or Campylotropal ovule of Wallfower (Cheiranthus), showing, f, the funiculus which attaches the ovule to the placenta, p the primine, s the secundine, n the nucleus, ch the chalaza. The ovule is curved upon itself, so that the foramen is near the funiculus.

295. Anatropous or Anatropal ovule of Dan-Anatropous or Anatropal ovule of Dam-delion (Leontodon Tranacoum), showing the coats of the ovule surrounding the nucleus, n, which is inverted, so that its base, ch, where the chalaza exists, is removed from the base or hilum of the ovule, h, while the foramen, f, is near the base. The connection between the base of the ovule and the base of the nucleus at s is kept up by means of the raphe, r.

Raphe, consisting of cellular tissue and of spiral vessels.

Botany. When the hilum is placed midway between the micropyle and the chalaza, the ovule becomes Heterotropal (ετέρος, diverse), and in such cases it frequently happens that the funiculus proceeds at right angles from the ovule, so that the latter becomes horizontal. Such ovules are considered by some as produced by a partial adhesion of the funiculus to the upper part of one side of the ovule.

Anatropous ovules are very common. They appear to be formed with the view of allowing the pollen tubes to reach the foramen easily. Campylotropous ovules are by no means uncommon. They are met with in Cruciferous and Caryophyllaceous plants, in Mignonette, and in the Bean. The orthotropous form is rare as a permanent condition of the ovule; it is met with in a few natural orders, such as the Buckwheat and Rock-rose tribes. Many look upon it as being the earliest state of all ovules, and refer the other forms to changes produced during growth.

Ovules vary in number. Sometimes there is a solitary ovule in each ovary, or in each loculament, at other times there are several. When the number is not great, and is uniform, the ovules are said to be definite, when very numerous they are indefinite. They are attached in various ways to the placenta, and their position in the ovary varies. When the placenta at the base of the ovary is the only part ovuliferous, then the ovule is erect, as in Polygonum. When the ovuliferous part is above the base, and the ovules proceed obliquely upwards, they are ascending, as in the Pellitory, and if they are developed equally on either side of the attachment, they are horizontal or peltate, as in Crassula. When the ovuliferous part of the placenta is at the apex of the ovary, the ovules are pendulous, as in Valerian, when below the apex, they are suspended, as in the Apricot (Fig. 275). In the Common Thrift, a funiculus extends from the placenta to the apex of the ovary, and curves downwards so as to suspend the ovule. When an ovary is multi-ovular (contains many ovules), the ovules may be all attached in the same way, and be placed either collaterally or one above the other (Fig. 279); or they may be attached in different ways, so that some are erect and others pendulous. These terms apply only to the position of the ovule as respects the ovary, and they have reference alike to orthotropous, campylotropous, and anatropous ovules. Thus, an anatropous ovule may be either erect or pendulous as regards its position in the ovary. The same terms apply to the seed in its relation to the seed-vessel.

Some ovules are not contained in a true pistil, i.e., in a

and stigma. These ovules are met with in the Cycas* and Cone-bearing orders. In the former, the ovules are arranged on the edges of metamorphosed leaves, and the pollen from the male flowers is applied directly to them, without the intervention of a stigma. In the latter

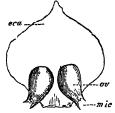
tion of a stigma. In the latter the ovules (Fig. 296, ov) are covered by scales, eca, which are hardened bracts or floral leaves covering the female flowers. In this case also the pollen is applied to the micropyle, mic, of the ovules, without the intervention of a stigma.

1. The latter Fig. 296. Is stillate flower of a Fir (Pinus), consisting of a scale, eca, which is a hardened bract, and two ovules, constituted to its base. The object of the ovules also the pollen is applied to the micropyle, mic, of the ovules, without the intervention of a stigma.

carpel consisting of true ovary

*Plate

CXXXIV.



†† Pistil after becoming the Fruit.

The Fruit-is, properly speaking, the pistil arrived at maturity, containing the ripe seeds, in which the embryo plant is developed (Fig. 297, pl). The simplest form of fruit is that formed by a single carpel, inclosing one or more seeds (Fig. 276). It often happens that changes take place

by which some parts of the carpel are rendered succu- Botany. lent, and, then, in place of a dry fruit, there is produced a fleshy one. This is well seen in the case of the Peach, in which the outer epidermal covering of the carpel forms what is called the skin, the parenchymatous cells of the mesophyllum constitute the flesh, and the inner epidermis of the carpellary leaf is changed into the stone; the kernel being the ripe seed containing the embryo plant. In the Coco-nut, in place of fleshy cells, woody fibrous ones are produced; the outer layer of the husk representing the external epidermis of the ovarian carpel, the fibrous portion being the parenchyma of the carpel, and the hard shell being the inner epidermis of the carpel inclosing the seed and the embryo.

As in the case of the pistil, so in the fruit, the carpels composing it may be distinct or united. When the fruit consists of a single ripe carpel, or of several separate and distinct carpels, it is said to be Apocarpous or Dialycarpous, as in the Pea (Fig. 276) where there is a single carpel, and in the Ranunculus (Fig. 277), and Columbine (Fig. 298),

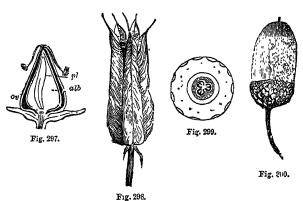


Fig. 298.

Fig. 297. Fruit of a species of Dock (Rumez), cut vertically. It is a monospermous indehiscent dry fruit, called an Achne, or Ackanium. The outer part, ov, is the pericarp or seed-vessel containing the seed, with its coverings. The seed contains nourishing mater, called albumen or perisperm, alp, and the embryo plant, pl, with its cotyledons pointing downwards, and its radicle upwards. The seed is orthotropal, and the embryo is inverted. At the upper part of the pericarp two of the styles and stigmas are seen curving downwards. At the base, part of the perianth is represented.

298. Apocarpous fruit of Columbine (Aquilegia vulgaris), consisting of five separate mature carpels, with styles and stigmas.

299. Transverse section of the Acorn (glans), showing the three carpels with two voules in each, of which it is originally composed. Two of the carpels and five of the ovules are obliterated during the progress of growth, so that the mature fruit is unifocular and monospermal. Surrounding the ovary the mass of bracts is seen.

300. Acorn, or fruit of the Oak (Quercus), consisting of the ovary containing a single seed, and surrounded by a series of bracts which form the cup or cupula.

in which there are several separate mature carpels. When the mature carpels are combined, as in the Poppy, the fruit is Syncarpous. Sometimes the mature pistils of several flowers are incorporated into one hard or succulent mass, as in the Cone, in the Mulberry, and in the Fig (Fig. 157), and in these instances, what is commonly called the fruit, consists, in reality, of a great number of fruits united together. Such fruits are called Collective or Multiple.

The fruit may be formed not merely by the pistil, but also by other parts of the flower united to it, more or less completely. Thus, in the Apple, Pear, Gooseberry, Currant, and Melon, the calyx is combined with the pistil; in the Hazel-nut, the Acorn (Fig. 300), and Chestnut, bracts form the husk, the cup, and the burr; in the Rose the receptacle is enlarged, and covers the pistil. Occasionally the fruit seems to consist not merely of a number of rows of transformed leaves, but of a transformed branch in addition.

By ascertaining the anatomy and structure of the pistil, we are led to a knowledge of the nature of the fruit, and we are enabled to see the changes which take place during growth. These changes depend on increase of the parenchyma, adhesion of one part to another, obliteration of lo-

Botany. culaments or of ovules, and the development of additional processes or partitions from the placenta, and from other parts of the pistil. Thus, the Coco-nut in its young state, is formed by three carpels, each containing a single ovule, while in its mature condition there is only one loculament and one seed. In this case the partitions between the carpels are obliterated, and one ovule is developed at the expense of the other two. These changes may be traced on careful examination; and even in the ripe fruit indications of them are seen in the markings on the shell. The Acorn in its early condition (Fig. 299), is formed of three carpels, with two ovules in each, as seen in the Figure, but in the progress of development changes are induced by which the fruit (Fig. 300) becomes one-celled and one-seeded. In these cases a trilocular sex-ovular pistil becomes a unilocular and monospermic fruit. In the Hazel, the Ash, the Elm, the Beech, and the Horse-chestnut, similar changes are produced in the pistil by the abortion of ovules, and the obliteration of divisions. In the Thorn-apple the pistil is formed of two carpels, separated by a septum, while the fruit exhibits four loculaments, produced by prolongations from the placentas, forming a spurious septum in each carpel.

It sometimes happens that the receptacle or peduncle becomes succulent, and is called the fruit in ordinary language.

Thus, in the Strawberry (Fig. 301), the true fruit consists of small single-seeded (monospermic) dry seed-vessels (commonly called seeds), scattered over a succulent convex receptacle; in the Rose, the true fruit consists of similar seed-vessels arranged on a fleshy concave receptacle (Fig. 185); and in the Fig the true fruit consists of monospermic seed-vessels produced by separate flowers, and scattered over the inner surface The fruit of the of a concave succulent receptacle (Fig. 157). *Pl.CXVI. In the Cashew,* the nut or true fruit is borne on a coloured succulent stalk, which enlarges during ripening.

In the interior of some fruits a pulpy substance is produced, apparently as a secretion from the inner lining of the ovary. This kind of pulpy matter is met with in the Gooseberry, Currant, Grape, Orange, and

The fruit of the Strawberry (Fragaria vesca) consisting of the enlarged succulent receptacle, or growing point, bearing on its surface numerous single-seeded carpels or achenes. Each achene has a style and stigma, and is thus at once distinguished from a seed. pod of Cassia Fistula. Occasionally the organs adjacent to the pistil become the succulent parts of the fruit. In Strawberry-Blite, the calyx surrounding the pistil, and separate from it, becomes red and juicy; in Gualtheria procumbens, the free calyx, after flowering, becomes red and succulent, surrounding the true fruit, which is dry. In the Yew, the bracts enveloping the seed become succulent.

The fruit, generally speaking, consists of the seed-vessel or Pericarp ($\pi\epsilon\rho$), $m\epsilon$ around, and $\kappa \alpha \rho \pi \delta s$, fruit), and the Seed. en It cannot be said to be perfect unless the seed and embryo are produced. In many cultivated fruits, however, the seeds are abortive. Thus, in the case of the Bread-fruit, Banana, and Pine-apple, the best fruit is seedless, and such is often true of the Orange and the Grape. The Drupe of the Cherry (Corasus), out vertically the carpellary leaf, and, like it, can be separated into three parts; the outer epidermal covering (Fig. 302, ep), called Epicarp, or Exocarp. (en), upon, etc. Epicarp, or Exocarp, (ἐπὶ, upon, ἔξω,

Fig. 302.

Fig. 301.

outside, καρποs, fruit); the middle parenchymatous portion, me, called Mesocarp (µέσος, middle), and when succulent, Sarcocarp (σὰρξ, flesh), and the inner epidermal covering, en, called Endocarp (& Soo, within), and when hard and stony Putamen (putamen, the shell of a nut). These

three coverings are well seen in the Peach, in the Cherry, and in the Date. In their original structure these parts correspond with the leaf, but changes take place during ripening, by which some cells are hardened and others become succulent, and thus the resemblance to the leaf is much obscured. That succulent fruits, such as the Peach, Apricot, and Cherry, are to be regarded as altered carpellary leaves, is shown in the case of the double Cherry, where true leaves occupy the place of the fruit (Fig. 186). Dr Wyville Thomson records instances of the common Sloe and Bird-cherry producing red-coloured follicular pods. In many fruits, as in the Nut, the different pericarpial layers are so blended that it is not easy to mark their separation.

Some fruits fall without opening or dehiscing, the seeds being liberated during the process of decay; such fruits are Indehiscent (indehisco, not to open). Other fruits open or dehisce in various ways, so as to scatter the seeds, and are called Dehiscent. The dehiscence takes place either in a vertical or in a transverse direction; the former is the usual mode. Vertical dehiscence takes place through the sutures, or by the separation of the parts of which a syncarpous fruit is composed. The separate parts are called Valves. In fruits formed by a single carpel, the dehiscence occurs either at the ventral or dorsal suture, or both. In the follicles of the Pæony, the Columbine (Fig. 298), and the Marsh Marigold, the dehiscence is ventral; in Magnolia grandiflora the dehiscence is sometimes dorsal; while in the pod of the Pea (Fig. 276) and of the Bean, it is both ventral and dorsal.

When the fruit consists of several carpels united, or is syncarpous, the dehiscence takes place either by a separation of the constituent carpels through the dissepiments (Fig. 303), and in that case is Septicidal (septum, partition,



Fig. 303. Diagram to illustrate the septicidal dehiscence in a pentalocular capsule. The loculaments, L correspond to the number of the carpels, which separate by splitting through the septa, s.

304. Diagram to illustrate loculicidal dehiscence. The loculaments, L, split at the back, and the valves separate, bearing the septa, s, in their centres.

305. Diagram to illustrate septifragal dehiscence, in which the dehiscence takes place through the back of the loculaments, L, and the valves separate from the septa, s, which are left attached to the placentas in the centre.

and cædo, to cut), as in Figwort and Gentian, where there are two valves, in Meadow-saffron, where there are three valves, and in the Fig-Marigold and the Rhododendron, where there are five or more valves; or the dehiscence takes place by the dorsal suture of each carpel (Fig. 304), and in that case is Loculicidal (loculus, a loculament, and cædo, to cut), as in the Iris, the Pansy, the Lily, and the Horse-chestnut.

There are modifications of these kinds of dehiscence. Thus, in the septicidal form the valves, on separating, sometimes carry the placentas with them, as in Gentian and Colchicum (Fig. 287); at other times, the placentas or placentaries are left attached to the central axis or columella, as in Rhododendron. In the case of Hura, Euphorbia, and Janipha,* each carpel, or coccus as it is called, separates *Pl. CXIII. from the columella, carrying with it an inclosed seed. In fig. 2. the loculicidal dehiscence the dissepiments may remain attached to the middle of each of the valves, and separate along with them, or the septa may adhere to the axis, and allow the valves to fall off without them (Fig. 305), as in the Thorn-apple and Purple Convolvulus. The latter kind of loculicidal dehiscence is called Septifragal (septum, a partition, and frango, to break). In some cases the dehiscence is at first loculicidal, and afterwards the carpels separate

fig. 1.

Botany. from each other in a septicidal manner. This union of the two kinds of dehiscence is seen in some Spurges, in the *Pl. CXV. Castor-oil fruit, and in the Purging Flax.*

In Orchis, the placentas, as represented in Figure 282, are parietal, and the seed-vessel opens by three valves (Fig. 306, v), which are placentiferous in their middle, but

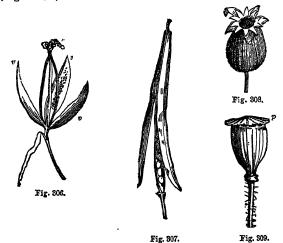


Fig. 306. Seed-vessel of an Orchid (Orchis), opening by three valves, v v v, which bear the placentas and seeds in their middle. The midros of the carpels remain united at the base and apex, and the withered fioral envelopes, e, are seen attached at the apex.

307. Siliqua or seed-vessel of Wallidower (Oheiranthus Cheiri), opening by two valves, which separate from the base upwards, leaving the seeds attached to the placentas in the middle, with a replum

seeus attached to the parameters, opening by ten teeth at the apex. The placents is free central. The calyx is seen surrounding the seed-vessel, but not adherent.

309. Capsule of Poppy (Papaver), opening by pores, p, under the broad peltate stigma.

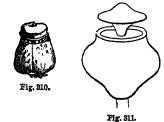
the midribs of the three carpels remain united at their base and summit, and the withered floral envelopes, e, are seen attached at the apex. In the pod of cruciferous plants, such as Wallflower, Whitlow-grass, and Shepherd's-purse, as well as in the pod-like fruit of Celandine, two valves separate from the base upwards (Fig. 307), leaving the parietal placentas united together by a cellular frame or replum, which is either entire or perforated. In vertical dehiscence the splitting sometimes takes place only at the apex of the fruit, so that the seed-vessel opens by teeth, as in Campion (Fig. 308), and Mouse-ear Chickweed, or by pores, as in the *PI. CXII. Poppy* (Fig. 309), or by rupturing, as in Frogsmouth, or by one large orifice, as in Mignonette. In the Bell-flower, the seed-vessel dehisces in a loculicidal manner laterally, or near the base.

Transverse dehiscence is of rare occurrence. It is seen

*Plate JIIVXXC

fig. 2.

in Henbane* (Fig. 310), Pimpernel, Purslane, and in various species of Monkey-pot (Fig. 311), in which the upper part of the fruit separates like a lid. This is called Circumscissile (circum, around, and scissilis, cleft) deleaves which separate at the articulationsthe united petioles forming the lower part of



hiscence, and seems to Fig. 310. Seed-vessel of Henbane (Hyoscyamus indicate that the seed-vessel in these cases is formed by jointed

Seed-vessel of Henbane (Hyoscyamus indicate that the see

this account called Pyxis or Pyxidium.

311. Fruit (pyxidium) of the Monkey-pot (Lecythis ollaria), opening by a lid.

The dehiscence is transverse or circumscissile, and the capsule is operculate or lidded.

the fruit, and the united laminæ constituting the lid. Carpology.—A classification of fruits ought properly to

be founded on a consideration of their original formation, Botany. and of their anatomical structure in the early state. This is often puzzling to the student, inasmuch as it requires that he should trace the fruit during its different stages of development. By so doing, however, he is enabled to observe the various changes which take place by absorption, obliteration, adhesion, and division of parts, and he is in a condition to explain many apparent anomalies. Thus, in the Coco-nut, he sees that there are at first three loculaments and three ovules, but as the fruit ripens, two of each of them disappear, and finally only one remains. The three ridges, however, which remain on the endocarp, are at once explained by a reference to the early condition of the nut. Such is the case with many fruits, the structure of which would be obscure without a knowledge of the morphological alterations which have taken place. The names applied to fruits have a reference chiefly to their fully developed

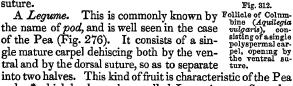
Without attempting to give a rigorous and minute definition of Carpological (καρπός, fruit, and λόγος, discourse) terms which have been multiplied to a cumbrous extent, we shall merely explain some of those which are most frequently employed, arranging them according as they refer to fruits formed by a single separate flower, and which are called Simple or Monogynacial (formed by one Gynacium); or to fruits formed by a combination of numerous flowers, and which are called Collective, Multiple, Anthocarpous $(a\nu\theta os, flower, and \kappa a\rho\pi os, fruit), or Polygynæcial (formed)$ by many Gynœcia).

Simple or Monogynæcial Fruits.—These may consist either of a single mature carpel, or of numerous separate carpels, arranged in one or more rows in a circular manner, on flat convex or concave receptacles. They may be formed not only of the pistil but of the other parts of the flower united to it, and they may either be dehiscent or indehiscent, dry or succulent.

A Follicle is a fruit formed by a single mature carpel de-

hiscing by the ventral suture (Fig. 312). The fruit may consist of a single follicle, as is seen occasionally in the Pæony; more commonly it is formed by two or more separate follicles arranged in a circular or spiral manner, as in the Marsh Marigold, and Columbine (Fig. 298). In some follicular fruits the opening takes place by the dorsal

the name of pod, and is well seen in the case of the Pea (Fig. 276). It consists of a single mature carpel dehiscing both by the ventral and by the dorsal suture, so as to separate



order,* which has hence been called Leguminous. Some le- * Plate gumes, as those of Cathartocarpus Fistula, do not open; others CXVIL have divisions between each of the seeds formed by transverse foldings, as in Sainfoin (Fig. 313), and Bird's-foot. The latter is called a lomentaceous or moniliform legume or a Lomentum, and when mature it usually separates into pieces, each of which contains a single seed. In some legumes, a spurious division is formed in a vertical manner by a prolongation from the placenta, or by a folding inwards of the dorsal suture. The legume is sometimes twisted, and spiral; at other times it has a leafy and inflated aspect, as in Bladder-Senna. In some legumes, the outer portion or the exocarp (epicarp) separates from the endocarp, which still remains covering the seeds. In some indehiscent monospermal legumes the coverings become succulent; so that they are really drupaceous, thus establishing a connection between the Leguminous and Rosaceous orders.

A Siliqua is another kind of pod, formed (according to most authors) by the union of two carpellary leaves with



Botany. parietal placentas, and dehiscing by two valves which separate from below upwards. It is well seen in the common Wallflower (Fig. 307), and in other Cruciferous plants. The two valves separate from the placentas, leaving them united

> Fig. 313. Fig. 316.

> > Fig. 314.

Fig. 313. Lomentum or lomentaceous legume of a species of Sainfoin (Hedysarum). Each seed is contained in a separate cavity by the folding inwards of the walls of the legume at equal intervals; and the legume, when ripe, separates transversely into single seeded portions.

314. Compound ovary (Siliqua) of Waliflower (Cheiranthus), consisting of at least two carpels united. One valve has been removed to show the partition or replum, ci, formed of a double layer from the placents, cn, on either side, to which the ovules ou, are attached by means of funiculi. The style and stigma, s, are at the upper part of the ovary.

the ovary.

315. Silicula of Whitlow-grass (Draba), opening by two flat valves, o, from below upwards, leaving the parietal placentas, pl, in the centre, united by a membrane or replum. The partition of the seedvessel is broad, and hence the name Latiseptæ.

316. Silicula or pouch of Shepherd's-purse (Capsella), opening by two folded valves, which separate from below upwards. The Phragma

is narrow (angustiseptæ).

by a cellular prolongation or replum (Fig. 314, cl), which divides the seed-vessel vertically into two loculaments. A broad and short siliqua has received the name of Silicula. In it (the silicle) the carpellary leaves are either united together, so that the septum is in the broadest diameter of the pod (latiseptæ), as in Thlaspi and Draba (Fig. 315); or the carpels are folded so that their dorsal suture is prominent, and the replum is narrow or linear (angustiseptæ), as in the Shepherd's-purse (Fig. 316). The Siliqua and Silicula are occasionally indehiscent and monospermal (μόνος, one, σπέρμα, a seed).

A Capsule is a dry syncarpous fruit dehiscing either vertically by valves, teeth, or pores, or transversely by a lid. It is composed of several carpels united, and it may exhibit all the kinds of dehiscence to which reference has already been made. In Caryophyllaceous plants, the dehiscence of the capsule often takes place by short valvular teeth (Fig. 308), in the Mahogany fruit by complete valves which separate from below upwards, in Colchicum and in Cotton, by valves separating from above downwards, in the Poppy (Fig. 309) by pores below the stigma, in Frogsmouth by rupturing at the apex, in Mignonette by becoming patent at the apex, in Campanula by irregular openings near the base, in Henbane (Fig. 310) by a lid, in which case the capsule sometimes receives the name of pyxidium, in Spurges* by the sudden separation of elastic cocci or carpels, each containing one seed, and in the Balsam by the separation of five elastic valves which coil upwards.

An Achænium or Achene (a, priv., and xaíveu to open) is a dry indehiscent one-seeded (monospermous) fruit, as in Crowfoot (Fig. 317). It is formed of a single carpel which VOL. V.

is closely applied to the seed. At first sight it is difficult Botany. to distinguish this kind of seed-vessel from a seed, and hence Linnæus termed some achene-bearing plants naked-seeded (gymnospermia—γυμνος, naked, σπέρ- μa , a seed). It is common to find several separate achenes forming the fruit. In Buttercups, the achenes are aggregated on a convex receptacle (Fig. 277), in the Strawberry they are placed on a convex succulent receptacle (Fig. 301), and in the Rose on a concave receptacle (Fig. 185). In all these cases, the presence of styles and stigmata enables the student to ascertain that what are commonly called seeds are in reality fruits. In the

Fig. 317. Achenium of Crowfoot (Ranunculus). A single-seeded seed vessel, with the peri-carp applied closely to the seed. Such fruits resemble seeds in appearance; the style and stigma, s, aid in distinguishing them.

instances already noticed, the numerous achenes are the produce of a single flower, but cases occur, such as the Fig (Fig. 157) and Dorstenia (Fig. 156), in which they are each the produce of a separate flower. In the Borage and Mint orders, the two or four achenes forming the ripe fruit (Fig. 318) are at first united, and even when matured, there is a common style which is attached to the apparent base of each achene. Cases also occur in which the achænia are united to the tube of the calvx.

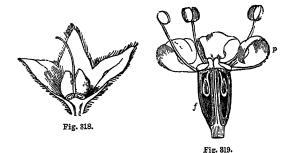


Fig. 318, Calyx and fruit of Comfrey (Symphytum), cut vertically. The fruit is divided by the folding of the overy into four single-seeded portions or achema, two of which are seen in the figure, and the style appears to arise from the base of the carpels.

319. Flower of Fenuel (Fomiculum vulgare), one of the Umbelliferse, cut vertically, showing the fruit, f, composed of two single-seeded carpels, or achenes, united, so as to form a cremocarp. The pendulous seeds are seen in the carpels or mericarps. The two styles are seen at the apex of the fruit, with their dilated bases formed by an epignnous disk. The points (apicula) of the petals, p, are turned inwards. The calyx tube is adherent to the fruit, and the limb of the calyx is often obsolete.

Thus in Composite plants, such as the Thistle and Dandelion, what are called seeds are in reality single-seeded fruits, each produced by a separate flower, with the tube of the calyx united to it, and the limb of the calyx appearing as a rim or as a hairy appendage, called pappus (Figs. 206 and 252).

In Umbel-bearing plants, such as Hemlock and Fennel, two achænia, invested by the tube of the calyx, are united by their faces, so as to form a compound fruit called a Cremocarp* (κρέμαεν, to suspend, and καρπὸς fruit), with a division or commissure between them (Fig. 319). This fruit, when ripe, shows its composition by separating into two achenes (called here, mericarps or hemicarps, μέρος, part, ημισυς half), which are suspended by a slender central stalk or axis (Fig. 320), called a Carpophore (καρπὸς, fruit, and φορέειν, to bear). The outer surface of these mericarps is marked by ridges and furrows, and there are often peculiar vittæ or receptacles of oil present in the peri-

*Pl.CXXL figs. 2 & 3..

Fig. 320.

Fig. 320.
The fruit of the Fennel (Foniculum vulgare) arrived at maturity. It separates into two coci or which is marked with obtuse prominent ridges on the surface, and is suspended from the summit of a process of the axis (columella), called a carpophore.

CXXXII. fig. 7.

À Caryopsis (καρύα, a nut, and ὄψις, appearance) is a dry in-

Fig. 321.

Garyopsis, or single-seeded grain of Oats (Avena). The fruit and seed are incor-porated. The peri-carp, o, bears the styles and stigmas, and incloses the seed, t, with its al-bumen, or peri-sperm, a, and its embryo, consisting of the cotyledon, c, c, the genutle, c, a

Botany.

dehiscent monospermous seed-vessel resembling an achæ-

nium, but differing in the complete adhesion and incorporation which exists between the pericarpial covering and the seed. It is seen in the common cultivated grains, as Wheat and Oats (Fig. 321), and in general in all Grasses. In these plants the pericarp cannot be separated from the seed. Hence the grains of Wheat, Maize, Barley, Rye, and Oats, are in common language called seeds. It is only by examining them in the early state, and noticing the styles, that we can determine their real nature.

A Nut is a dry unilocular one-seeded indehiscent fruit with a hard covering. In its early state, it is usually composed of two or more carpels, with one or more ovules in each; but, in the progress of growth, all disappear except one. It is illustrated by the Hazel-nut, the Chestnut, the Acorn (Fig. 300), and the Coco-nut. In many cases it is surrounded by a series

of bracts forming an involucre, seen in the root, r. the husk of the Nut, the cup of the Acorn, and the burr of the Chestnut. Some restrict the term nut (glans) entirely to such cases. The pericarp of the nut has its parts frequently so united as not to be distinguished from each other. In the Coco-nut, however, the pericarp can be separated into an epicarp or outer covering, a fibrous mesocarp, and a stony endocarp, marked with three ridges and three depressions, one of which is perforated. The epicarp of the nut of the Sago-Palm is scaly.

A Samara (Samera, seed of Elm), is a nut or achænium,

in which the pericarp is extended in the form of a winged margin or apex. There are originally two carpels united, but one of them is frequently abortive. This samaroid fruit occurs in the Maple (Fig. 322), and Sycamore, the Ash, and the Elm. The samara of the Sycamore opens by splitting into two in a septicidal manner.

A Drupe is the general name given to what are called stone-fruits, such as the Peach, the Plum, the Cherry, the Apricot, the Date, the Olive, and Coffee. It is a one-



Fig. 822. Branch of the Sugar-Maple (Acer saccharinum), bearing a cluster of samaroid fruit.

celled, one or two-seeded indehiscent fruit, having a fleshy mesocarp, which is hence denominated sarcocarp. In the Peach, the epicarp is the separable skin, the sarcocarp is the flesh which is eaten, and the endocarp is the hard shell or putamen, which can be split into two parts. In the Walnut, the putamen is divided in a marked manner into two, and from its interior bony partitions extend, so as to form lobes in the seed or kernel. Some fruits, such as the Almond, are called drupes or drupaceous, in which the sarcocarp is not succulent. Many call the Coco-nut a drupe, with a fibrous mesocarp. There seems to be, in reality, in such cases, a transition from the drupe to the nut. The aggregation of several drupes forms the fruit of the Raspberry, the Bramble, and the Quassia plant.

A Berry or Bacca, is the name given to all indehiscent syncarpous fruits, the seeds of which are immersed in a pulpy or fleshy mass. Such fruits are collectively called baccate or berried. In the true berry, such as the Gooseberry and Currant, the calyx adheres to the fruit, and the placentas are parietal (Fig. 323), while in the grape (Uva) the ovary alone is present, Botany. and the placentas are central. Instances

of baccate fruits are seen in Solanaceous plants,* such as the Potato, Belladonna,* Winter Cherry, (Fig. 207) and Mistleto.

In the Pomegranate there is a peculiar succulent berried fruit, called a Balausta (balaustium, the flower of the Pomegranate), in which the pulpy cells are arranged in two rows, some of which are in the centre round the axis, and others are placed outside, all being adherent to the calyx. In the Orange there is a modification of the berry, called Hesperidizm (the golden fruit in the garden of the Hesperides) in which there is a separable wind not formed by the cells. The fruit is called a Bacca.

rind not formed by the calyx, consisting of epicarp and mesocarp, and pulpy separable cells formed by the endocarp.

Cucumber and Melon (Fig. 324). It consists of three carpels united, covered by a firm rind, which is partly formed by the calyx. The placentas are by some considered as parietal, and as sending processes inwards, by others p they are looked upon as central, and as sending processes outwards, which reach the walls of the fruit and then curve backwards, bearing the seeds. The processes proceeding from the axis to the walls are usually obliterated, according to the latter view, giving rise to the appearance of the placentas being parietal. The fruit thus becomes one-celled. A transverse section of the Melon

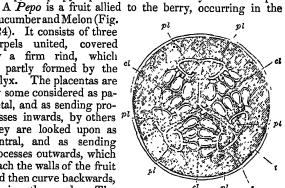


Fig. 324.

Transverse section of the fruit of the Melon (Cucumis Melo), showing the placentas, pl, with the seeds attached to them. The three carpels forming the pepo are separated by partitions, cl. From the centre, processes, s, go to the circumsterence, t, ending in enred placentaries bearing the ovules. These placentas by some are considered as parietal, formed on the walls of the truit, by others they are looked upon as the curved terminations of the contral processes, s.

Fig. 324.

is given in Fig. 324, in which pl indicates the placentas, cl the septa, and s the processes connecting the curved placentas with the centre. In the Plantain and Banana, the fruit is allied to the pepo, consisting of three carpels, with parietal placentas, the perianth being adherent to the ovary, and the seeds immersed in a pulpy mass when ripe.

A Pome is a fleshy syncarpous fruit composed of two or more scaly, or horny, or bony carpels, covered by a pulpy mass, which is incorporated with the calvx. fleshy portion may be considered either as the combined epicarp and mesocarp, or it may be reckoned the receptacle enlarged, as in the Rose, and united to the calyx. This

kind of fruit is seen in the Apple (Fig. 325), the Pear, the Quince, and the Medlar. The cartilaginous cells inclosing the seeds of the Apple, and the bony coverings (nucleus) of the seeds of the Medlar, may be reckoned either as the endocarp, or as the entire pericarp, according to the view taken of the formation of the pulpy exterior.

Multiple, Collective or Polygynæcial Fruits.—These fruits are formed by the Gynœcia of several flowers united, and the name anthocarpous is also applied, because they consist usually of the bracts and floral envelopes combined with the ovaries. They are either indehiscent or dehiscent, succulent or drv.



Fig. 325. Section of the fruit of ection of the fruit of the Apple (Pyrus Malus), consisting of a fleshy covering partly formed by the calyx, and five cavities in the centre with seeds. The fruit is called a Pome. In the Medlar the endocarp is stony.

*Plate CXXVI. *Plate CXXVIL

Fig. 323.

Fig. 326.

Fig. 326.

Fruiting branch of the Bread-fruit tree (Arto-carpus incise), with its large pinnatifid leaves. The fruit, b, is anthocarpous, and consists of numerous female flowers united together so as to form a succulent mass. It is often seedless. The property of the seedless of the seedless. The seedless of the seedless of the seedless.

Botany.

A Cone, Strobilus (στρόβιλος, a fir-cone), is a form of collective fruit, composed of scales or bracts covering one or more naked seeds (Fig. 296). Some consider these scales as carpels spread out, but from the absence of style and stigma, they seem more properly referable to floral leaves or bracts. The cone gives name to the natural order Coniferæ, or Cone-bearers, such as the Fir and Larch. In the Juniper the scales of the cone are succulent, and the fruit has sometimes received the name of Galbulus. In the Yew the bracts enveloping the naked seed also become succulent.

In the Fig (Fig. 157) a multiple fruit occurs, called Syconus (σῦκον, a fig), consisting of numerons flowers inclosed in a hollow receptale. What are called the seeds of the Fig, are in reality monospermous seed-vessels (achenes), with styles and stigmata. In the Mulberry, Bread-fruit

(Fig. 326), and Pine-apple, the ovaries and floral envelopes of several flowers are all united into one fleshy mass, placed on a more or less convex or elongated receptacle, and the fruit is called a Sorosis (σωρὸς, a congeries or cluster). The crown of the Pine-apple may be regarded as a series of empty bracts terminating the axis. In the strobili of the Hop, the bracts covering the flowers are membranous in place of being succulent.

Transformations in Fruits.—The same causes which produce alterations in the other parts of the flower, give rise to anomalous appearances in the The carpels, in place of bearing seeds, are sometimes changed into leaves, with lobes at their margin.

male flowers, a, are arranged in a spike. Leaves are sometimes produced from the upper part of the fruit, which is then called frondiparous, (frons, a leaf, and pario, to produce). In the genus Citrus, to which the Orange and Lemon belong, it is very common to meet with a separation of the carpels, so as to produce what are called horned oranges and fingered citrons. In this case a syncarpous fruit has a tendency to become apocarpous. Orange we occasionally find a supernumerary row of carpels produced, giving rise to the appearance of small and imperfect oranges inclosed within the original one. sometimes happens that, by the union of flowers, double fruits are produced. Occasionally, a double fruit is produced, not by the incorporation of two flowers, but by the abnormal development of a second carpel in the flower.

The Seed.—When the ovule arrives at maturity it constitutes the seed, which is contained in a seed-vessel in the plants which are called Angiospermous (ayyos, a vessel, and $\sigma\pi$ έρμα, a seed); while, in *Gymnosperms* (γυμνὸς, naked, and σπέρμα, a seed), such as Coniferæ and Cycadaceæ, it is naked, or, in other words, has no true pericarpial covering. By far the larger number of flowering plants belong to the former division. It sometimes happens in Angiosperms, that the seed-vessel is ruptured at an early period of growth, so that the seeds become more or less fully exposed during their development; this occurs in Mignonette, where the capsule opens at the apex, and in Cuphea, where the placenta bursts through the ovary and floral envelopes, and appears as an erect process bearing the young seeds.

The seed (Fig. 327) consists of a nucleus, c, usually covered by two cellular integuments, e, and te, which are sometimes included under the general name of Spermoderm (σπέρμα, a seed, and δέρμα, skin). The outer integument is denominated the *Episperm*, *Exosperm*, or more commonly the Testa (Fig 327, te). It corresponds usually to the primine of the ovule, but it is frequently formed by a union of both primine and secundine. It varies in its texture, being metimes thin and membranaceous, at other times thick and

hard. It presents various colours, being brown, white, red, black, and mottled. Its surface sometimes presents ridges and furrows, as in Larkspur, reticulations, as in the Water



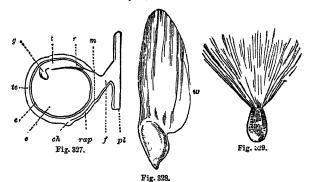


Fig. 327. The seed of the Pea (Pisum), deprived of one-half of its integrment or spermoderm. The outer covering called either epicarp, exocarp, or testa, is marked te, the inner, called endocarp, e. Within these integrments is the nucleus, consisting of cotyledons or seed-lobes, o, containing nourshing matter the gemmule, or young leaf-bud, q, the radicle, or young root, r, the tigelle or stalk between root and bud, t. The seed is attached to the placenta, pl. by a cord or funioulus, f. The nourshing vessels, rap, enter the nucleus at the chalza, ch, and the root of the embryo points to the micropyle or foramen, m.

238. Seed of Fir (Pinus), with a membranous appendage, w, to the testa, called a wing: The seed is said to be winged.

329. Seed of Far (Pinus), with a cluster of hairs arising from the edges of the micropyle, and by some considered as a hairy aril. These hairs are for the purpose of scattering the seed.

Cress, alveolar depressions, as in the Poppy, and tubercular eminences, as in Chickweed. Occasionally, the seminal integument is furnished with appendages in the form of wings, as in Pine seeds (Fig. 328) and Bignonia, or with a margin as in Sandwort; and at other times it is provided with hairs, as in the Cotton plant, Asclepias (Fig. 329), and the Willow. It is of importance to distinguish between such hairs and the pappus of Composite plants, and of Valerian,* which is in *Plate reality an abortive calycine limb attached to the fruit. We CXXII. have already stated that the presence of the style or stigma fig. 3. distinguishes single-seeded fruits from seeds.

The seed of some Polemoniaceous plants has a covering, consisting of small cells or hairs containing spiral fibres inside. These hairs are closely applied to the surface of the episperm, and are confined by a mucilaginous coating. When placed in water, the mucilage dissolves, and the hairs are liberated, so as to spread out in all directions. The walls of the cells are also usually ruptured, so as to allow the spiral fibres to uncoil, and form a beautiful object under the microscope. The same kind of structure occurs in the pericarpial covering of some Labiate plants, such as Salvia, and of some Composite plants, such as Senecio. The spreading out of these fibrous cells is apparently intended for the purpose of fixing the seed in the moist soil, into which they are carried by the wind. Sometimes the secundine of the ovule assumes a succulent consistence in the seed, and

The Endopleura or Tegmen is the inner seminal envelope or integument. In general, it is formed from the tercine or the membrane of the nucleus, and it is sometimes united with the embryo-sac. In some cases, as in the Water-Lily, Ginger, and Pepper, this sac remains as a distinct covering of the young plant under the name of the vitellus (Fig. 333, es). The endopleura is often incorporated with the testa, and scarcely separable from it. It is composed usually of a thin layer of cellular tissue, and when the nucleus is sinuous, as in the Walnut, it follows its windings, so as to enter between the lobes.

forms a lining to the episperm.

The spermoderm, or general seminal integument, has certain markings corresponding to those mentioned in the ovule. Thus, we observe the micropyle or small opening in the coats which extends to the nucleus (Fig. 327, m), the chalaza (Fig. 327, ch) or the fibro-vascular connection between the nucleus and the coats, and the base or hilum by

Botany. which the seed is connected with the funiculus (Fig. 327, f). These parts bear the same relation to each other as they do in the ovule. Thus, in an orthotropous seed, the hilum and chalaza are united, and the micropyle is at the opposite end or apex; in a campylotropous seed, the hilum and chalaza are united, and the micropyle is slightly removed from the hilum; while in an anatropous seed, the nucleus is invertedits base and the chalaza being removed from the hilum, and the micropyle being close to the hilum.

The micropyle is smaller and less distinct in the fullgrown seed than it was in the ovule. It indicates the place where the radicular extremity of the embryo is situated. Its situation in the Bean and Pea, when they begin to sprout, is marked by a little lid-like process (embryotega) which is pushed upwards. The chalaza is more or less evident in different seeds. It is conspicuous in anatropous seeds, such as the Orange (Fig. 330, c), where the raphe (Fig. 331, r) or vascular connection between it and the placenta exists. The raphe forms a cord usually along the inner side of the

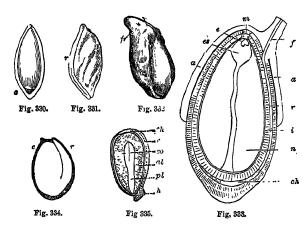


Fig. 334. Fig 335. Fig, 333.
Eig. 330. Anatropal seed of the Orange (Citrus Aurantium) opened to show the chalaza, c, which forms a brown spot at one end.
331. Entire anatropal seed of the Orange (Citrus), with its rucose or wrinkled te-ta, and the raphe or internal funiculus, r, ramifying in the thickness of the tests on one side.
332. Arillode, a, the false aril of the Spindle-tree (Euonymus), arising from the micropyle, f.
333. Arillode, a, the false aril of the Spindle-tree (Euonymus), arising from the micropyle, f.
334. Young anatropal seed of the White Water-Lily Nymphæa alba), cut vertically. It is attached to the placenta by the funiculus or umbilical cord, f, cellular prolongations from which form an aril, a. The vessels of the cord are prolonged to the base of the nucleus, n, by means of the raphe, r, composed of cells and spiral ressels. The base of the nucleus is indicated by the chalaza, ch, while the apex is at the micropyle, m. The covering of the seed is marked t. The nucleus, n, is composed of albumen or perisperm, surrounded by its covering, and inclosing the embryo-sac, es, which remains in the rips seed in the form of a vitellus. The embryo e, with its suspensor, is contained in the sac, the radicle pointing to the micropyle m.
334. Seed of Wallflower (Cheiranthus) out vertically. The seed is exalbuminous or aperispermie—all the nourishing matter being incorporated with the cotyledons, c. On removing the integument which is marked by the dark lines, c. On removing the integument which is marked by the dark lines, the embryo alone is found in the interior. The radicle, r, is folded on the edges of the cotyledons, which are accumbent; the plant belongs to the division of oracifers, called Pleuronizee.
335. The seed of the Pansy (Viola tricolor) cut vertically. The seed is anatropal, and the embryo is orthotropal, the cotyledons, co, point to the base of the nucleus or chalaza, ch, while the the radicle, or the other extre

seed, and may be considered as a prolongation from the funiculus, along with a covering derived from the integument of the seed. The scar or hilum is of different sizes and colours, and indicates the base of the seed or the place where it is attached to the placenta. This attachment is either direct, or is accomplished by the intervention of a stalk or cord called the funculus, which in Magnolias becomes much elongated. In the Bean the scar is of a black colour; in other cases it is white or brown. It sometimes extends over a large portion of the seed, as in the Horse-chestnut.

On the outside of the integument of the seed there is sometimes an additional partial covering of a cellular nature which is developed after the ovule is fertilized, and which

has received the name of Aril (arillus). It proceeds from Botany. the placenta or top of the funiculus in some instances, while in others it arises from the foramen of the seed. In the former case it is called a true or funicular aril, while in the latter it is called a false or micropylar aril, or sometimes Arillode. In the Passion-flower and Water-Lily, a funicular aril exists, while in the Spindle-tree, Nutmeg, Spurge, and Milkwort, a micropylar aril (Fig. 332, a) is seen. In the Nutmeg,* the arillode is laciniated and of a fine scarlet colour, *Plate constituting the mace. Certain cellular processes are occa-CXXXI. sionally seen at the base, apex, or sides of the seed, which fig. 6. have received the names of Caruncles and Strophioles.

The different parts of a seed are represented in Figure 333, n being the nucleus or central portion, composed of nourishing matter inclosing the embryo-sac, es, with the embryo-plant, e, the radicle of which points to the micropyle, m; f the funiculus, ch the chalaza, r the vessels running from the placenta to the base of the nucleus, i the integuments or spermoderm, and a a the funicular aril.

The nucleus or kernel of the seed (Fig. 333, n) is the fully-developed central portion of the ovule. It is much altered in general by the deposition of starchy, azotized, and ligneous matter, and by the development of the embryo. It consists either of the embryo alone, as in Wallflower (Fig. 334), or of the embryo along with a separate deposit of nourishing matter called the Albumen or Perisperm, as in the Pansy (Fig. 335). This albumen consists of starchy, ligneous, oily, saline, and nitrogenous substances contained in cells of various consistence. It is, therefore, not merely what chemists call vegetable albumen; and hence it is better to give it the name of perisperm or endosperm.

A seed is said to be albuminous or perispermic when it has a separate store of albumen distinct from the embryo, as in the Coco-nut, Wheat, and Pansy (Fig. 335); and exalbuminous or aperispermic when the nutritious matter is incorporated with the lobes of the embryo, as in Cruciferous plants (Fig. 334), in the Bean, the Pea (Fig. 327), and Almond. The perisperm varies in its consistence according to the nature of the deposit and the state of the cells. In the Vegetable-Ivory Palm, the cells are thickened by ligneous deposits, and the perisperm is of a horny consistence; so also in Coffee. In the Cereal grains, as Wheat, it is mealy and farinaceous; in the Poppy it is oily; in the Coco-nut it is cartilaginous; in the Mallow, mucilaginous. When cut, the perisperm may present a uniform appearance, as in Castor-Oil, or it may have a mottled or ruminated appearance, as in the Nutmeg* and Betel-nut. The latter *Plate depends on some unaltered cells of the endopleura or of the CXXXI. embryo-sac ramifying through the substance and forming fig. 11. convolutions. The proportion which the perisperm bears to the embryo varies much. Sometimes, as in the Coconut, in the Date, and in Monkshood, the embryo is very small, while the albumen is abundant; at other times, as in the Nettle, the embryo is large and the albumen small. The deposit of albumen takes place within the integuments of the seed. It either occupies the space between the endopleura and the embryo-sac, when it is called exospermic, as in the Water-Lily and other plants which have a distinct vitellus; or it is deposited within the sac, and then is endospermic; or it occupies both positions at once, and then may be called by the general name of perisperm.

The Embryo-is the young plant contained in the seed. It is the part to the production and nourishment of which all the floral organs contribute. It is contained originally in a cavity called the embryo-sac (Fig. 333, es), and appears at first as a small vesicle or cell (Fig. 333, e), attached to the sac by a cellular process called a suspensor, which is often very long, as in Cruciferous plants. The embryo-sac is sometimes separated from the endopleura by a quantity of perisperm (Fig. 333, n), at other times it is incorporated with it. The embryo-sac exhibits peculiar tubular prolon-

*Plate

CXXVI. fig. 5.

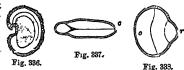
gations from its base and apex in some instances, as in the

Eyebright.

The Embryo in its structure exhibits cells and spiral vessels. It consists of a general axis, one part of which is concerned in the production of the root (Fig. 335, pl), and another in the formation of the stem (Fig. 335, co). The radical or root-portion of the axis always points to the micropyle of the seed. Hence, in orthotropal seeds, the embryo is said to be inverted, because its radicle points to the apex of the seed where the micropyle is situated, while in anatropal seeds (Fig. 335) it is erect. The axial portion of the embryo is provided with foliaceous or fleshy organs called seed-leaves (Fig. 335, co) or Cotyledons (κοτυληδών, name of a plant with fleshy leaves), which serve a temporary purpose in nutrition. From the upper part of the axis, the stem called the *Plumule* rises, bearing the ordinary, or *primordial* leaves of the plant. These separate parts are well seen when the young plant has begun to grow, as in Figure 59, where t is the general axis, with the roots, r, at the base, the cotyledons, cc, above, and the plumule with the primordial leaves, q q, coming from between the cotyledons.

The embryo is sometimes placed in the centre of the albumen, or in the axis of the seed, and in a straight direction (Fig. 335), it is then axile or axial; when not in the centre of the seed it is abaxile or eccentric. In place of being straight it is often curved in various ways. This may depend on the curvature of the seed itself, as in the Snake-nut, and in Campylotropous seeds; or the seed may be straight, and the embryo alone curved. In the Chickweed order the embryo is curved round the albumen (Fig. 336), becoming peripherical. In other cases, as the Thorn-

apple and Solanum,*it is curved in a similar way within the albumen. In Grasses it is situated at the base of the seed, and outof the seed, and outside the albumen (Fig. Fig. 386. Seed of the Red Campion (Lychnis), out 321). In the Poppy the embryo is in the axis, but is curved or arcuate, in Geranium the cotyledons are twisted and doubled, in Convolvulus they are corrugated, and in the Potato and in Bunias they are spiral. In some Cruciferous plants the cotyledons plants the cotyledons



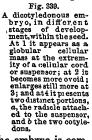
are bent like a leaf folded laterally on its midrib, and they are then called conduplicate, and marked o>; in other Cruciferous plants, they are flat, and the radicle is either bent along their edges, as in Wallflower (Fig. 337, r), and marked o =; or lies on the back of one of them, as in Rocket (Fig. 338, r), and marked o ||. In the former case, the cotyledons c are accumbent, in the latter incumbent. Some authors speak of the position of the embryo not merely in reference to the seed, but also in reference to the fruit. This is apt to lead to confusion. A superior or ascending radicle is the name given by them when it points to the apex of the fruit, while an inferior or descending radicle points to the base of the fruit; a centripetal radicle points to the centre or axis of the fruit, while a centrifugal one points in the opposite way.

In some plants, the embryo is entirely cellular and has no cotyledons. They are denominated Acotyledonous. They correspond to Cryptogamic or flowerless plants. The embryo, in such cases, is called a Spore (Fig. 8). It gives off roots and stems from different parts of its surface, and not

from any fixed points. It may either be regarded as an Botany. ovule remaining in a cellular state, or as a simple cellular embryo. It will be noticed when treating of the organs of Cryptogamic plants.

Plants which possess cotyledons in their embryo (Figs. 57 and 61) are called Cotyledonous, and they are divided into those having two cotyledons (Fig. 59), and which are called Dicotyledonous, and those having one (Figs. 60 and 63), called Monocotyledonous. The former correspond with the Exogenous division of Phanerogamous or flowering plants, the latter with the Endogenous. A dicotyledon ous embryo at first appears in the form of a cell (Fig. 333, e), the production of which in the embryo-sac depends on

the application of the pollen to the stigma. This cell is nucleated, and develops others in succession, until the embryo assumes the appearance of a congeries of cells suspended by a cellular filament (suspensor) as shown in Figure 339, 1. The globular cellular mass becomes afterwards more elongated, and passes through the stages 2 and 3 of Figure 339 until it assumes the appearance seen at 4, having an oblong or cylindrical form, with one extremity, a, undivided, and the other, b, lobed or notched. The undivided portion is the radicle (young root), and it may be considered as part of the rudimentary axis, from one end of which the roots are given off, and from the other the primary



bud or plumule. The split portion of the embryo is composed of two lobes or cotyledons, formed at one node, and

placed opposite to each other.

The cotyledons vary in their consistence, being sometimes leafy, at other times fleshy. They are sometimes so large as to form the great bulk of the seed, as in the Bean, Pea, and Almond. They form the first bud of the axis, which may thus be said to consist of a radicular and cotyledonary portion—their point of union being the Collum, neck, or crown. The part interposed between the neck and the cotyledons, which is often very short, is sometimes called the *Cauliculus* or *Tigellus*. The dicotyledonous embryo then is composed of two leaves or two unifoliar phytons, as they are called, united together so as to form one axis. The sheathing lower part of the cotyledons helps to form the caulicule; and from the axil of the cotyledons, or from the axis between them, is produced the plumular or gemmular bud (Fig. 59, gg), which forms the stem and leaves. This embryo may be represented by the ideal Figure 340, in which b is the axis or tigellus, a the radicular portion, connected with the soil and darkness, d the two cotyledons, united at their lower part so as to form the tigellus, and e the primary bud or plumule, connected with air and light. The embryo may be called a bifoliar phyton.

Although this is the usual state of the embryo in Exogens, nevertheless there are a few exceptions. In some Exogens without leaves, as the Dodder* and Rafflesia, the cotyledons are also suppressed. The embryo of these plants has a resemblance to the spore of Acrogens. In Cone-bearing plants, as the Pine, Spruce, Fir, and Cedar, the cotyledons are split by collateral chorisis, so as to be divided into several (Fig. 341), and this has given rise to the term polycotyledonous applied to them. The cotyledons of the Geranium and Lime-tree are divided into lobes. Accidental divisions are also seen in the cotyledons of the Sycamore and Rue. In Schizopetalon and some other Cruciferæ, the cotyledons are usually bipartite, so as to appear to be four.

A monocotyledonous differs from a dicotyledonous embryo in having only one cotyledon or seed-leaf (Fig. 63, c). It is composed of an axis having a radicular portion, r, and a cotyledonary portion, c, and it may be represented by a fig. 8.

Botany. single leaf or a unifoliar phyton. In Figure 342 is given an ideal representation of a monocotyledonous embryo, with its tigellus or axis, b, having a radicular portion, a, one coty-

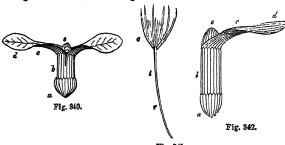


Fig. 341.

Fig. 341.

Fig. 340. Ideal representation of a dicotyledonous embryo or bifoliar phyton, with its radicular extremity, a, its two cotyledons, de, with their sheathing bases embracing the axis, b, and the primary bud, c. A dicotyledonous plant may be considered as composed of a series of such bifoliar phytons.

341. Polyocotyledonous embryo of the Pine (Pinus) beginning to sprout. The axis, t, shows its radicular portion, r, and cotyledonary portion, c. The cotyledons, c, appear to be numerous, but this is considered as being produced by chorisis or the division of two. Within the cotyledons the primordial leaves are seen, constituting the plumule or first bud of the plant.

342. Ideal representation of a Monocotyledonous or unifoliar phyton. The axis, b, has a radicular extremity, a, and a plumular bud, c. The cotyledon, d. c, has a sheathing base embracing the axis, and giving off the plumular bud, c, from its axil. A monocotyledonous plant may be considered as composed of a series of such phytons.

ledon. d.c. with a sheathing base, and a bud in its axil. c.

ledon, dc, with a sheathing base, and a bud in its axil, e, which rises as the stem. When this embryo is examined in the seed, it frequently exhibits no marked divisions—the cotyledon being coiled round the axis like a sheath, and embracing the plumule so as to conceal it. This is the case with the embryo of the Coco-nut. Sometimes a monocotyledonous embryo has more than one cotyledon. In that case, the second cotyledon alternates with the first, being produced at a second node, which is separated from the first

Transformations in Seeds.—Changes take place in seeds by abortion, degeneration, and union. There are few plants in which all the ovules become perfect seeds. Many are suppressed during the progress of growth, so that frequently one seed is developed at the expense of several ovules. Sometimes the seeds are converted into leaves. There is usually a single embryo in each seed, but cases occur in which a plurality of embryos is produced. This is a very common occurrence in the Orange, Cycas, and Cone-bearing orders. In the case of the two latter orders, the suspensor often ramifies so as to produce numerous separate embryos on its branches. These embryos are frequently abortive. In the seed of the Fir there are certain cellular bodies, called corpuscles by Brown, which give origin to filaments by which the embryos are suspended. Accidental union of embryos also take place.

II.—REPRODUCTIVE ORGANS OF FLOWERLESS PLANTS.

It has already been stated that Flowerless or Cryptogamic plants are composed either entirely of cells, as occurs in Seaweeds and Mushrooms; or of cells and vessels united, as seen in Ferns, Mosses, and their allies. The vascular tissue consists chiefly of pleurenchyma (Fig. 24) with closed spirals, annular (Fig. 32), and scalariform vessels (Fig. 34). In the simplest plants, as Protococcus (Fig. 343), the cell performs all the functions necessary for the nourishment and reproduction of the plant. In the more complicated Flowerless plants, there are some organs specially adapted for nutrition or vegetation, and others for reproduction. In the higher Cryptogams, there are roots, conspicuous stems, and leaves, for the purposes of nutrition, and certain special organs destined for reproduction. As these tribes produce a foliaceous axis or corm, they are denominated Cormogens or Cormophytes, and when their stems are woody, they present the acrogenous structure already described. In the lower Cryptogamics there are no true roots, nor stems,

nor leaves, and their nutritive and reproductive organs are Botany. frequently assimilated. These tribes, from having no foliaceous axis, but simply a cellular expansion, have been called Thallogens or Thallophytes.

While the nutritive organs of Cryptogamic plants bear

a greater or less resemblance to those of Phanerogams, the case is very different with the reproductive organs. Cryptogams have no flowers and no true seeds; they are propagated by cellular bodies denominated Spores (Fig. 344), which are cells capable of sprouting and forming new plants, (Fig. 348), and which some have called cellular embryos without cotyledons, or leafless phytons. The plants are consequently A cotyledons. gans. Cryptogams donous.







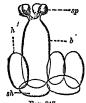


The term spore $(\sigma\pi\rho\rho)$, seed) should be confined to the ultimate germinating cell of Cryptogamics. It is frequently, however, applied to the cell in which the true spores are formed. Hence spores have been called simple or compound, according as they are formed by one or by several cells. The term Sporidium is applied to the compound spore of Lichens

Spores are developed either in the interior of the cell which gives origin to them, or on the outside of it. In the former case, they are called Endospores, in the latter, Exospores or Gymnospores. In Protococcus (Fig. 343), the fructification consists of numerous spores in the interior of a mother-sac, more or less spherical; in Palmella (Fig. 11), the mother-cell contains two or four spores; while in Vaucheria, only one spore is produced. A cell containing one, four, six, eight, or numerous spores or sporidia, receives the name of Theca (Fig. 346, t).

The exospores or naked spores in certain Moulds consist of elongated filaments which are formed by a series of cells placed end to end (Fig. 18, c). When ripe, the cellules separate. In Botrytis a single spore only constitutes the exospore, while

in Cantharellus there are two, and in Agarics four (Fig. 347, sp). Leveille called the mother-cell, on the exterior of which one, two, four, or many spores are formed, a Basidium (Fig. 347, b). In Agarics, the basidia bearing four spores at their extremity are in general united together so as to form a tissue called Hymenium (Fig. 347, h). In Lichens, Sphærias, and Pezizas, the thece containing four, six, or eight spores or sporidia placed one above the other are often separated by filaments or Paraphyses (Fig 346, p); and the united thece and paraphyses constitute the hymenium, which is placed so as to form a tissue called Hyme-



on the tissue forming the cortical or medullary layers called the subhymenium (Fig. 347, sh). The spore-bearing tissue is sometimes called generically the Excipulum; it may be flat, as in Usnea, and is then called Apothecium, or hollow, as in Peziza, and then called Receptacle; or it may form a closed cavity with an opening (ostiolum) only at one part, and then it is called a Conceptacle. In Ferns and Mosses,

Botany. the hollow cavities containing the spores receive the name of Sporangia (σπορά, seed, ἄγγος, a vessel) or spore-cases.

Spores are generally regarded as being produced by the agency of certain organs equivalent to the stamens and pistils of Phanerogams. These organs have been demonstrated more or less completely in all the orders of Cryptogamic plants, and they have received the names of Antheridia (Fig. 348, a), and Pistillidia or Archegonia (Fig.

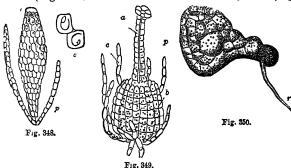


Fig. 348. Antheridium, a, of the Hair-moss (Polytrichum), consisting of cellules, c, containing phytozoa couled up in their interior. The phytozoa have a thickened extremity, whence proceeds a tapering tail-like process. Along with the antheridium are two separate filaments or paraphyses, p, which are probably abortive antheridia.

349. Pistillidium of Liverwort (Machanta), surrounded by its cellular covering, b, and by septate filaments called paraphyses, c; and surmounted by a style-like calyptra, a.

350. Spore, s, of a Forn (Peteri tongifotia) sprouting, giving off a root-like process, r, and a flat cellular expansion, p, called the pro-thallus or pro-embryo. On this expansion antheridia and pistillidia are said to occur.

349—ἀρχὴ, beginning, and γονὴ, offspring), the former representing the stamens or the male, the latter the pistil or the female. The antheridia were early noticed by Hedwig in the case of Mosses, and their presence has of late years been detected in nearly all the Cryptogamic tribes. In Mosses and in Liverworts antheridia and archegonia occur on the fully-developed plants. In Ferns and Horse-tails, they are seen on a cellular structure of a leafy character, called the Proembryo or Pro-thallus (Fig. 350), developed from the spores.

In antheridia there have been detected cells containing moving filaments, Phytozoa, or Spermatozoids, or Antherozoids (ζωον, an animal—Fig. 348, c). Each phytozoon (φυτον, a plant, and ζωον, an animal) is formed in a special

cell, is rolled upon itself in a spiral manner, and escapes either by a pore or by a dissolution of the wall of the cell. It is often furnished with slender threads at one extremity (Fig. 351). In the thecæ and sporangia, also, of many Cryptogamics, certain moving spores have been observed, furnished with vibratile threads or cilia (Fig. 8). These spores have been denominated Zoospores or Sporozoids (σπορά, a seed, ζῶον, an animal, ecos, resemblance). Their motions seem to be connected with vibratile processes which vary in number, and which proceed from different parts of the spore.



Fig. 351. Fig. 351.
Phytozoon or spermatozoid, from the antheridum of Chara.
It has two long vibratile processes at one extremity, and to these its movements

Filices or Ferns.—These Cryptogamic plants are composed cellular and vascular tissue. They have roots, leaves, an of cellular and vascular tissue. acrogenous stem, containing scalariform vessels, and an acotyledonous embryo. The stem or Caudex either rises conspicuously into the air, as in the case of Tree-ferns with their elegant foliage, or it appears as a rhizome running along the surface of the earth or under ground, as seen in the native Ferns of Britain. The trunk of Tree-ferns is hollow when fully formed, generally simple, sometimes dichotomous, having on the outside leaf-scars which display the markings of the vascular bundles (Fig. 88). The leaves. which are called *Fronds*, are produced at the summit of the stem, and they form a very graceful crown or coma. In the

young state, they are rolled up in a circinate manner, so as to resemble a crosier (Fig. 100). They consist of veins and parenchyma, the former being usually of equal thickness throughout, and divided in a forked (furcate) or reticulated manner. The epidermis has stomata, but they are not very numerous. The fronds bear the fructification. In some instances they produce bulbils or gemmæ, which, when separated from the plant, take root and give rise to new individuals; such Ferns are called Bulbiferous or Gemmiparous.

The fructification in its fully developed state appears as Sporangia, or Spore-cases, situated on the veins on the back, or on the margins of the leaves, containing spores. These spore-cases are arranged in clusters (sori) of a round (Fig. 352, s) or elongated form, and they are either naked

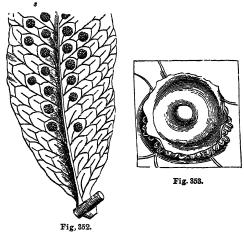


Fig. 352. Frond (fructiferous leaf) of a Fern (Niphobolus), showing sori, or round clusters of sporangia at the ends of vens. As these sori are on the back of the frond, the Fern is called dorsiferous.

353. Sorus or cluster of Sporangia of a Fern (Aspidium trifoliatum). The Sporangia are coveged by an industum or involuce, derived from the epidermis of the frond. The involuce is round (orbicular), and attached by its centre in an umbilical manner. The annulate sporangia are seen at the lower edge of the involucre.

or covered by a layer of the epidermis, which forms an Involucre or Indusium (Fig. 353). This indusium presents various forms, and is pushed off during growth in different ways, according to its mode of attachment to the leaf. It sometimes happens that the sporangia, in place of being in clusters on the back of the frond, as in the dorsiferous fructification, appear in the form of a simple or branched spike, as in Osmunda.

The sporangia commence as cellular buds from the parenchyma. Some of the cells constitute the stalk when present (Fig. 354, p), others form the sporangium, s, in the interior of which spores are formed. It frequently happens that the cells outside the sporangium form an Annulus or ring (Fig. 354, a), which is either vertical, and attached by its base, as in Polypody, or horizontal and free, as in Hymenophyllum. The cells composing the ring have walls which vary in thickness on the inner and outer side, and by their unequal contraction finally rupture the delicate sporangium, so as to allow the spores to escape. The ring is very obscure and imperfect in some Ferns, as Osmunda, and it is wanting in Moonwort and Adder's-tongue, and in many other Ferns. Hence, some Ferns are called annulate (having a ring), others exannulate (not having a ring). The spores are covered by a double membrane, and the outer layer is marked with points (Fig. 344). These spores, during germination, give rise to the pro-thallus or proembryo (Fig. 350), bearing the antheridia and archegonia.

Equisetaceæ, or Horse-tails.—The plants of this Cryptogamic order exhibit cells, vessels, a siliceous, striated epidermis, and stomata. They have roots, rhizomes, or underground stems, and aerial branches, but no true leaves. The rhizomes sometimes extend to the depth of many feet.

The stalks sent up from the rhizomes are hollow and jointed, the articulations being separable, and surrounded by toothed sheaths (Fig. 355, s).

The fructification in its advanced state consists of sporecases inclosing spores, attached to the under surface of shield-like hexagonal scales (Fig. 356), and collected into a

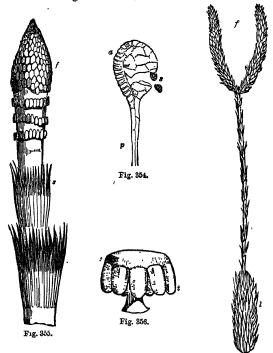


Fig. 357

Fig. 354. Mature sporangium of the Male Fern (Lastrea Filiz-mas). It is supported on a stalk, p, some of the cells of which form an elastic ring or annulus, a, round the spore-case. The spore-case, s, opens at the side to discharge the spores.

355. Fructification of a species of Horse-tail (Equisetum Telmateia). The stalk is surrounded by a series of membranous sheaths, s s, which are fringed by numerous sharp processes or teeth. The fructification, f, is at the extremity of the frond, in the form of a pyramidal mass of polygonal scales, bearing spores on their under surface.

356. Polygonal scale, s, of a species of Horse-tail (Equisetum), bearing membranous sacs, t, which open on their inner surface to discharge spores.

memoranous sacs, t, which open on their inner surface to discharge spores.

357. Fructification of a Club-moss (Lycopodium clavatum). The branch is covered with minute pointed leaves, t; from it proceeds a stalk bearing at its extremity two spikes, f, consisting of modified leaves, with fructification.

common pyramidal head (Fig. 355, f). The scales (Fig. 356, s) bear on their under surface a circular row of membranous sacs elongated like teeth, t. The sacs open towards the centre of the scale, or that part to which the stalk is attached. Within these sacs there are mother-cells which produce each a single spore. This spore is provided with two elastic spiral appendages, which at first completely cover the wall of the mother-cell and inclose the spore, but finally spread out so as to burst the walls of the sac (Fig. 9, a, b). The spore, when sprouting, produces a proembryo or pro-thallus, which at first appears as a green-lobed leaf supported on a stalk. The lobes of the proembryo extend and subdivide until a number of cellular septate tubes are produced, containing green matter. It is in this state that bodies resembling the antheridia of Ferns have been detected, as well as peculiar cells, which have been regarded as equivalent to archegonia.

Lycopodiacea, or Club-mosses. These plants have creeping stems or corms, which produce leafy branches, having some resemblance in general appearance to Mosses. Structurally they consist of cells and vessels, the latter occurring in the form of woody and annular vessels, which occupy the axis or central part of the stems. Roots are given off from the primary stem, as well as from different parts of the branches. The leaves are small and sessile,

imbricated (Fig. 357, 1), or verticillate, and on their epi- Botany. dermis stomata exist in small quantity. The fully-developed fructification occurs in the axil of leaves, which are often collected together in the form of a spike f. The fructifi-

cation is of two kinds, one being kidney-shaped, two valved cases (Fig. 358), containing minute cells, which are discharged in the form of yellow dust, known as Lycopode powder, and used, from its inflammable nature, in place of sulphur. The other kind of fructification consists of a roundish and somewhat four-sided body, called by Müller Oophoridium (ŵòv, an egg, and \$\phi\phi\phi\epsilon\text{to}\text{ known as Lycopode pow-





Fig. 359. Fig. 358.

taining four large spores in its interior, and opening by two valves (Fig. 359). These large spores, called *ovules* by some, germinate and reproduce the plant. While the first mentioned organ is considered by some as an antheridium containing grains like those of pollen, the latter is looked upon

as the pistillidium with ovules.

Marsileaceæ, Rhizocarpeæ, or Pepperworts. — These plants have creeping stems with leaves, which are divided into three or more cuneate portions, and have a circinate vernation. The leaves have stomata and veins. The stem increases by its extremity. It contains a central vascular bundle consisting of woody and scalariform vessels surrounded by parenchyma. The fructification is produced at the base of the leaf-stalks. It consists of Sporocarps (σπορά, a seed, and καρπὸs, fruit), or ovoid sacs inclosing organs of re-

production. In Figure 360 is represented the two-valved sporocarp or involucre, s, of Marsilea open, and giving out a cellular cord (called by some the midrib of the modified leaf forming the involucre), which at first was curved in a ring-like manner so as to unite the valves, and which finally is detached at one end, p, bearing the reproductive spike-like masses, f, on its surface. These masses consist of antheridia and pistillidia inclosed at first in sacs, and attached to mucilaginous placentas. The pistillidia give origin to the sporangia or ovules, each containing a single germinat-

Musci or Mosses.—These plants have stems bearing minute cellular leaves. The stems consist of cells which in the periphery are polyhedral, while in the centre they are elongated. There is no pleurenchyma nor true vascular system. In many Mosses the stem terminates at a certain epoch, by bearing the organs of reproduction. Such stems are determinate, and the Mosses are called Acrocarpous (ἄκρος, top, and καρπὸς, fruit). In other cases the principal stem ends in a leafbud, and continues to elongate, the organs of reproduction appearing on lateral branches. Such stems are indeterminate,

and the Mosses are called Pleurocarpous (πλευρά, side, and καρπός, fruit).

Fig. 860.

Fructification of a species of Pepperwort (Marsilea Fabri). The sporocarp, so pens to give out a peculiar cord or peduficle, p, which at first was curved in a ring-like manner. This cord bearsspike-like fructification, f, consisting of artheridia and pistillidia inclosed in saos, and attached to a common axis or placents. The leaves, when produced on the stem, are called caulinary; when they surround the reproductive organs they are called perichætial (περί, around, and χαίτη, stalk). The latter are usually more approximated than the others, and

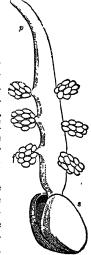


Fig. 360.

Botany. form a sort of rosette, in the centre of which the reproductive organs are situated. The leaves are very thin in their texture, and are frequently composed of a single cellular layer. The cells usually contain chlorophyll, but sometimes, as in Sphagnum, they are colourless. The cells are either uniform in their size and appearance, or a certain number towards the centre are elongated, so as to form veins or ribs. The phyllotaxis of Mosses is usually 1, 2, or 3. Buds, or what are called Innovations, are often produced in the axil of the leaves. These buds, when detached, become new plants.

Occasionally the reproductive organs of Mosses have a peculiar leafy covering or Perigone, formed by the adhesion of three or six small leaflets, which are quite distinct from the perichætial leaves. The organs of reproduction are of two kinds: one, consisting of cylindrical, pear-shaped, or ellipsoidal stalked sacs, containing minute cells, with phytozoa or spermatozoids in their interior (Fig. 348); the other being also stalked sacs, of a more or less spherical form, containing germinating spores. The former constitute the antheridia, the latter the pistillidia or archegonia. These organs sometimes exist together on the same plant; at other times they are on separate plants. In the former case the Mosses are monœcious, in the latter diœcious. When both these organs are not only on the same plant, but also surrounded by the same perigone, the term hermaphrodite has been applied by some.

The antheridia of Mosses are produced from little clusters of leaves, which differ from those of the stem. They appear in the form of cellular, cylindrical, clavate bodies (Fig. 348, a), containing at first a mucilaginous fluid, and finally very minute, quadrilateral cellules, c, (sometimes called Zootheceζωον, animal, θήκη, a sac), in each of which a spiral phytozoon is seen. The antheridia dehisce by irregular openings at their apex, so as to discharge their contents. Along with the antheridia there are cellular jointed filaments (Fig. 348, p), called Paraphyses, which are considered to be an abortive state of these organs. The archegonia, often mixed with paraphyses or abortive filaments, arise also from small clusters

or rosettes of leaves (Fig. 361, f), and appear in the form of spherical or obovate bodies having an outer envelope (epigone) and a central cellular nucleus. In the progress of growth, the central portion increases and rises upwards, and, at the same time, the epigone is ruptured near the base one portion of it remaining below in the form of a small sheath (vaginula), the other being carried up on the fruit-bearing stalk in the form of a Calyptra (Fig. 361, c). This calyptra is sometimes split at one side (Fig. 361), so as to become dimidiate (halved), and at other times it is either entire or split equally all round the base, and it is then called mitriform. The nucleus or central mitriform. The nucleus or central portion, when fully developed, constitutes the Sporangium. The sporangium is usually supported on a stalk or seta (Fig. 361, p), formed by the lower cells of the nucleus. The seta is often twisted, and, from its hygrometric property, it produces changes in the position of the sporangia for michithe callyptra has fallen. The seta is twisted, and displays hygrometric properties.

Fig. 361.

dryness or moisture of the atmosphere. A species of Funaria or Cord-moss, receives the name of hygrometrica, on this account.

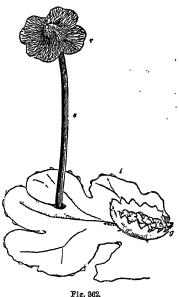
The sporangium in its young state is a mass of cellular VOL. V.

tissue, the cells of which are homogeneous, and contain Botany. green matter. When mature, it is an urn-like body (Fig. 20), with a cellular central axis called columella, and a cavity containing spores. In some instances the sporangium is indehiscent; in other cases it opens either by four lateral valves, as in the Split-moss (Andræa), or by means of a lid called an Operculum (Fig. 20). Sometimes there is a thickening or swelling called apophysis, at the union of the seta and urn.

When the operculum is removed, the opening (stoma or mouth) of the sporangium is seen. This is sometimes entire, as in Mosses called naked-mouthed (qymnostomi, yuuvos, naked, and στόμα, month); at other times it is surrounded by a Peristome (περὶ around, and στόμα, mouth), formed by prolongations and divisions of the two inner parietal layers of the sporangium (Fig. 20, p). The peristome consists of one or more rows of hygrometric cellular teeth, which are either four, or some multiple of that number. When there is one row of teeth, the Mosses are called

Aploperistomi ($\delta\pi\lambda\delta$) single); when there are two rows, the Mosses are called Diploperistomi (διπλόος, double). The peristomatic processes (teeth) are sometimes twisted as in Tortula. In some Mosses the inner parietal layer appears as a membrane called Epiphragm or Tympanum, stretched across the mouth, from the walls of the sporangium to the columella.

Hepaticæ or Liverworts .- In these plants the vegetative system. (organs of nutrition) consists either of a simple cellular expansion or thallus, or of an axis bearing cellular leaves. A In Marchantia this thallus (Fig. 362) bears the organs of reproduction, as well as cup-



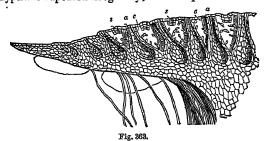
species of Liverwort (Marchantia polymorpha), with its green thallus, t, bearing a cup-like body, g, in which minute cells or free buds are seen, and a stalked receptacle, s r. In the substance of the disk-like receptacle, r, cells are produced containing phytozoa. These are considered antheridia.

like bodies with toothed edges, containing little germs or bulbils, g, which are not traced to a reproductive process, and differ from buds, in being contained in peculiar organisms.

In Hepaticæ, the reproductive organs consist of zoothecæ or antheridia, and archegonia or pistillidia, either on the same or on different plants. The antheridia are small cellular sacs of a globular, ovoid, or flask-like form, (Fig. 363). They have a single or double cellular covering, inclosing viscid matter, in which are developed four-sided cells, in each of which is a small filiform body, rolled up in a circular manner, and displaying rapid movements. These bodies, called phytozoa, are finally liberated, and unrol themselves, appearing as filaments swollen at one extremity, and gradually tapering to the other.

The archegonia or pistillidia of Hepaticæ are either situated in the substance of the thallus, as in Riccia, or they are raised upon stalks, as in Marchantia and Jungermanniæ. In Marchantia these stalks bear radiated receptacles on the under surface of which the sporangia are placed. These sporangia have a membranous covering called epigone or calyptra, the upper end of which elongates like the neck of a bottle (Fig. 349 a), so that the

pistillidium resembles a pistil, with its ovary, style, and stigma. When the sporangium is raised on its stalk, the calyptra is ruptured irregularly; its lower portion remaining



Vertical section of the disk-like receptacle of Liverwort (Marchantia), showing the antheridia, a a, in its substance. These antheridia are flask-shaped sacs containing phytocary cells. They communicate with the upper surface, and their contents are discharged through it. Between the antheridia there are air cavities, cc, connected with stomata, ss.

in the form of a sheath round the base of the stalk. The pistillidium, thus formed by the central cellular sporebearing sac and the epigone, is surrounded also by a cellular sac called the perigone (Fig. 349, b), which begins in the form of a ring at the base, and ultimately forms a cup-like covering. Occasionally there are certain cellular filaments, or perichætial leaves, surrounding the perigone (Fig. 349, e). In Marchantia the perigone incloses a single pistillidium; in Jungermannia it incloses several, but only one is developed. Along with the spores in Hepaticæ there are elastic spiral fibres called elaters.

Lichenes or Lichens—are cellular plants growing on stones, on the surface of the earth, and on trees, and taking up nourishment by all points of their surface. They belong to the Thallogenous division of Cryptogamics, in which no vascular tissue is seen. Their vegetative system varies much in its form and appearance. Sometimes it appears as fine pulverulent matter in the form of a leprous or mealy crust; sometimes it is a foliaceous expansion, as in Parmelia (Fig. 364), and in Iceland Moss; sometimes it is in the form of filaments, as in Archil, of horn-like processes, or of branching stalks, as in the Rein-deer Moss; and sometimes it is a gelatinous mass.

The vegetative system is sometimes called the thallus. It consists of two layers of tissue, one called cortical, in which the cells are more or less rounded, the other medullary, in which there are both round and filiform cells. The spherical cells of the medullary layer (Fig. 365, g), are generally filled with green matter, and, in certain circumstances,

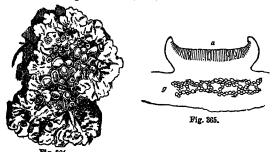


Fig. 364. A Lichen (Parmelia), with its cellular expansion (thallus), and its rounded apothecia, or spots of fructification.

365. Vertical section of an apothecium and thallus of a Lichen. Rounded free cells, g, of a green colour, and called gonidia, are seen in the centre of the thallus. These gonidia, which are called free buds by some, are capable of germinating and reproducing the plant. They constitute the active part of the Lichen, and are surrounded on each side by integumentary layers. Sometimes they burst through the surface of the thallus. The apothecium, a, consists of thece and paraphyses. Its upper surface is often coloured and covered by a perithecium.

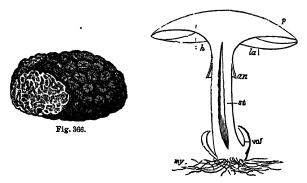
they become detached and form separate individuals. These green cells have received the name of Gonidia.

The reproductive organs of Lichens consist of thecæ

(sporangia of some), often accompanied with paraphyses. Botany. While these represent the archegonia or pistillidia, there is no good evidence of the existence of true antheridia. Itzigsohn has recently indicated the presence of antheridia containing spermatozoids, but his observations have not been confirmed by Tulasne and others. The thecæ contain four, eight, twelve, or sixteen sporidia (Fig. 346), which are cells with spores in their interior. The sporidium in its early state consists of two nucleated cells (Fig. 345), which in the progress of growth become changed, so that ultimately the mature sporidium contains numerous minute spores. The thecæ and paraphyses are usually united together, so as to form a mass of fructification of a circular, cup-like, globular, or linear form. The fructification, when circular, is called Apothecium and Patella (Fig. 364), when linear, Lirella. Sometimes the fructification is covered by a cortical layer of cells (perithecium) varying in colour, black, red, or pale, which ultimately gives way, either by a pore or by irregular dehiscence. This is seen in what are called Angiocarpous Lichens.

Fungi.—These are cellular plants having neither leaves. nor stems, nor roots. The organs of nutrition or vegetation consist of whitish anastomosing filaments called Mycelium (μύκηs, a fungus) or spawn (Fig. 18, m), which spread like a network through the substances on which the Fungi grow. From this network proceed bodies resembling globes, circular disks, mitres, cups, and coralline branches, which bear the organs of reproduction. The mycelium is developed either under ground, or in the interior of the substance on which the plant grows. The filaments of the mycelium are composed of elongated colourless cells.

The organs of reproduction are produced at different points of the mycelium, sometimes solitary, sometimes several together. They at first appear as small tubercles composed of very minute hexagonal cells. These tubercles increase and present different phenomena according to the nature of the plant to which they belong. Thus in Ægerita, the tubercle, after attaining its full development, is covered with filaments, each bearing a spore at its extremity; in Peziza, it is hollowed out into the form of a cup more or less deep, the interior of which is lined with thecæ or asci; in Agaricus,* it produces a pileus or cap-like body borne on *Plate a long stalk which comes from the interior of the tubercle, CXXXVI. and bears the fructification externally; in Lycoperdon it figs. 5 & 6. forms in its tissue numerous lacunæ, from the circumference of each of which are produced elongated cells bearing four spores on their surface. Some Fungi vegetate under the surface of the ground, and either produce their fructification



there, as the Truffle (Fig. 366), or above ground, as the

Fig. 366. The Truffle (Tuber cibarium), a subterranean Fungus, with a black tuberculated or warty external covering, and a white cellular interior containing sportferous cells.
 367. Vertical section of a Mushroom (Agaricus campestris); my, mycellum or spawn; vol. remains of volva or wrapper; st, stipe or stalk; an, annulus orring, being the remains of the velum, veil, or cortina; la, lamells or gills of the hymenium, λ; p, the pileus.

Mushroom (Fig. 367). A very large number, however, are

developed as parasites in the interior of living or dead organized bodies.

* Plate

The organs of reproduction of Fungi* are spores, CXXXVI. either naked or contained in thecæ or asci, which are mixed with certain filaments called antheridia. Little is known in regard to the latter. When spores are produced in the interior of distinct sacs, called *Thecæ* or *Cys*tidia (Fig. 368, cys-κύστις, a bladder), they are denomi-

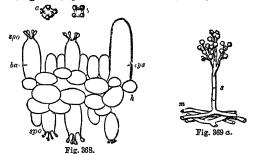


Fig. 368. Portion of a lamella or gill of the Mushroom (Agaricus campestris), out transversely, showing the two lateral surfaces bearing basidia, bas, with four spores, spo, at their apices, and cystidia, cys, or sacs containing minute cells. The hymenium is marked λ. At α and b are represented the four spores.
... 369 α. A species of Mould-fungus (Botrytis), consisting of a mycelium, m, bearing a septate cellular stalk, s, which branches at the apex, each division bearing a rounded spore.

nated *Endospores*, and the plants are said to be thecasporous; when they are developed on the exterior of sacs called Basidia (Fig. 368, bas—βάσις, foot), they are denominated Exospores, and the plants are basidiosporous; when produced in the midst of a gelatinous mass, without any evident organization, they are called Myxospores (μύξα, mu-

cus), the plants being myxosporous.

The fructification is composed either of a single transparent colourless cell, of a rounded or spindle-like form, at the end of each filament (Fig. 369 a); or it is composed of several cells united in a linear series (Fig. 18) or irregularly. The cystidia and basidia are either monosporous or tetrasporous (Fig. 368, spo). When either of these kinds of fructification are united into a mass along with paraphyses, they form what is called the Hymenium (Fig. 368, hύμην, a membrane). The hymenium is either naked, as in the Hymenomycetous Fungi, or it is inclosed in a membrane called *Peridium*, as in Gasteromycetous Fungi. This membranous covering may be either single or double.

In the Mushroom (Fig. 367) and other species of Agaricus,* the following are the usual organs observed:-A my-CXXXVI. celium or spawn, my, developed under ground, bearing tufigs. 5 & 6. bercles which consist of the reproductive organs inclosed in a volva or wrapper. This volva, vol, is ruptured in the progress of development. The Agaric is then seen to be composed of a pileus, p, supported on a stalk, st, called a stipe. On the lower side of the pileus is the lamellar hymenium or gills, la, bearing spores. The hymenium was first covered by the veil or indusium, which finally gives way, leaving only a ring, an, round the stalk.

Alga.—Under this name are included numerous plants which grow in the sea, in rivers, lakes, marshes, and hot springs. Their structure is such that they can only grow in water; when exposed to the air they wither and cease to grow. They have no true leaves and no proper stem, but consist of a thallus or cellular expansion which varies in colour-being brown, red, green, or yellow. In some of the larger Seaweeds, as D'Urvillæa utilis and Lessonia fuscescens, the thallus is supported on a thick stalk, which exhibits in its structure the appearance of concentric circles. These stalks, however, are composed entirely of cellular tissue arranged in a peculiar manner. There is no vascular system and no woody fibre in their composition. Some species have root-like processes by which they are attached to rocks. These are only intended for fixing them to a spot

so as to allow the fronds to be properly exposed to the water, and they do not appear to act as special nutritive organs. The structure of Algæ is cellular, and the cells vary much in form. Some of the cells are round or elliptical, others square, others elongated. The absorption of nourishment takes place throughout the whole substance of the thallus. On the surface of some Algæ, as the Charas, carbonate of lime is deposited, and sometimes, as in Corallines, the whole texture is so permeated by this substance, as to become of a hard and stony consistence.

In Algæ the reproductive organs vary in their appearance. They consist of spore-cases, which are often aggregated together in Conceptacles (Fig. 369 b), along with Antheridia containing spermatozoids (Fig. 370, a). The spores are often united in fours in a mother-cell, forming a tetraspore (Fig. 371, t). There are also present in many

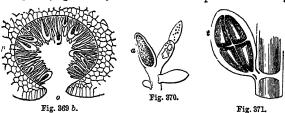


Fig. 369 b. Transverse section of a conceptacle of a Seaweed (Fucus vesiculosus), showing the spores in the coverings. p, and paraphyses liming the cavity. The spores escape by an ornice, o.

370. Antheridium, a, or Zootheca of a Seaweed (Fucus serratus), containing phytozoa.

371. Tetraspore, t, of one of the rose-coloured Seaweeds (Callithamnion oruciatum).

Algæ Zoospores or Sporozoids, which exhibit movements during a certain period of their existence, and are provided with filamentous vibratile processes.

In some of the lower plants of this order, such as Diatomaceæ (Fig. 13), an evident division of cells takes place; and in this way the plants are propagated. In Protococcus, the plant of Red and Green Snow (Figs. 56 and 343), and in Palmella, the plant of Gory Dew (Fig. 11), and their allies, the whole plant separates into cells, which may be considered either as buds or spores. In these plants no special reproductive organs have been detected. In some of the Confervæ, as well as in Diatomaceæ, the union of cells takes place in a singular manner, so as to give rise to the formation of germinating spores (Fig. 19).

Diatomaceæor Brittleworts—are among the simplest forms of Algæ. They are usually composed of united rectangular fragments of a brittle nature, which separate at certain periods of growth, and form new individuals (Fig. 13). The true Diatoms have a siliceous covering, so that they retain their form when dry, and are not destroyed by fire; while the division called Desmidieæ have no siliceous covering, and alter much on drying. In some of the plants of the order, the union of cells, called Conjugation, has been observed, similar to what takes place in Confervæ.

Confervas and their Allies.—These are plants usually of a green colour, consisting of round or cylindrical cells united (Fig. 17), so as to form a filamentous or a flattened thallus. In their simplest form they are seen in the Palmella (Fig. 11), consisting of a single globose cell, dividing first into two, and afterwards into four cells, which finally burst the mother-cell, and escape. Each of these divisions, like the parent cell, has the power of vegetating, and of dividing, by a merismatic process, into four, so as to multiply the plant. In Vaucheria, the terminal cell is concerned in the production of a germinating cell or spore, which has peculiar motions. In Achlya prolifera the terminal cell discharges numerous moving spores. In Zygnema and other Confervas (Fig. 19), the cells composing the filaments have the power of giving out lateral cellular processes, by means of which a union takes place, the result being the production of a spore, either in the tube between the filaments, or in one of the

*Plate

Botany. cells of the filaments. The cells in these plants appear to have different functions, and to correspond to the antheridia

and pistillidia of the higher Cryptogams.

Florideæ, or Rose-coloured Seaweeds.—These Algæ are usually of a rose or purplish colour, and consist of variouslyformed cells, arranged either in a single row, or in several rows, so as to form an articulated or an expanded flat and often divided thallus. The organs of reproduction are restricted to particular parts of the thallus, and consist of spore-cases, containing spores, frequently four in number, intermixed often with antheridia, or filaments containing spermatozoids, these organs being placed in the interior of conceptacles. The reproductive organs exist either in cavities of the thallus, or in distinct sacs produced on the surface of the thallus, or at the apex of some of its divisions. The occurrence of Tetraspores, (Fig. 371), or mother-cells containing four spores, is general in this division of the Algal alliance. The antheridia consist of septate filaments, the terminal cell of which assumes a clavate form, and contains phytozoa. The latter become free by the dissolution of the

walls of the cell. Besides the tetraspores, sacs (coccidia or ceramidia) of a rounded form exist, containing minute spore-like bodies (Fig. 372), which some call sporules. They appear to germinate, and differ from buds, in being contained in special sacs; some consider these cellular bodies as bulbils, which separate from the parent plant; others look upon them as another kind of spore.

Fucaceæ, or Brown Seaweeds.—I nese are usually brown or olive-coloured plants, growing chiefly in salt water. They consist of cells, which are united so as to form various kinds of thalli. Sometimes the thallus is supported on a distinct stalk, formed of elongated cells; and in the frond there occur also thickened cellular lines, having the appearance of veins. The cells of the thal-Fucaceæ, or Brown Seaweeds.—These cur also thickened cellular lines, having the appearance of veins. The cells of the thallus are often agglutinated together by a

of pear-shaped germinating cells or spores. gelatinous intercellular substance. The reproductive organs consist of spore-cases and antheridia, contained in conceptacles (Fig. 369 b), which are aggregated together in receptacles, or large club-shaped expansions, at the extremity or margin of the thallus and its divisions (Fig. 39, fr). The antheridia are sacs (Fig. 370, a) borne on jointed filaments, and containing moving phytozoa. Antheridia and sporecases are seen on the same or on different plants.

Characeæ or Charas.—These plants are considered as allied to Algæ, although they present many marked peculiarities. They consist of an axis formed by elongated tubular cells (Fig. 21), either transparent, or incrusted with carbonate of lime. From the axis arise branch-like processes, arranged in a verticillate manner. In the interior of the tubes of these plants, distinct circulating motions are seen under the microscope. The reproductive organs of Charas are of two kinds, one called the Globule (Fig. 373, g), a spherical body, containing filaments with phytozoa, the other denominated the Nucule (Fig. 373, n), an oval body containing a germinating cell or spore. The nucule is produced on the axil of a branch, and consists of a large central cell or spore, surrounded by



five cells, which are wound round it in a spiral manner, and ending in five tooth-like processes at the apex. The globule is usually placed immediately below the nucule, and consists of eight valves, inclosing a cavity in which the filamentous articulated phytozoary cells are contained. The cells in the interior of the valvular cavity are filled, like Botany. those on the flat portion of the valves, with red granules.

On the apex of cells projecting from the centre of each valve, there are numerous filaments (Fig. 374), composed of cellules containing minute escape from the cell,

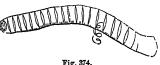


Fig. 374.

phytozoa, coiled up in a partitioned filament of Chara, consisting of a series of cellules containing pluy-tozoa, one of which is seen escaping in the form of a spiral thread.

and exhibit spontaneous movements (Fig. 351).

II.—PHYSIOLOGY OF THE REPRODUCTIVE ORGANS.

I.—PHYSIOLOGY OF THE FLORAL ENVELOPES.

The appendages of the flowers which assume a green colour perform the same functions as leaves, giving out oxygen under the influence of light. The cells of the floral leaves or bracts, and of the calycine leaves or sepals, commonly contain chlorophyll, which is produced under the agency of light by a process of deoxidation, carbon being fixed and oxygen separated. The bright-coloured parts of flowers do not appear to decompose carbonic acid; on the contrary, they exhale this gas. The corolla is associated with the thalamus or receptacle in producing abundance of starch, which is changed into sugar during flowering, so as to afford nutriment to the stamens and pistils. While the calyx and green parts of the flower are concerned in the elaboration of the juices under the influence of light, the corolla is more immediately concerned in the protection of the internal organs, in the formation of coloured juices, and in the production of amylaceous and saccharine matter. The quantity of starch accumulated in the receptacles of flowers is often large. This is well seen in Compositæ, such as the Artichoke and Thistle. The amylaceous matter during flowering in these plants becomes saccharine, and is absorbed by the flowers for their nourishment.

The flower, according to Saussure, in the exercise of its functions, absorbs oxygen gas, and gives out carbonic acid. The absorption of oxygen is carried on by the coloured corolla, along with the essential organs of reproduction. The organs of plants which consume most oxygen are those which wither most quickly, viz. the stamens, styles, and petals. The quantity of oxygen absorbed is much greater when the stamens and pistil are perfect than when they are abortive or wanting. A perfect flower, with the latter organs present took up more oxygen than one which had become double by the more or less complete conversion of

the stamens and pistil into petals. Thus

Common Stock, Single Red, consumed 11 times its vol. of oxygen. Double 7.7 ,,

,, Common Tuberose, Single g. " Double 7.4 " " Indian Cress, Single 8.5 Double 7.25

In proportion to their volume the essential reproductive organs absorb more oxygen than the entire flowers; and male flowers consume more oxygen than female ones.

At the same time that oxygen is absorbed there is a conversion of starch into grape sugar, an evolution of carbonic acid gas, and in many instances a very marked elevation of temperature, caused by the combination between the carbon of the flower and the oxygen of the air. The starch, which is stored up in the receptacle and at the base of the petals, by passing into the state of dextrin and grape sugar, becomes fitted for vegetable nutrition. At the same time important purposes are served in the economy of the plant. Thus the saccharine and honey-like matter which often collects in the cup of the flower, and sometimes in special pits or depressions, as in Crown Imperial (Fig. 55), attracts bees

*Plate

fig. 2.

Botany. and various insects, which are thus made instrumental in scattering the pollen. According to Vaucher, the saccharine matter is applied to the stigma and other parts of the pistil, so as to favour the application and bursting of the

grains of pollen.

An evolution of heat takes place during flowering; but from the large surface exposed, it seems to be in most instances carried off by the atmosphere as soon as it is developed. Cases occur, however, in which the temperature can be noted. Thus the flower of a Cistus showed a temperature of 79°, while that of the air was 76°, and those of a Geranium 87° when the air was 81°. Otto ascertained that the flowers of Victoria regia at Hamburg gave out heat when the anthers were mature. Mulder found the flower of Cereus grandiflorus 1° to 2° F. warmer than the atmosphere. M. Teysman at Burtenzorg, in Java, observed an elevated temperature in the male cone of Cycas circinalis.* By means of CXXXIV. an air thermometer Saussure found the flowers of Polyanthes tuberosa $\frac{1}{2}$ °, those of Bignonia radicans 1°, those of Cucurbita Pepo 1° to 3° F. above the temperature of the air.

The most marked instances of the evolution of heat, however, occur in the blossoms of plants belonging to the natural order Araceæ. In them the inflorescence consists of a thick fleshy spadix (Fig. 166) containing much starch, and bearing numerous male and female organs inclosed in a large sheathing bract or spathe. Senebier found that the temperature of Arum maculatum* rose to 15.5° F. above CXXXV. that of the air, and Dutrochet measured it from 25° to 27°. Goeppert states that the temperature of the spadix of Arum Dracunculus rose to 31.5° F. above that of the air surrounding it. Brongniart in 1834 found the temperature of Colocasia odora 19.8° F. above the air of the conservatory in which the specimen grew. From Dutrochet's examination of the spadix of Arum maculatum it appears that the maximum of temperature in the spadix occurred at 5.30 P.M., one hour and a half after the complete opening of the spathe, and that the heat was 18.7° above that of the surrounding air.

> The seat of the highest temperature changes during flowering. When the spathe opens, the staminal organs show the greatest heat; and after the pollen is discharged, their temperature falls, and the part of the spadix above them grows warm. Hubert states that the outer surface of the spadix is that in which the temperature is principally developed. The male organs of the Arum have a higher temperature than the female. There is also exhibited during flowering a daily maximum and minimum of temperature, which, however, do not appear to occur at regular periods. In the case of Arum maculatum, Dutrochet found the maximum temperature at 5.30 P.M., while Senebier noticed it after six in the evening. In Colocasia odora, Brongniart found the maximum at 5 P.M.; Vrolik and De Vriese, as well as Van Beek and Bergsma, at 3 P.M.; Hasskarl, in Java, at 6 A.M.; Hubert, in Madagascar, after sunrise. In the gardens of Paris, Amsterdam, and Leyden, Colocasia odora attains its maximum temperature at noon. The production of heat in Arum italicum, according to Saussure, attained its maximum from 4 to 7 P.M.

Brongniart gives the following results of his observations on Colocasia odora as regards the time and degree of maximum heat:-

DATE OF OBSERVATION.		Hour of Max. Tempera- ture.	Tempera- ture of Air.	Tempera- ture of Spadix.	Tempera- ture above Air.
Spathe opened March Pollen dis- charged,	$ \begin{cases} 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \end{cases} $	3½ P.M. 4½ ,, 5 ,, 5 ,, 11 A.M.	76·1° F. 75·2 74·8 75·2 80·6 77·9	84·2° F. 93·2 93·2 95 95 95·3 82·4	8·1° F. 18 18·4 19·8 14·8 4·5

The rise of temperature bore an evident relation to the

development of the stamens and the emission of the pollen. Botany. and after the latter had taken place, the temperature felland the spadix withered.

Garreau made observations on the heat given out by the spadix of Arum italicum. In an experiment conducted on 8th June 1851, the atmospheric temperature being 66.2° F. he found that the mean heat per hour was 11.2° F., the mean of the oxygen consumed 76.6, and its mean volume, when compared with the organ as unity, was 169. The oxygen consumed during the 6 hours of the paroxysmal heat was 460 cubic centimetres, and that consumed during the 18 succeeding hours was 230, making in all, in 24 hours, 690 cubic centimetres. The quantity of oxygen consumed increased with the temperature. In three distinct experiments the results were-

No. 1. Mean heat, 9.9° F. Oxygen consumed, 16.1 cubic cent. - 11.2 16.9 No. 3. 13.1 17.3

Garreau says that the nature of the surface of the spadix of Arum seems to facilitate absorption. It consists of numerous projecting cells, giving a velvety appearance to the organ, with two or three open stomata. Saussure found that the blossom of Arum maculatum, when cold, consumed five times its volume of oxygen, but when warm, thirty times. In a flower during the paroxysm, he found that the spathe consumed five times its volume of oxygen, the bare portion of the spadix 30 times, and the part covered with flowers 132 times.

The relation which the evolution of carbonic acid bears to the heat produced is thus shown by Dutrochet:-

NAME OF ORGAN.	Mean Temp. above Air in 12 Hours.	CO2 evolved in 24 Hours.
Spathe of Arum maculatum Spadix of do. Male organs of do. Female organs of do. Female flower, Gourd	0·06° F. 18·00 12·00 2·7 0·16	Cubic centimetres. 4:0 38:0 135:0 10:0 7:6

The quantity of carbonic acid evolved is in direct proportion to the oxygen absorbed, and the degree of chemical action which takes place determines the amount of heat.

The presence and contact of oxygen gas is necessary for these phenomena. When the spadix of an Arum is put into oxygen gas, the heat is developed rapidly and powerfully, the maximum difference between the heat of the oxygenated spadix and another in the air varying from 5° to 12° F.; and when the spadix is placed in carbonic acid gas or nitrogen, the evolution of heat ceases. The production of heat is prevented by covering the spadix with olive oil, grease, tallow, honey, or starch.

Periods of Flowering.—The age at which different species of plants produce flowers varies. Some spring from seed and produce flowers in the course of a single year and die, others produce flowers the second year after germinating and then decay, while a third set continue to flower for many years in succession. Hence the division into annual (O), biennial (d), and perennial (4), plants. In some cases flowering is long delayed, and when it does occur the development of the flowering stalk takes place with great vigour and rapidity, and the plant dies after producing fruit and seed. Any cause, whether natural or artificial, which retards flowering, is attended with results of a similar kind more or less marked. When fruit trees have been in a non-flowering condition, they sometimes suddenly produce abundance of blossoms. A season in which blossoming has been scanty is often succeeded by one in which it is profuse. When the flower-buds are taken off early, it sometimes happens that an annual plant, such as Mignonette, is rendered biennial or perennial. The tree Mignonette is pro-

duced in this way. When plants grow in a rich soil it others a few hours later, others at mid-day, others in the Botany. sometimes happens that, in place of producing flowers, they develop branches and leaves luxuriantly. In these instances cutting the roots, pruning the branches, taking a ring of bark out of the stem so as to retard the descent of sap, and transplanting into poor soil, frequently cause the plants to flower. Injuries inflicted on forest trees late in the season sometimes give rise to autumn flowering. When a branch is grafted on a vigorous stock it often happens that its flowering is accelerated. By this process a check is put to luxuriant branching, and the sap of the old stock stimu-

lates the young graft or scion.

The different periods of the year in the various countries and climates of the globe are marked by the flowering of certain species of plants. Each climate has its peculiar floral calendar. Thus in Scotland we have the Winter Aconite (Eranthis hyemalis) and the Snow-drop (Galanthus nivalis) flowering in February, the Primrose (Primula vulgaris) in March, the Cowslip (Primula veris) and Daffodil (Narcissus Pseudo-Narcissus) in April, the Hawthorn (Cratægus Oxyacantha) in May, numerous successive species expanding their blossoms during each month of summer, the Ivy (Hedera Helix) flowering in September, and the autumn Crocus (Colchicum autumnale) pushing up its flowering-stalks in October. Every month and every week has thus its peculiar flowers. The expansion of certain flowers indicates the revival of vegetation after winter in temperate and cold regions, and after the dry season in warm countries.

The time of expansion of the flowers of the same species in different countries gives indications in regard to the climate; and the difference of seasons in the same locality is also marked by the dates at which the same species flower. The registration of the periodical phenomena of flowering or florescence is suggested by the British Association as one of the points to be attended to in determining the nature of different seasons. In 1829 Schubler states that the Lily of the Valley (Convallaria majalis) flowered at Rome on the 26th April, at Tubingen on 10th May, at Berlin on 17th May, and at Greifswald on 10th June. According to Berghaus the same species flower at Zurich 6 days later than at Parma, at Tubingen 13 days later, at Jena 17, at Berlin 25, at Hamburg 33, at Greifswald 36, and at Christiania 52. The Almond is said to flower at Smyrna early in February, in Germany at the beginning of April, and in Christiania not till the commencement of June. There is thus periodicity in flowering as regards the seasons, and plants retain the tendency to expand their flowers at a definite period of the year even when transported to countries where the seasons are reversed. In these circumstances they do not immediately accommodate themselves to the opposite conditions of the seasons in which they are placed, but for a while continue to show symptoms of flowering at the usual time to which they were accustomed in their native clime. Some varieties flower earlier than others of the same species. This has been noticed in the case of species of Thorn, Horsechestnut, and many other plants. By means of slips taken from such plants gardeners perpetuate early flowering

Temperature is a most important agent in causing plants to flower, but in each species the range of flowering-temperature is definite. A high temperature, in the case of plants belonging to cold regions, often makes them produce leaves in place of flowers, or if flowers are produced, they drop off and are abortive. Fruit trees of temperate regions, when grown in tropical countries, are frequently unproductive. In cultivating plants in hot-houses, it is of importance to regulate the temperature, and at the same time to attend to the state of moisture and ventilation, if we wish the plants to flower properly.

There are differences in regard to the hours of the day at which flowers expand. Some open at dawn of day,

evening, and a few after darkness has come on. Roemeria violacea expands its blossoms early in the morning, and the petals have generally fallen off two or three hours before noon. Many Composite plants, as Chicory (Fig. 375), show a remarkable tendency to open and close their florets. Species of Goat's-beard (Tragopogon) receive the common name of go-to-bed-at-noon on account of closing their florets at mid-day. Ornithogalum umbellatum (Fig. 376) is called Lady-Eleven-o'Clock, on account of its flowers expanding about that hour in the forenoon. CEno-the Cichoraceous plants, the Chicory (Cichorium Inty-bus), which opens its flowers



Fig. 375.

Primrose from opening its flowers in the evening. The vigils of plants attracted the attention of Linnæus, and he constructed what he called a Floral

Clock, in which the hours of the day were indicated by the opening of certain flowers, and which were hence called horological.

Fritzsch has paid particular attention to the opening and closing of flowers, and gives the results of observations made at Prague, in Bohemia. He states that these phenomena are rarely momentary, but that they are slow and continuous processes, which at all hours of

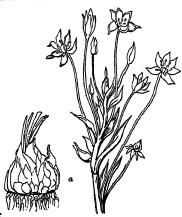


Fig. 376.

flowers in regard to sleeping and waking are influenced by light, by temperature, and more especially by insolation or exposure to the direct rays of the sun. They are also, in a

certain degree, dependent on colour.

Although there seems to be no time of day when the blossoms of certain plants do not open, yet in the greater number of cases they are closed soon after sunset. number of species which begin to awake increases slowly at the early hours of the morning, then more rapidly from 2 A.M. to 7 A.M., and decreases again rapidly after mid-day. After that hour only those species open which are nightbloomers. With the exception of a few hours about midnight there is no hour of the day at which blossoms do not begin to close; there are, however, only a few about midday, from which time the number increases, reaching its maximum at 6, and then again decreasing.

When blossoms begin to open after the cessation of sleep, the change usually takes place in the first instance slowly, then more rapidly, and, as it approaches its maximum there is another retardation. In a few plants only the complete expansion lasts an hour, more commonly not so much; they then begin to close again, at first slowly, afterwards more rapidly, and, as they approach the maximum of approxima-

Botany. tion of their petals, the progress is again slow. The flower remains many hours in a more or less closed condition. until the time returns for a new cycle of phases. The state of expansion of the corolla varies. In some cases the limb spreads out at a right angle with the tube, in other cases the angle is less, while in some the limb is turned down so as to form an oblique angle with the tube.

The time of the greatest expansion of the flowers varies in different species. In general the number of species whose blossoms attain the maximum of their phase increases from sunrise to mid-day, and then decreases till sunset. None of the day-bloomers are open till 7 A.M., or later than 5 P.M. A similar law seems to hold good with the nightbloomers, which generally seem to open their corolla fully towards midnight, while at mid-day they are completely closed. In those blossoms which are fully expanded in the morning, the duration of expansion is short. In those blossoms which expand in the afternoon, the condition of waking is limited by the length of time the sun is above the horizon. In those blossoms which are fully expanded in the night, the duration of sleep is shortest. Those blossoms which are fully expanded in the morning open in general more rapidly than they close, while in those which open in the afternoon the contrary law prevails. While the time of sleep of plants is in close connection with the apparent daily course of the sun, the degree of expansion depends on the temperature of the air and various meteoric conditions, as well as on insolation or exposure to the direct rays of the sun.

Exposure to artificial light causes some flowers to expand. The flowers of Crocus have opened under the light of an Argand lamp, those of Gentiana verna expanded fully when exposed to the light of a gas-burner. Gloomy weather and rain cause flowers to close. Those which are very sensitive to such influences are called meteoric. There is a periodicity in flowering which is not easily interrupted. If a plant is accustomed to flower in daylight at a certain time, it will still make an effort to expand its flowers at the wonted time, even when confined in a dark room; showing that light is not the only cause of the expansion. As regards the connection between the colour of flowers and their expansion, Fritzsch says that vellow blossoms possess the strongest tendency to contract and expand, then follow white, red, and blue.

The direction and position of the flowers on their stalks appear in some cases to be controlled by the sun's rays. This is particularly the case in Composite plants. The capitula of some of them are erect during the day, and droop at night. Species of Hypochæris are said to incline their heads towards the quarter of the heavens in which the sun is shining. The name Sun-flower (Helianthus, Girasole) was given to a genus of Composite plants on account of the supposed influence of the sun on the direction of their heads. In Victoria regia there is a spontaneous motion of the flower and the flower-stalk, the cause of which appears to be very

Occasionally movements of irritability are observed in petals. Morren observed them in the labellum of some Orchids, such as Megaclinium falcatum, and they have been noticed also in the stalk of the labellum of Drakea elastica, which bends in a hinge-like manner when irritated. Various species of Pterostylis, and many Bolbophyllums, especially B. barbigerum and B. Careyanum, show labellar movements. In Caleana nigrita, a Swan River Orchid, the column is a boat-shaped box, the lid of which is formed by the labellum. The latter is hinged on a claw, which reaches the middle of the column; when the flower opens the labellum turns round within the column and falls back, so that, the flower being inverted, it stands fairly over the latter; whenever an insect touches its point the labellum makes a sudden revolution, brings the point to the bottom of the

column, and thus imprisons any insect which the box may contain. If an insect is caught, the labellum remains shut; but if there is no insect, it recovers its position. The labellum of Spiculæa ciliata is also moveable.

Colours of Flowers.—The colours of flowers naturally attract the attention of all, and their varied hues are in an especial manner an object of interest to the florist. These colours usually reside in the corolla, but in the case of many plants, especially Monocotyledons, they occur both in the calyx and corolla (perianth); and in some instances, as in Salvia and Amherstia, the bracts are highly coloured. The changes produced by culture on the colours of many plants are familiar to every one, and they may be well illustrated in the case of the Tulip and Dahlia, the flowers of which are naturally of a yellow colour, but in the hands of the florist assume all varieties of red, white, and yellow. From its variable nature, colour is not taken much into account by the practical botanist in the determination of the species of flowering plants. It is chiefly in Cryptogamic plants, such as Fungi and Seaweeds, that this character is regarded of value. It is probable, however, that too little attention has been paid to this subject, owing to the want of an accurate nomenclature, such as has been adopted by Werner in the characters of minerals.

In reference to their colours, flowers are divided by De Candolle into two series-1. Those having yellow for their type, and which are capable of passing into red and white, and never into blue. 2. Those having blue for their type, and capable of passing into red and white, but never into yellow. The first series is called Xanthic, the second Cyanic. The following is a tabular view of the two series, green being considered as an intermediate state of equilibrium between the two:--

> Orange-red Orange Yellow-orange Yellow Yellow-green Green. Colour of Leaves. Blue-green Blue Blue-violet Violet Violet-red

Green, which is made up of blue and yellow, is the centre whence the two series diverge, and they meet again in red. It would appear that all flowers capable of changing colour do so in general by rising or falling in the series to which they belong.

The original colour of the Tulip is yellow, and although by cultivation it is made to assume all the varieties of colour in the yellow series, we do not find it becoming blue. Such is also the case with the common Dahlia and the Rose. No one has succeeded in getting a blue variety of either of the latter. The Geranium, on the other hand, although it presents all shades of blue, red, and white, does not become yellow. There seems thus to be a certain limit in the range of colour which a species can be made to assume. These remarks apply only to the change of colour in a given They will not apply in all cases to every species species. of a genus. Thus, while most of the Gentians belong to the blue series, and do not become yellow by cultivation, there is a yellow species of the genus (Gentiana lutea) which never changes into blue. Again, we find certain plants exhibiting, in the same flower, blue and yellow colours. This is seen in Dendrobium sanguinolentum; also in Pansies, and in many other parti-coloured flowers, as in Convolvulus tricolor, and in species of Myosotis, which have a yellow zone round the corolline tube, while the upper

Botany. part is blue. In these last mentioned cases each of the coloured portions of the flower vary in general only in their proper series—the part which is yellow never becoming truly blue, nor the blue yellow. The florets of the ray of Composite plants often exhibit blue colours, while those of the disk are yellow. The law by which the changes of colour are regulated has not been ascertained, and it is impossible, in the present state of our knowledge, to predict what colour a florist's flower will assume. The different rays of light have different effects as regards colours. It would appear, also, that the nature of the soil sometimes alters colours. Thus, Hydrangea hortensis (Hortensia speciosa) produces blue in place of pink flowers, when planted in some kinds of bog earth and of yellow loam. The colours of flowers often appear to depend on the state of oxygenation of the juices. Certain flowers have a pale hue when first produced, and change under the influence of sunlight. The colouring matter of flowers is usually of a fluid nature, and has not the composition of chloro-

> The arrangement of coloured flowers in the parterre is a matter deserving the attention of gardeners. Chevreul has written very fully on the subject. He states that an important principle is to combine such colours as produce white light. Thus red, blue, and yellow, form, by their union, a white ray. Hence flowers of these colours may be, with propriety, placed together; or a flower of one of these primary colours may be combined with one whose colour is made up of the other two in the shape of a binary compound. Thus, red agrees well with green, which is made up of yellow and blue. This may be seen in the case of the scarlet Pelargonium, where the colour harmonizes with its own green leaves, or with the green of other plants around it; so also in the case of red Dahlias. Again, blue harmonizes with orange compounded of yellow and red, as may be illustrated by a combination of the Brachycome ıberidifolia with Erysimum Perofskianum. Yellow harmonizes with violet, composed of blue and red, as seen in the petals of Pansies. To produce the best effect the colours should be as nearly as possible of the same tone. In cases where colours do not agree, placing white between them restores the effect.

Odours of Flowers.—The odours of flowers, as well as their colours, vary much. The sources of odours in flowers are very obscure. They are often traced to the presence of fragrant volatile oils or resins. The effluvia are of such a subtle nature as to elude chemical analysis. They are usually developed under the influence of sunshine, but in certain instances odours are emitted during the absence of light. Some flowers are only odoriferous in the evening. This is the case with Cestrum nocturnum, with several species of Catasetum and Cymbidium, and with Lychnis vespertina. Certain flowers, such as Hesperis tristis, and Nyc-

tanthes arbor tristis, receive their specific names (tristis, sad) from giving out their fragrance only at night.

The exudation of odours by nocturnal flowers sometimes takes place in a peculiarly intermittent manner. Thus in the night-blooming Cereus (Cereus grandiflorus) the flowers are fragrant only at intervals, giving out puffs of odour every half hour, from eight in the evening till midnight. Morren states that on one occasion the flower began to expand at six

One of the Carrion flowers (Stape-lia variegata), belonging to the natural order Asolepiadaces. It receives its English name on account of the fetil odour of its dark brown flowers.



Fig. 877.

o'clock in the evening, when the first fragrance was perceptible in the hothouse. A quarter of an hour afterwards the first puff of odour took place, after a rapid motion of the Botanv. calyx; at 6.23 there was another powerful emanation of fragrance; by thirty-five minutes past six the flower was completely open; at a quarter to seven the odour of the calyx was the strongest, but modified by the petals. After this time the emanations of odour took place at the same periods as before. The odours of flowers have frequently peculiar effects on nervous individuals, particularly when the odours are connected with the presence of hydrocyanated oils. The odour of some flowers is remarkably overpowering, and that of others, such as Stapelias or Carrion flowers (Fig. 377), is very offensive.

II.—PHYSIOLOGY OF THE ESSENTIAL ORGANS OF REPRODUCTION.

1. Sexuality of Plants. Maturation of the Organs concerned in Reproduction; and changes preceding the Development of the Embryo.

The idea of the existence of separate sexes in plants was entertained in early times, long before separate male and female organs had been demonstrated. The production of Dates in Egypt, by bringing two kinds of flowers into contact, proves that in very remote periods some notions were entertained on the subject. Female Date Palms only were cultivated, and wild ones were brought from the desert in order to fertilize them. Herodotus informs us that the Babylonians knew of old that there were male and female Date-trees, and that the female required the concurrence of the male to become fertile. This fact was also known to the Egyptians, the Phœnicians, and other nations of Asia and Africa. The Babylonians suspended male clusters from wild Dates over the females; but they seem to have supposed that the fertility thus produced depended on the presence of small flies among the wild flowers, which, by entering the female flowers, caused them to set and ripen. The process was called palmification. A similar statement was made in regard to the Fig. The process of caprification, or bringing wild Figs in contact with cultivated ones, so as to cause the latter to ripen soon, is mentioned by Aristotle, who observed that a certain insect was generated on the flowers of the Caprifig (wild Fig), which, having become a fly, entered the unripe fruit of the domestic Fig. and caused

Grew, in a paper on the Anatomy of Plants, read before the Royal Society in November 1676, seems to have been the first who really observed the functions of the stamens and pistils. Up to this period all was vague conjucture. Grew speaks of the attire, or the stamens, as being the male parts, and he mentions having spoken of the subject to Sir Thomas Millington, Savilian Professor at Oxford, who entertained the same opinion. Ray adopted Grew's views, and states various arguments to prove their correctness in the preface to his work on European Plants, published in 1694. In 1703, Mr Samuel Morland, in a paper read before the Royal Society, stated that the farina (pollen) is a congeries of seminal plants, one of which must be conveyed into every ovum or seed before it can become prolific. In this remarkable statement he seems to anticipate in part the discoveries afterwards made as to pollen tubes, and more particularly the views promulgated by Schleiden. In 1711, Geoffroy, in a memoir presented to the Royal Academy at Paris, supported the views of Grew and others as to the sexes of plants. Linnæus was the next botanical author who took up the subject of the sexes of plants, and he may be said to have opened a new era in the history of Botany. He first published his views in 1736, and divided plants into sexual and asexual, the former being Phanerogamous or flowering, and the latter Cryptogamous or flowerless. In the latter division of plants he could not detect stamens and pistils, and he did not investigate the mode in

Botany. which their germs were produced. He was no physiologist, and did not promulgate any views as to the embryogenic process.

Soon after the promulgation of Linnæus' method of classification, the attention of botanists was directed to the study of Cryptogamic plants, and the valuable work of Hedwig on the reproductive organs of Mosses made its appearance in 1782. He was one of the first to point out the existence of certain cellular bodies in these plants which appeared to perform the functions of reproductive organs, and to them the names of antheridia and pistillidia were given. This opened up a new field of research, and led the way in the study of Cryptogamic reproduction, which has since been much advanced by the labours of numerous botanical inquirers.

In 1815, Treviranus roused the attention of botanists to the development of the embryo, but although he made valuable researches, he did not add much in the way of new information. In 1823, Amici discovered the existence of pollen-tubes, and he was followed by Brongniart and Brown. The latter traced the tubes as far as the nucleus of the ovule. These important discoveries mark a new epoch in Embryology, and may be said to be the foundation of the views now entertained by physiologists, which have been materially aided by the subsequent elucidation of the process of cytogenesis, or cell-development, by Schleiden, Schwann, Mohl, and others. The whole subject has been investigated recently with great assiduity and zeal by physiologists, both as regards Cryptogamous and Phanerogamous plants. formation of germinal vesicles in the ovule, and the development of the embryo in flowering plants, have been fully considered by Schleiden, Mirbel, Mohl, and others; the embryogenic process in Coniferous plants and in the higher Cryptogams by Hofmeister, Suminski, and Mettenius; and that of the lower Cryptogams by Thuret, Decaisne, and Tulasne. We have thus been enabled to come to certain general conclusions on this obscure subject, and future observers have been directed in the proper path of investigation.

In flowering plants the organs concerned in reproduction are the stamens and pistils, while in flowerless plants, organs called antheridia and archegonia, as well as peculiar cells, exist, which appear to perform this function. As regards the former class of plants, many proofs have been given that the pollen discharged from the anthers must be applied to the stigmatic surface of the pistil in order to produce perfect seed. Among the best evidences of the functions of the stamens and pistil in flowering plants, are those derived from species in which these organs are separated, and in which, when contact is carefully prevented, no seed is produced. Experiments of this kind require much caution to avoid fallacy arising from pollen being wafted from a distance, so as to cause female plants to produce fruit. Moreover, it sometimes happens that in plants usually producing pistilliferous flowers only, stamens are developed. Such a case might be considered, by careless observers, as an instance of a female plant producing fertile seed without the action of pollen. When flowers are completely double, that is, when the stamens and pistils are entirely converted into petals, no seed is produced. Occasionally, however, in flowers apparently double, a single stamen may exist, with sufficient pollen to fertilize the plant, or the pistil may be perfect, so that pollen from other plants may affect it, and lead to the production of perfect seed. In certain instances, it has been stated that perfect seed has been produced without the agency of pollen. But the cases require further investigation. Henslow has conjectured that cases where fertile seed is stated to have been formed without the action of pollen, may be analogous to what is seen in Aphides, where one impregnation is sufficient to produce eight or ten generations.

In Phanerogamous plants provision is made for securing VOL. V.

the application of the pollen to the stigmatic portion of the

pistil or to the ovule. The relative lengths of the stamens and pistils, in erect and pendulous flowers, are varied on this account, and the mode in which the anthers open is also made subservient to the same end. In the case of some plants, the elastic filaments are bound down by the floral envelopes until such time as the pollen is ripe, and then they are set free so as to scatter the pollen with great force. This phenomenon is seen in the common Nettle (Urtica dioica), and in the Pellitory of the wall (Fig. 378). In the species of Kalmia a similar phenomenon is ripe, and then the perianth expands, the filaments are thrown out the force, so as to scatter the pollen on the female flowers in the vicinity. floral envelopes until such time as



nomenon is observed, the anthers being held for a time in little pouches or sacs of the corolla, and then moving with a jerk towards the pistil.

In the Barberry (Fig. 379), the filaments are very irritable on their inner surface, at the point where they join

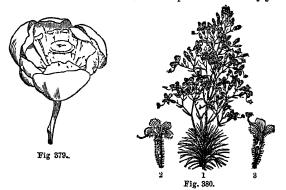


Fig. 379. Flower of the Barberry (Berberis vulgaris), the stamens of which are irritable, and move towards the pisul when touched at their base.

380. A species of Stylewort (Sykudalum tenus johum, which displays irritability in its reproductive column. 1. Plant, with its narrow leaves and numerous flowers, from each of which a column projects formed by the united stamens and pistil. 2. Flower separated, showing callyx, corolla, and column; at the extremity of the latter the anther lobes are placed, surrounding the stigms in the centre. 3. A similar flower, showing the column in the act of passing from one side of the flower to the other.

the receptacle, and when touched in that situation they move towards the central organ. The motion, like that of the leaves of the Sensitive plant, seems to be connected with a small cellular swelling or gland at the base. In species of Stylidium (Fig. 380), the stamens and pistil are united in a common column, which is jointed and irritable, and which, when touched at the joint, passes with force and rapidity from one side of the flower to the opposite one, so as to burst the anthers and scatter the pollen on the central stig-The stamens of the common Rock-rose (Helianthemum vulgare), and of species of Cistus, exhibit movements which are apparently connected with the application of the pollen. In Parnassia palustris (Fig. 381), and in Rue, the stamens move forward in succession towards the pistil.

Insects are sometimes employed in scattering pollen. The bees in collecting the honey secreted at the base of the pe-tals are made instrumental in applying the pollen to the stigma. In Orchids, in which the anthers are placed on the upper part of a column with the stigmatic surface separated from them, and the pollen is in masses (Fig. 265), the agency of insects seem to be required for fertilization. The flowers of these plants exhibit remarkable animal forms, probably with the view of attracting insects. The flowers also secrete a large amount of saccharine matter, and are odoriferous; their pollen-masses are very easily detached. All these circumstances seem to be connected with their mode of impregnation. In Asclepiadaceæ, which have

also peculiar pollinia (Fig. 382), insects are attracted by Botany. the odour of the flowers, which is sometimes very fetid, as

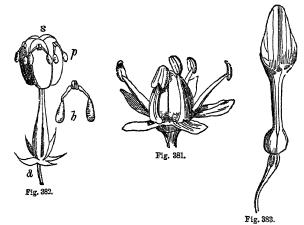


Fig. 331. Flower of the Grass of Parnassus (Parnassia palustis), the stamens of which move in succession towards the pistal, in order to scatter their pollen. In the Figure, some stamens are seen applied to the pistal, and others removed from it.

... 382. Pistal of one of the Asolepiadacese, with the calyx and flower-stalk, a, the pollen masses, p, adhering to the stigma, s. Polken-masses, b, separated with the gland uniting them.

383. Separated with the gland uniting them.

383. Separated with the gland the stamens and pistal at its base. The inside of the tube of the perianth is lined with stiff hairs pointing downwards, which allow the entrance of an insect called Tipula pennicornis, but prevent its exit until the pollen has been scattered on the stigma, and the flower has withered.

in Stapelia (Fig. 377), as well as by saccharine matter. In various species of Birthwort (Fig. 383), in which the essential organs are contained in a tubular perianth, insects are employed to effect the application of the pollen. Species of Tipula enter the expanded portion of the perianth, and then crawl down through the long tube to the cavity at the base containing the stamens and pistil. On attempting to return they are prevented from getting out by numerous hairs pointing downwards, which act like a trap. While moving about in the lower chamber, the insects spread the pollen when ripe, and afterwards when the flower fades they escape.

Pollen grains in general require to be protected from the direct action of moisture, which causes them to burst prematurely. The closing of flowers during rain accomplishes this object. In the Daisy and other Composite plants the outer florets close over the inner ones, and thus prevent injury from wet. When plants grow in water the pollen is sometimes of a peculiar nature, and the anthers are placed along with the pistils in a covering to protect them from the effects of moisture. In other aquatics, the peduncles rise above the water at the time when the flowers are developed. In Vallisneria (Fig. 22), the female plant, b, sends up a long spiral peduncle, which sometimes increases in length 14 inches during twenty-four hours, and which enables the flower to appear above water, and to be accommodated to its depth, at the same time that the root remains attached to the mud below; the male plant, a, on the other hand, is detached from the bottom of the water, floats on the surface, and there perfects its pollen, which is ultimately wafted on the pistilliferous plant.

The fertilizing power of the pollen is retained for a different length of time in different species of plants. According to Kölreuter and Gærtner, the pollen continued fresh in some species of Tobacco only for 48 hours; in Datura Stramonium, D. Tatula, and D. ferox, and in Lychnis dioica for 2 days; in Hibiscus Trionum and the Clove-pink for 3 days; in Lobelia syphilitica and L. splendens for 8 or 9 days; in Wallflower for 14 days; in Orchis abortiva for 2 months. The pollen of the Hemp, Tea, and Camellia, has been kept fresh for a year; and Michaux mentions the pollen of Chamærops humilis and of the Date as having been

used successfully after 18 years. Pollen may be carried to Botany. a distance and retain its fertilizing power.

The quantity of pollen produced in some cases is enormous. In the case of Firs and Pines, this seems to be connected with the fact that the cones or female organs are separate from the staminal clusters, and that, moreover, the leaves are usually evergreen, and thus present an obstacle to fertilization. The yellow powder in Pine forests falls to the ground in vast quantity, and it is sometimes carried by the winds to a great distance, so as to fall in the form of what have been called sulphur showers. Morren counted the number of pollen grains in a plant of Cereus grandiflorus which grew in the stove of the Botanic Garden of Liège. He found that in each flower there were 500 stamens, and as 40 flowers were produced, the total number of stamens on the plant was 20,000, and of pistils 40, each having 24 stigmas. Each anther contained 500 pollen grains, and hence the total number of grains in each flower was 250,000, and upon the entire plant 10,000,000. In many catkinbearing plants, which are monœcious or diœcious, the pollen

common Hazel, and in Willows. Observations have been made by Gærtner and Kölreuter as to the quantity of pollen required to fertilize the ovules. One grain, or at most three, are sufficient to impregnate the ovule of Mirabilis longiflora and M. Jalapa. In a single flower of Hibiscus Trionum, Kölreuter counted 4863 pollen grains, and he ascertained that 50 or 60 were sufficient to fertilize all the ovules in the ovary, usually amounting to 30; when fewer grains were employed, impregnation was not complete; thus 25 grains only impregnated from 10 to 16 ovules. In most cases the pollen of a single fertile anther is sufficient for the perfecting of the ovules, and the additional anthers are produced with the view of insuring the result. Morren states, that in the flower of Cereus grandiflorus he found 150,000 grains of pollen, out of 250,000, which had not been applied to the stigma, while the number of ovules in each ovary was about 30,000.

is abundant, and the essential organs are developed before

the leaves are produced. Examples of this occur in the

During the evolution of the stamens and the maturation of the pollen, the pistil undergoes changes, more especially as regards the stigma, which becomes enlarged, lax in its texture, and covered with a viscid secretion. In species of Campanula, during the discharge of the pollen, the style, which is covered with hairs (Fig. 384), elongates, and in

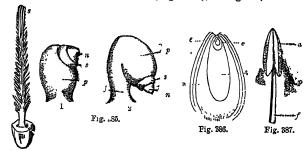


Fig. 384. Style of a species of Bellflower (Campanula) covered with hairs, which collect the pollen.

... 385. The ovule of Celandine (Chelidonium), with its primine, p, secundine, s, and nucleus, n, projecting through the foramen, which is slightly turned round in 1, and completely turned in 2. By this change in the position of the ovule the foramen is brought near the placenta, and the pollen tubes reach it more easily. The funiculus or umbilical cord, f.

... 386. Ovule of Polygonum, showing the nucleus, n, and the embryosac, s, containing a vesicle or germinal cell, c, formed before impregnation. This cell, after fertilization, develops the first embryonal cell, c.

... 387. Stamen, s, of Wallflower (Cheiranthus), scattering the pollen, p, from the anther, a. The filament, f.

its upward progress brushes the pollen from the anthers. The hairs which collect the pollen apply it to the stigma, the branches of which, s, are at first erect, and afterwards, by changes in their cells, become revolute. In Goldfussia (Ruellia)

Botany. anisophylla, the style has a curved stigmatic apex, which gradually becomes straightened so as to come into contact with the hairs of the corolla on which the pollen is scattered. The stigma in species of Mimulus, is bilamellar, and the two lamellæ close when touched with pollen or any extraneous body.

> Before the process of impregnation, certain changes also take place in the ovule. The relative position of its parts is frequently altered, so that the micropyle is brought near to the placenta (Fig. 385). Moreover, one of the central cells becomes much enlarged and developed, so as to form the embryo-sac (Fig. 386, s). At the end of this sac, next to the micropyle, several delicate free nucleated cells are produced, to which the name of embryo-vesicles or germinalvesicles has been given (Fig. 386, c). In this way the ovule is prepared for the action of the pollen, and for the production of the embryo plant.

> The essential organs, when performing their active functions, absorb much oxygen and evolve carbonic acid. At the same time they acquire a certain elevation of temperature. This has been already noticed when speaking of the floral envelopes. The time of the emission of pollen seems to be that at which the maximum heat is produced, and the stamens have a higher temperature than the pistil. When the stamens and pistil are mature the anther bursts (Fig. 387), and scatters the pollen, p, on the stigma (Fig. 388, stig). There it is detained, and is acted on by the viscid secretion,

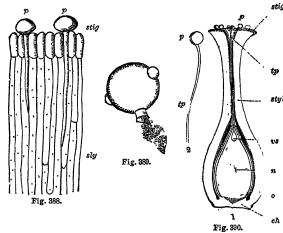


Fig. 398. Grains of Pollen, p. p. applied to the viscid cellular stigma, stig, of Frogsmouth (Antirrhanum majus). The style, sty, is laid open to show the pollen tubes passing down to the ovary.

389. Spherical grain of pollen of the Cherry (Cerasus), showing a pollen tube formed by the intine, with its extremity ruptured, so as to discharge fovilla, f.

390. Pistil and pollen of Polygonum. I. Stigma, stig, with pollen grains, p, adherent to it, sending tubes, ty, down the conducting tissue of the style, styl; the ovary, o, containing the ovule with its covering and central cellular mass or nucleus, n, containing a rudimentary embryo-sac, us, in which ultimately the embryo is developed. The base of the ovule attached to the placenta is marked by the chalaza, ch. 2. Follen grain, p, separated, with pollen tube, tp.

by means of which tubes are developed from the intine (Figs. 269, and 390, 2). This is a sort of germination of the pollen cell. These tubes pierce the stigmatic tissue, and convey the fovilla (Fig. 389, f), through the canal of the. style to the ovule. In Figure 390, 1, the ovary, o, with the ovule, n, and embryo-sac, ve, is represented; the pollen, p, is applied to the stigma, stig, and its tubes, tp, pass through the conducting tissue of the style, styl, to reach the embryo-sac.

The emission of tubes sometimes commences half a minute after the pollen has been applied to the stigma; in other cases, as in Mirabilis Jalapa, it takes from 24 to 36 hours. In the Larch Geleznoff says that the tubes do not emerge for 35 days. The length to which the tubes extend is often very great. In Cereus grandiflorus, Morren estimated that the tubes when they reached the ovary ex-

tended as far as 1150 times the diameter of the pollen Botany. grain; in Crinum amabile, Hassall says they reach 1875 times the diameter of the grain, in Cleome speciosa 2719 times, in Oxyanthus speciosus 4489 times, and in Colchicum autumnale 9000 times. The length of time which the pollen tube takes to traverse the conducting tissue of the style varies. The time does not always correspond with the comparative length of the style. In some short-styled plants the time taken is very long, while in the case of the long-styled Cereus grandiflorus and Colchicum autumnale a few hours is sufficient. In the case of some Coniferous plants, as Pinus sylvestris, Pineau states that a year elapses before the tubes reach the embryo-sac.

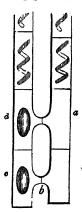
2. Embryogeny in Cryptogamous or Acotyledonous Plants.

In the simplest Cryptogamic plants, composed of a single rounded cell, as in the Red-snow plant (Fig. 56), the processes of reproduction and nutrition cannot be separated. The same cell appears to perform both functions. At a certain period of growth divisions take place in the cell-contents, and, by the bursting of the parent cell, germs are discharged which are capable of producing new individuals. As we ascend in the scale the plants become more complex. In place of one cell they consist of several united together either in a single or branched linear series, and combined both end to end and laterally, so as to form cellular expansions. In this state the nutritive and reproductive cells are often separate and distinct, as may be seen in common Mould, and in Fungi generally. In Confervæ (Fig. 19) and in Diatomaceæ (Fig. 13) the existence of reproductive cells with distinct functions has been observed. In many of them we perceive at certain stages of growth cells united by a process of conjugation, the result of this union being the production of a cellular embryo or spore (Fig. 391, c). This conjugation is a very interesting process, and

tends to throw light on the subject of reproduction throughout the whole vegetable kingdom. The cells in these plants have in their interior a granular endochrome, which appears to have different functions in the different cells. When certain cells are brought into contact, tubes are emitted which unite the two (Fig. 391, b), the endochromes come into contact, and the result is the formation of a spore, the mixed endochromes being surrounded with a proper membrane. Sometimes the contents of one cell considered as the male pass into the other in which the spore is produced, as in Zygnema, and some-times the contents of both cells unite, and the spore is produced in the tube between them, as in Diatoms.

In many of the Confervæ, however, Filaments of Zygnema, spores appear to be produced without the conjugation of separate filaments. In such instances it is conjectured that different cells in the same filament perform different functions, and are so placed that at a certain period their contents by coming into contact develop a germ. The same filament may thus contain both male and female cells; although botanists as yet have cells; although botanists as yet have

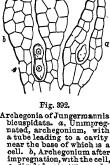
not been able to show the difference between them. In some species of Meloseira the endochrome at each end of the cell appears to have a different property, and mixture takes place in the cavity of a single frustule. In this case there is a movement towards the centre of the cell when the spore is formed.



ferent kinds of reproductive organs, which can, however, only be observed at certain periods of development, and frequently cannot be seen after the embryo has been fully formed. In the same way as in the flowering plants, when the seed has been ripened the stamens have generally withered and fallen off, and sometimes also the style and stigma. It is of importance, therefore, in all investigations into Cryptogamic reproduction, to examine the plants at their early period of growth. The reproductive organs have received different names in different natural orders of Cryptogams. They are generally called antheridia and archegonia or pistillidia, from their supposed analogy to anthers and pistils. The antheridia contain sperm-cells, in each of which is a moving ciliated phytozoon, spirillum, or spermatozoid, and the pistillidium or archegonium contains a germcell or embryonal cell, which produces a germinating body.

Spermatozoids are considered as analogous in their funtion to the spermatozoa of animals. They have been tracec to the archegonia, or the cells in which the rudimentary embryo is formed. Hofmeister states

that he has often seen spermatozoids swimming about around the archegonium, in longitudinal sections of the involucres of Jungermannieæ (Fig. 392); he has also seen them in a motionless state after the rudiment of the fruit began to be developed. Similar observations have been made in regard to Mosses and Ferns; and Suminski is disposed to think that the extremity of a spermatozoid in Ferns is developed as an embryonic cell, in the same way as Schleiden thinks the end of the pollen tube constitutes the first cell of the embryð in flowering plants. Thuret has observed in directious Fuci, that the Archegonia of Jungermannia observed in the archegonium was bicuspidata. a. Unimpregnated. archegonium, with not developed as a germinating body, when the antheridian cells were kept separate. After the application of the contents of the antheridia to the archegonia, a cellular body is produced in the latter, which may be called a sporoid embryo. This cell



archegonia of Jungermanul bicuspidata. a. Unmmpregnated, archegonium, with a tube leading to a cavity near the base of which is a cell. b, Archegonium after impregnation, with the cell, c, divided into two nucleated portions. This double nucleated body is the ruddiment of the fruit-bearing stalk. At the apex of the canal leading to the cell are seen spermatozoids, s.s.

may be discharged at once, or it may go through certain phases of existence without being separated from the plant on which it is produced.

In Mosses there is a free germ-cell (embryonal cell) at the base of the archegonium. Spermatozoids, from the sperm-cells of the antheridium, reach it in all probability, and then it is developed into the sporangium or spore-case (Fig. 393), which is the second generation of the plant, according to some authors. The spores produce the leafy plant, bearing antheridia and archegonia. In Figure 394 is shown the confervoid prothallium, p, of a Moss produced from the spore, and bearing buds, a, b, which produce leafy individuals with organs of reproduction. After the contact of these organs, a single cell of the archegonium is developed into the complete fruit (theca or sporangium) which is often borne upon a stalk (Fig. 393). The complete fruit contains spores, which, when discharged, again develop the foliaceous plant. Bruch and Schimper say that Mosses having antheridia and archegonia upon the same stem always bear fruit, and that in dioccious Mosses the capsule is not developed unless the plants bearing sperm-cells and those producing germ-cells are in proximity.

In Ferns the prothallium, pro-embryo, or prothallus (Fig. 395), bears antheridia and archegonia at the same epoch. It is produced from the spore, and consists of cells, as shown

Proceeding to other divisions of Acotyledons, we find dif- in Figure 350. The antheridia occur on the under surface Botany.

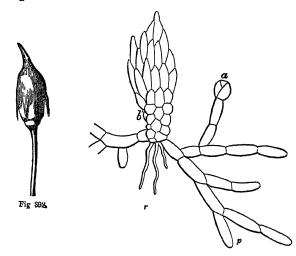


Fig. 394.

Fig. 393. Sporangium of a Moss (Polytrichum), supported on a stalk. This stalked sporangium is produced by the impregnated cell of the archegonium. It constitutes the second generation.

... 394. Prothallium p, of a Moss (Punaria hyprometrica), consisting of a congaries of cells arranged in a fillioum manner. This prothallium originates from the spore, and bears a bid, a, and a young stem b, from the base of which roots proceed. This stem bears antheridia and archegonia. An impregnated cell in the archegonium produces the stalked theca or sporangium.

of the prothallium, and they consist of a cellular papills having a central cavity (Fig. 396, α). This cavity contains free cellules, which are discharged by a rupture at the apex, b, and these little cellules, in bursting, give exit to a ciliated spiral filament or spermatozoid (Fig. 397), which swims actively in water. The archegonia (Fig. 398) exist on the under side of the prothallium, near the notch of the border. They are less numerous (varying from three to eight), and consist of cellular papillæ formed by ten or twelve cells. They are larger than the antheridia, and have a central canal, a, leading down to a large globular cell, c (called by some, ovule), imbedded in the substance of the prothallium or pro-embryo, and containing the embryo germ, e. This canal is closed at first, and then opens. In the globular cell at the bottom of the archegonium, a free cell is first formed, which, it is supposed, is reached by the spermatozoids. After a time this cell divides, and is gradually

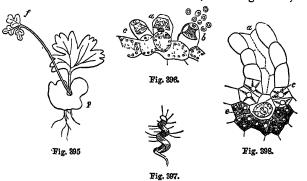


Fig. 395. Young plant of a Fern (Pteris paleacea), showing the commencement of the sporangiterous frond, 7, arising from the impregnated ovule in the archegonium; the prothallium, p, being still attached.

396. Antheridia from the prothallium of the Common Brake (Pteris aquilina). a, An unopened antheridium; b, antheridium bursting at the apex, and discharging free cellules, each containing a spermatozoid; c, antheridium after the discharge of the cellules.

397. Aspermatozoid with cilia, discharged from a cellule in the antheridium of the Forked Spleenwort (Asplemium septentrionale).

398. Archegonium of the Forked Spleenwort (Asplemium septentrionale) immediately after impregnation. 4, Canal leading to the ovule or large cell, c, at the base of the archegonium; c, nucleated embryonic cell, whence the sporangiferous frond proceeds. Spermatozoids from the antheridium reach the canal of the archegonium, and impregnate the ovule. and impregnate the ovule.

converted into an embryo, with a bud above and a radicle

Botany. below, from which the regular leafy stem of the Fern grows (Fig. 395, f). The life of the sporangiferous plant is indefinite, as in Tree Ferns, while the prothallium is usually of very short duration. Thus in Ferns the spores contained in the sporangium form the prothallus (Fig. 395, p) without impregnation, and this latter process is necessary for the development of the germ (Fig. 398, e), which gives rise to the leafy sporangiferous stem or frond; while in Mosses the spore forms the prothallus and the leafy stem without impregnation, and this latter operation only causes the development of the stalked theca, or spore-producing part of the plant (Fig. 393)

Hofmeister and Mettenius have examined the reproduction of Club Mosses (Lycopodiaceæ), and have detected antheridia and archegonia. They find that the small spores of Lycopods discharged from the antheridia (Fig. 358), do not produce new plants, but have an office analogous to that of the pollen, namely, to effect the fertilization of a germ produced by the large spore (Fig. 359). The small spores contain cellules with spiral filaments or spermatozoids (Fig. 399, c); the other spore emitted from the oophoridium or sporangium is much larger than the pollinic spore, and is the







Fig. 400.

Fig. 401.

Fig. 399. Small spore (pollinic spore) of a Lycopod (Sclaginella helvetica), bursting and discharging cellules, c, containing spermatozoids.

... 400. Large spore discharged from the cophoridium of a Lycopod (Sclaginella Metressa), with the outer coat removed to show the young cellular prothallium, p, at the upper end.

... 401. Vertical section of a small portion of the prothallium and upper part of the large spore of a Lycopod (Sclaginella denticulata), showing the embryo, c, developed from a contral cell of one of the archegona, c, carried down by the growth of the suspensor, so as to be imbedded in the cellular tissue at the upper part of the spore.

analogue of the ovule. The large spore forms a cellular prothallium in its interior (Fig. 400, p), on which archegonia are developed. The process of impregnation is supposed to take place here by the spermatozoids of the small

spores coming into contact with the large spore, after the coat of the large spore has burst at its apex, so as to expose the cellular prothallium and its archegonia. The free cengrows down into the prothallium (Fig. 401). A suspensor is thus formed, at the end of which is the embryo, e,





Fig. 402.

tral cell of the archegonium then enlarges, divides, and elongates
into a filament, which

Fig. 402. The small spore of a Rhizocarp (Pilularia globulifera, Pillwort). The
inner coat is protruded, and the outer
coat has burst, so as to discharge
cellules containing spormatozoids.
Some of the spermatozoids are separate, and are seen coiled up in a spiral

form.

403. Archegonium, a, of a Rhizocarp(Pilularia globulifera) cut vertically after impregnation, showing the prothallum, with the embryo in its interior in an advanced state. This embryo gives origin to the leafy stem.

imbedded in the cellular tissue at the upper part of the large The embryo finally produces its radicle and its bud, which is developed as the leafy frond. In Rhizocarps the antheridia are sacs containing small spores, which emit cellules with spermatozoids (Fig. 402). The large spores contained in the sporangia of Rhizocarps produce a prothallium like that of Lycopods, in which archegonia appear (Fig. 403). The prothallium usually develops only one central archegonium. To this the spermatozoids get access, and then the development of the embryo takes

Embryogeny in Gymnospermous Phanerogams.

In Gymnospermous plants, such as Coniferæ and Cycadaceæ,* impregnation is effected by direct contact between *Plate the pollen and the ovule. There is no true ovary bearing CXXXIV. a stigma. In the Coniferæ the scales covering the seeds are either reckoned as bracts or as expanded ovarian leaves. In Cycadaceæ the naked ovules are produced on the margin of modified leaves. In both these orders it is usual to meet with more than one embryo in the perfect seed. In the Coniferæ there is also a peculiar delay in the production of the embryo, after the contact of the pollen. The phases through which the embryo passes in the seed may be reckoned as somewhat similar to those observed in the case of Lycopodium. Brown long ago noticed in the albumen of Coniferous seeds semicylindrical bodies, three to six in number, which he called corpuscles and which are produced before the pollen tube reaches the ovular sac (Fig. 406, d). They are arranged in a circle near the apex, and differ from the mass of the albumen in colour as well as consistence.

Hofmeister gives the following views as to the production of the embryo in Gymnosperms. The ovule of Conifers consists of a short nucleus inclosed in a single integument, and having a large micropyle (Fig. 404). In the delicate cellular nucleus there is developed an embryo-sac, b, sometimes more than one, as in the Yew tribe. The pollen grains enter the large micropyle and come into contact with the nucleus, and then send their tubes into its apex (Fig. 405, This process sometimes requires several weeks or months. After this the embryo-sac (Fig. 405 b) becomes gradually filled with cellular tissue or endosperm cells, and at the same time enlarges. This development of endosperm cells occupies frequently a long time, especially in the









Fig. 407.

Fig. 406.

Fig. 405.

Fig. 404. Vertical section of the ovule of the Austrian Pine (Pinus austriaca), showing the nucleus, a, consisting of delocate cellular tissue containing deep in its substance an embryo-sac, b, formed before impregnation by the coalescence of a vertical series of a few cells. The micropyle, m, is very wide, and through it the pollen grains come into contact with the summit of the nucleus, into the substance of which they send their tubes.

105. Vertical section of the ovule of the Soctoh Fir (Pinus sylvestris) in May of the second year, showing the enlarged embryo-sac, b, full of endopermal cells, and pollen tubes, c, penetrating the summit of the nucleus after the pollen has entered the large micropyle of the ovule.

nucleus after the pollen has entered the large micropyle of the ovule.

... 406. Vertical section of the embryo-sac, b, and of part of the nucleus, a, of the ovule of the Weymouth Pine (Pinus Strobus). At the micropylar end of the embryo-sac, two cells called corpuscles, d, have made their appearance. Each of these is at first separated from the inner surface of the micropylar end of the sac by a single cell, which afterwards divides into four, leaving a passage from the surface of the sac down to the corpuscle. The pollen grain, c, on the summit of the nucleus, then sends down a tube which perforates the embryo-sac, and reaches the corpuscle through the intercellular canal.

... 407. Nucleated cells of what Hofmeister calls the pro-embryo, in the ovule of the Weymouth Pine (Pinus Strobus). The cells are pushed downwards into the cellular tissue of the nucleus by the elongation of the upper cells, which finally form the suspensor.

Abietineæ, which require two years to ripen their seeds. After the embryo-sac has become filled with cellular tissue, certain cells at the micropylar end of the sac enlarge and form the corpuscles of Brown, the secondary embryo-sacs of Mirble and Spach (Fig. 406, d). Each corpuscle is at first separated from the inner surface of the embryo-sac by a simple cell, which afterwards divides into four by the formation of two vertical septa crossing each other; then a passage is formed between the inner angles of these cells leading to the corpuscle. In the cavity of each corpuscle free cells appear. After the corpuscles become evident,

the pollen tubes resume their growth, pass through the tissue of the nucleus, and reach the outside of the embryo-sac, one over each corpuscle. The tubes then perforate the membrane of the embryo-sac, reach the canal between the four cells, and come into contact with the corpuscle (Fig. 406, d). A cell at the lower end of the corpuscle then enlarges, and forms the embryonal vesicle. A free cell in the vesicle divides into eight cells by vertical and transverse septa, and these together constitute a short cylindrical cellular body (Fig. 407), the pro-embryo, as it is called by Hofmeister. The four lower cells of this pro-embryo, by

the elongation of the upper ones (Fig. 408), are finally pushed into the substance of the nucleus. The four elongated pro-embryonic cells (Fig. 409, 1) now appear as isolated suspensors (Fig. 409, 2), and the cell at the end of each suspensor becomes an embryo, g. There are thus four times as many rudimentary embryos as there are corpuscles. Usually one of

corpuscles. Usually one of these only becomes developed as the embryo of the ripe seed.

The view which seems to be supported by the best physiologists is thus given by Henfrey. In Conifers and Cycads, which embrace Gymnospermous plants, the pollen grains are applied to the micropyle of the ovule, without the intervention of a stigma; they then traverse the cells of the nucleus, and reach the embryo-sac. The endospermal cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate cells which fill this see demands of the prospermate the lower oells pushed farther lower to the Weymouth Pine, with the lower cells pushed farther lower to the Weymouth Pine, with the lower cells pushed farther lower to the Weymouth Pine, with the lower cells pushed farther lower to the weymouth Pine, with the lower cells pushed farther lower to the weymouth Pine, with the lower cells pushed farther lower to the weymouth Pine, with the lower cells pushed farther lower to the weymouth Pine, with the lower cells pushed farther lower to the weymouth Pine, with the lower cells pushed farther lower to with the lower or like longation of the upper suspensors taken from the ovale of the Weymouth Pine, with the lower cells pushed farther lower down by the elongation of the upper suspensors taken from the ovale of the Weymouth Pine, with the lower cells pushed farther lower down by the elongation of the upper suspensors taken from the ovale of the Weymouth Pine, with the lower cells pushed farther lower down by the elongation of the upper suspensors taken from the ovale of the Weymou

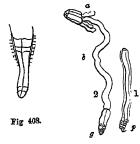


Fig. 409.

of the nucleus, and reach the its extremity.

embryo-sac. The endospermal cells which fill this sac develop corpuscles consisting of an enlarged cell surmounted by four others, which leave a canal between them leading to the large cell. The pollen tube enters the canal between these cells, and impregnates the large cell of each corpuscle, just as the spermatozoid acts in the case of Ferns. large central cell then produces four suspensors, each of which presents at its extremity a rudimentary embryo, only one of which becomes fully developed.

Embryogeny in Angiospermous Phanerogams.

In regard to Phanerogamous Angiosperms, when the pollen grains are discharged from the anther, they are applied to the stigmatic surface of the pistil, and the viscid fluid there secreted causes a rupture of the extine and the protrusion of the intine in the form of a tubular prolongation (Fig. 269, t), which gradually elongates as it proceeds down the loose conducting tissue of the style. The closed extremity of the pollinic tube sooner or later comes into contact with the ovule, and, in some cases, it appears to be met by a tubular prolongation from the ovule itself. When the pollen tube reaches the ovule it proceeds through the foramen or micropyle so as to come into contact with the embryo-sac (Fig. 386, s). Consequent on this is the development of the cellular embryo. The determination, however, of the steps of the embryogenic process has given rise to disputes among physiologists. Schleiden maintains that the end of the pollen tube enters or introverts the embryo-sac, and becomes the rudimental cell of the embryo, while most physiologists think that the tube merely comes into contact with the sac, in which a germinal vesicle has been previously formed ready for impregnation. Schleiden states that a cell of the nucleus is developed into the embryo-sac (the quintine of Mirbel), seen in Figure 410, s, and that this occurs in all Phanero-

gamous plants; that the embryo-sac contains a substance Botany. which is gradually transformed into cellular tissue, and which ultimately constitutes (when not absorbed by the growth of the embryo) the endosperm or albumen; that the pollen tube can be traced from the stigma to the micropyle in a very large number of plants, and that in Helianthemum dentatum he has not unfrequently extracted the pollen tube free, in unbroken continuity, from the pollen , grain to the ovule; that the tube next reaches the embryo-sac, s, the walls of which it presses in before it, and thus becomes surrounded by it, although in reality external to it, like the intestines and their peritoneal covering; that in some instances it causes absorption of the walls of the sac and enters it, and that the end of the pollen tube, e, forms the rudiment of the embryo or the germinal vesicle, in which cells are developed from cytoblasts, while a portion of variable length, at the upper part of the tube, remains as the suspensor or embryophore.

The views of Schleiden, when first propounded, stimulated all vegetable

Fig. 410.

Ovule of Philydrum lanuginosum, shortly after impregnation, according to Schleiden. The pollent tube, t, has reached the foramen (micropyle), and has passed through the ovular canal to the novel as an embryo-sac, sit has entered the latter walls or by introverting them. The end of the pollen tube, e, according to Schleiden, constitute to Schleiden, constitute to the first cell of the embryo. 1, the primine; 2, the secundine; ch, the chalaza; r, the raphe. tines and their peritoneal covering;

propounded, stimulated all vegetable

physiologists. The facts were new, and seemed to upset all former ideas as to the nature of the stamens and pistils. Mirbel and Spach, Meyen, Amici, Hofmeister, Müller, Tulasne, and others, entered the field, and the result has been that Schleiden's opinions have not been confirmed. These authors agree in tracing the pollen tube downwards to the ovule, and they maintain that in the embryo-sac there exists one or more vesicles before impregnation, and that one of these vesicles, after the impact of the pollen tube with the embryo-sac, becomes altered and enlarged, so as to form the rudiment of the embryo.

Amici maintains that there exists an embryonic or germinal vesicle before the application of the pollen; that the pollen tube (Fig. 411, t) reaches the upper portion of the

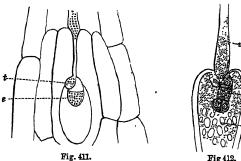


Fig 412. Fig. 411. Section of ovule of an Orchis (Orchis Morio), showing the pollen tube passing through the endostome, and reaching the embryo-sao in the nucleus. The closed and enlarged end of the tube, t, is applied to the sac, in which a vesicle had been previously formed. Transudation of fluids takes place, and the embryo, e, is developed at the lower end of the germinal or embryonal vesicle, while the upper part of the vesicle elongates, and forms a confervoid suspensor.

at the lower end of the germina.

upper part of the vesicle clongates, and forms a confervoid suspensor.

12. Section of the ovule of Enothera, showing the pollen tube, t, with its enlarged extremity applied to the end of the embryo-sac, and introverting it slightly; the germinal vesicle in the sac has been impregnated, and has divided into two parts, the upper part forming a confervoid septate suspensor, s, and the lower dividing into 4 parts, which form a globular mass—the rudimentary embryo, surrounded by endospermal cells, c.

embryo-sac, e, where the germinal vesicle had been previously formed: that imbibition of fluid then takes place between the end of the tube and vesicle, giving rise to the development of the embryo at the lower end of the vesicle, and

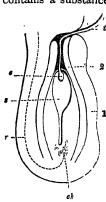


Fig. 410.

Bctany.

Botany. the elongation of the upper part in the form of a confervoid filament, which acts as a suspensor of the embryo. Hofmeister has examined the mode of fecundation in species of Œnothera, Godetia, and Boisduvalia, and the result of his researches is that he finds an embryo-sac containing at first numerous minute granules floating in a viscid mucilaginous fluid (protoplasm); in the midst of this granular matter certain nuclei appear, which develop cells varying in number from one to three or more (Fig. 412, v). These nucleated cells appear before impregnation; one of them becomes pyriform, and touches the membrane of the embryo-sac by its conical extremity, while its other extremity hangs free in This cell is the germinal vesicle—the the embryo-sac. embryonary vesicle of Amici. The pollen tube, in passing through the micropyle, is often contracted in its diameter. The end of it is expanded when it reaches the embryo-sac, to which it is applied either at the apex or near it (Fig 412, t). Sometimes the end of the tube, still closed, introverts the sac, as seen in the Figure, or even perforates it, so as to come into contact with the germinal vesicle. In either case an endosmotic action takes place between the contents of the tube and the sac or the vesicle. In consequence of this action, cell-formation begins in one, rarely more germinal vesicles. The vesicle increases, and is transformed into a compound cellular mass, which Hofmeister calls the proembryo. This divides into two by the formation of a septum; the upper part elongates, and forms a septate cellular suspensor, s, while the lower portion becomes globular, divides into four, and is developed as the embryo, surrounded by endospermal cells, e. Similar observations have been made by Mohl, Tulasne, Henfrey, and others.

The following may be given as a Resumé of the facts ascertained relative to the process of impregnation in Angiospermous Flowering plants. The pollen grains are applied to the stigmatic portion of the pistil, and by the action of the viscid secretion of the stigma a sort of germination commences—often in a few minutes, sometimes not for many hours, by means of which minute tubes are developed from the inner lining of the grains. These tubes, by continuous growth at their ends, are elongated, and pass through the conducting tissue of the style into the ovary-attaining, in some long-styled plants, a length exceeding the diameter of the grain many thousand times. Before the tubes reach the ovary the ovules have undergone changes in their interior; the embryo-sac has become enlarged, so as sometimes to occupy nearly the entire nucleus, and occasionally to project out of the micropyle in the form of an ovular tube or bag. The protoplasmic matter contained in the embryo-sac immediately before impregnation becomes altered, so as to produce endospermal cells. Nuclei appear in the protoplasm at the upper end of the sac next the micropyle. These nuclei, which are usually three, give origin to as many cells, which are termed the germinal or embryonal vesicles, and which are essential for the formation of the embryo. pollen tube, subsequent to this, reaches the upper part of the embryo-sac, after penetrating through the micropyle and any nuclear cells that may lie between it and the sac.

On reaching the embryo-sac the pollen tube is either arrested or it elongates still more, so that its swollen extremity penetrates latterly between the embryo-sac and the surrounding cellular tissue, or in certain rare instances introverts the embryo-sac, and even penetrates it so as to come into contact with the germinal vesicles. When the end of the tube comes into contact with the sac, it is probable that there is a transudation of the fluid matter of the fovilla, which passes through the membrane of the pollen tube, through the embryo-sac, and through the wall of the germinal vesicle, and thus impregnation is effected. After reaching the sac, the pollen tube begins to decay; its contents acquire a granular, half-coagulated aspect; and it' finally disappears by absorption. It usually happens that

only one germinal vesicle is impregnated, and in the progress of its subsequent growth it causes absorption of the others; sometimes, however, several are impregnated, and thus there may be a plurality of embryos formed (polyembryony). The impregnated vesicle enlarges, acquires an ovate, cylindrical, or clavate form, constituting the pro-embryo of Hofmeister. The vesicle divides in all cases by a transverse partition into two cells, one above the other; the lower of these produces cellular tissue in its interior, and is sometimes at once transformed into the embryo. At other times, and more frequently, there is a successive production of cells in the pro-embryonic body, so that the upper division of the vesicle forms a confervoid-like filament, the suspensor, while the lower is transformed into a globular cellular mass, which is the rudiment of the embryo. The suspensor is sometimes of great length; it is attached to the radicular end of the embryo, while the cotyledons are formed at the opposite side. In monocotyledons a single sheathing cotyledon is developed; in dicotyledons two opposite leaves, and after their formation the apex produces the terminal bud or plumule. The embryo is thus suspended in an inverted manner in the seed. In the progress of development a marked division takes place between the radicular extremity and the suspensor, and the latter finally shrivels.

5. Hybridization, or the production of Hybrids in Plants.

In connection with the subject of fertilization, the production of hybrids or mules deserves attention. When the pollen of one species is applied to the stigma of another species, so as to effect fecundation, the seeds thus formed give rise to individuals which are intermediate in their characters between the two parents. The plants produced by this heterogeneous fertilization are called hybrids or mules. A true hybrid is a cross between two species, but the term is often applied to crosses between mere varieties, races, or sub-species. The latter sort of crosses have been occasionally denominated sub-hybrids in order to avoid confusion. In hybridizing it is necessary to bring together species which are allied, as, for instance, the species of the same genus, or those of allied genera. It is not, however, easy to determine the plants which can produce hybrids. Many plants which seem to be nearly allied do not inoculate each other. Sageret failed in his endeavours to fecundate an apple tree by a pear tree, and no one has succeeded in getting hybrids between the gooseberry and currant, nor between the strawberry and raspberry. It is not common to meet with hybrids in a wild state, because there is a much greater likelihood of the pistil being impregnated by the pollen of the anthers beside it, than by that from a distance; and if fecundation has taken place, then pollen applied from other sources has

It has been found that for successful hybridizing the pollen must be in perfection, and the stigma also must be fully developed. There appears always to be a preference for its own pollen on the part of the stigma. When strange pollen is applied, even in the case of species which hybridize, it does not act so effectually on the ovules as the pollen belonging to the flower. Dichogamous plants, that is, those in which the sexes are separate, are not so susceptible of the influence of strange pollen. This seems to be a provision to guard against hybridity in such cases.

When impregnation takes place between two pure species the characters of the parents never remain pure and unaltered in the formation of the hybrid. In general every part of the new production is modified, so that it presents a decided difference from either of the parents, though resembling the one more than the other. Sometimes the influence of the male predominates, sometimes that of the female. Hybrids occur in which the characters of the parents are intimately blended, so that it is impossible to say

Botany. to which there is a greater resemblance. Sometimes the number of the organs is curiously intermediate; thus Cucubalus has three stigmas, and Lychnis five, and a hybrid between them has four. Again, hybrids occur in which one part or other approaches the paternal or maternal form, though the characters of the parent never pass altogether pure into the new organism. There is a third set of hybrids in which there is a resemblance to one of the parents, whether male or female, so decided, that the agreement is at once perceptible and beyond doubt.

Hybrids, although they may be fertile at first, rarely continue so for many generations. The cause of sterility in mules has not been fully ascertained. Henslow could not find in a hybrid Digitalis any structural changes which could account for barrenness. Hybrids may be fertilized by pollen taken from one of the parents, and then the offspring approaches in character to that parent. Hybrids impregnated for a third or fourth time with the pollen of the original male plant, approach more and more to the male type. Such is also the case when the impregnation is effected by pollen taken from the original female type, but in this instance the change is usually more slow. Gærtner, to whom we are indebted for most of these remarks on hybridity, gives a tabular view of the number of impregnations requisite to complete changes of species by hybridization. He produced hybrids between the two species named, and then, by using the pollen of the original male or female parent, he found that in progress of time the species are

brought back to the male or female type.

Hybridizing is an important horticultural operation. By it the gardener endeavours to increase the size of flowers, to improve their colour, to approximate their forms to some assumed standard of perfection, to enlarge the foliage as in esculents, to render tender plants hardy, to heighten the flavour of fruits, and to exchange early for late varieties. The changes produced by muling on the size and colour of the blossoms are very remarkable. By inoculating Cereus speciosissimus with C. grandiflorus, we find that the immediate result is a seedling whose flowers are ten inches in diameter. The hues resulting, however, from the union are not necessarily intermediate. Blue and yellow do not produce green, as proved by a hybrid between Verbascum phæniceum and V. phlomoides. By muling, beautiful varieties have been produced between Rosa indica and R. moschata, Azalea pontica and A. nudiflora coccinea, Rhododendron arboreum and R. caucasicum, catawbiense, ponticum and companulatum; between Rhodothamnus Chamæcistus and Phyllodoce cærulea, Veronica fruticulosa and saxatilis, Cereus speciosus and speciosissimus; also between species of Fuchsia, Mahonia, Potentilla, Pelargonium, Calceolaria, Viola, Dahlia, Erica, Narcissus, and numerous others. In the case of Rhododendrons, gardeners have been able to secure the fine colour of the Indian R. arboreum with the hardiness of the American species. By inoculating the common Heartsease with the large-flowered Pansy of the Altai Mountains, a degree of vigour has been infused into the former which we could not hope to obtain by ordinary means. The fine varieties of Pelargonium have been obtained, by cultivation and by hybridizing, from the smallpetaled Pelargonium of the Cape. Fruits and culinary vegetables are sometimes improved by hybridity. These hybrids cannot be continued from seed. They must be propagated by offsets or cuttings. The effect of hybridizing or crossing is very marked in the case of certain Cereal plants.

This subject has important bearings on the origin and limitation of species. If, as some old authors supposed, there were only a few species originally formed, and all the rest are the result of hybridization, there would be no limit to the production of species, and no permanence in their characters. This opinion, however, is not supported by facts. It is believed that the types of all the species now on the

globe were originally placed on it, and have given origin to Botany. offspring like themselves, capable of reproducing the species. We have already mentioned that hybrids are rare in a wild state, and they are seldom permanent and fertile, and they have always a tendency to revert to one of the original

III .- PHYSIOLOGY OF THE FRUIT.

While the object of fecundation is to develop the embryo in the seed, it causes at the same time changes in the pistil The stigma and style become dry, and either fall off, as in the Peach, Orange, and Nut, or are persistent, as in the Poppy (Fig. 309), Mangosteen, Clematis, and in many pods. (Fig. 314). The pericarp in some instances becomes swollen, even although the ovule is not fecundated. In such cases the fruit is abortive in as far as reproduction is concerned, although it may be valued for domestic purposes. Many of the best Oranges and Grapes contain no perfect seeds, and the fruit of the Banana, Plantain, Bread-fruit, and Pineapple, is most palatable when it is seedless. The age of trees seems to have an influence over the production of seeds. In the case of the Orange, it is said by Bullar that old trees

often produce seedless fruit.

The fruit during its growth attracts nourishment from the surrounding parts, and it is of importance that it should receive a large supply of elaborated sap. In their natural state some plants exhaust themselves in the production of fruit, and die after one year, if annuals, or after two, if biennials. Sometimes fruiting is long delayed, and ultimately takes place vigorously and abundantly. This is observed in plants such as the American Aloe, which only fruits once after many years, and then dies. The division of plants into Monocarpic (μόνος, one, and καρπός, fruit) and Polycarpic (πολύς, many) is founded on their times of flowering and fruiting. The former are such as flower and fruit only once in their life and then die; and this may take place at the end of one year, two years, or many years. The latter are such as flower and fruit many times in the course of their lives. A plant which has been prevented by an inclement season from perfecting its fruit, will often bear a large quantity the following season, if genial. An annual, by being prevented from fruiting, may be made to endure for two or more years. The increased vigour of perennials enables them to withstand the exhaustion induced by fruiting.

In the case of cultivated plants, where the object of the gardener is to have a supply of good fruit, many artificial means have been adopted to promote the development and maturation of the pericarp. The application of manure to the soil, by increasing the vigour of the plants, aids in this matter; also checking the branches by judicious pruning, so as to cause a great flow of sap to the fruit; and cutting a ring of bark from the branches, so as to produce accumula-tion of sap above the wound. In ringing the bark, care must be taken to make the cut so that the two lips of the wound may reunite in the course of a few months. If the cut is large, then the branch may be destroyed. It is prudent not to ring the bark of the main stem, but only that of branches; and the wound should be covered with graftingclay and damp moss, so as to allow the healing process to go on. Checking the roots has an important influence on the production of fruit. When fruit sets in large quantity, it is prudent to thin it early, and thus allow only a moderate quantity to come to perfection. As the sap is distributed to the whole fruit, this operation will permit more nourishment to go to that which remains. By judicious thinning, although the quantity of fruit is diminished, its quality is much improved.

The pericarp sometimes preserves its green colour and leafy aspect, as in the Pea, and continues to act as leaves do, decomposing carbonic acid during daylight, and giving

Botany. out oxygen. Sometimes the cells of the pericarp become I hardened and thickened by the deposit of lignine, and the seed-vessel becomes dry, assuming a white or brown colour. In these circumstances its active vital functions cease, and it no longer produces any marked effect on the air. In other instances the pericarpial cells contain matters which, in the progress of maturation, undergo chemical changes, so that the fruit becomes succulent, and its epicarp assumes various tints of red, yellow, and blue. As transpiration and evaporation take place from the surface of succulent fruits, the fluids in the outer cells become thickened, and thus promote the endosmotic action between them and the cells containing thinner liquids. In this way the fruit swells considerably. When the fruit has attained its full size the stalk dries up, and may be easily detached from the plant; at the same time waxy matter is deposited in the cuticle, which prevents the drying process from going on rapidly.

During their early state pulpy fruits are tasteless or slightly bitter, and they have at that time the structure and chemical constitution of leaves. In their second stage of development they acquire a sour taste from the production of acids, such as malic acid in the Apple and Gooseberry, tartaric acid in the Grape and Tamarind, citric acid in the Lemon, Orange, Red Currant, and Cranberry. In the third stage, or that of ripening, the acids diminish in quantity, they are more fully neutralized by the alkalies present in the fruit, and are partially decomposed; the cellulose forming the walls of the cells and vessels is also transformed, and along with the gum is converted into grape sugar. Saccharine matter may be formed from the acids in the fruit, by the addition of the elements of water, and the separation of oxygen. The changes which take place during ripening consist chiefly in a diminution of the quantity of water and of ligneous matter, and an increase in the quantity of sugar. Saussure and Couverchel state that ripe

Grapes, Apples, and Pears, when separated from their re-

spective plants, and kept at a temperature of about 60° Fahr.

gave out carbonic acid.

Berard thinks that these changes in fruits depend essentially on the action of the oxygen of the air. Fleshy fruits, he says, may be preserved with little alteration for many weeks in vacuo, in nitrogen, and in hydrogen gas; Peaches, Plums, and Apricots, may be kept from twenty to thirty days, and Pears and Apples for three months, in a sealed bottle, containing a little sulphate of iron, lime, and water, which remove the oxygen of the air. Fremy found that the ripening of the fruit was arrested by covering it with varnish, which he supposes to act partly by preventing the access of air, and partly by stopping the transpiration, and thus checking the flow of sap into the fruit. Couverchel says that the sugar of fruits is formed by the action of organic acids on the gum, dextrin, and starch; while others think that the cellulose and lignine are also transformed into sugar by the action of acids.

Certain fruits, more especially those belonging to the natural orders Pomaceæ and Ebenaceæ, after being ripe, undergo a series of chemical changes when pulled and allowed to remain in a room at a moderate temperature. The austerity of Medlars is diminished under this process, to which the name of bletting (French, blette) is given by Lindley. It is a stage intervening between what is commonly called ripeness and decay. The chemical changes consist in a loss of weight, in consequence of a separation of water and a diminution in the quantity of saccharine and ligneous matter. There is a slight increase at the same time in the albuminous matter and in the malic acid. During the maturation of certain fruits, oily and aromatic substances are produced which give a peculiar flavour. In fruits which form jellies, there is developed a gelatinous matter, to which the name of Pectic acid is given.

The greater number of plants ripen their fruit consider-

ably within a year from the time when the flower expands, and some require only a few days for the purpose. Some trees, as certain species of Oak, require eighteen months: Juniper fruit, and cones of the Firs, the fruit of some American Oaks, and of the Metrosideros of New Holland, hang above twelve months; and the Cedar requires twenty-seven months to mature its fruit or to bring its seeds to perfection. The Orange presents a singular phenomenon in respect to maturation of its fruit. This is generally looked upon as ripe at the end of the first year; but it often happens in the south of Europe that, in order to obtain Oranges of the best quality, the fruit is allowed to remain for a second summer on the tree. It is not easy then to say what is the real term of maturation in this fruit in its natural state. Discussions have arisen as to the time when the fruit of the cereal plants is most productive to the farmer. Many think that wheat ought to be cut before the fruit reaches perfect maturity, inasmuch as it then yields most flour. When allowed to remain till fully ripe, then the outer covering or bran thickens at the expense of the flour. Such is also said to be the case in Oats. About a fortnight before ripening is said to be the proper time for cutting corn, as the skin is then thinner, the grain fuller, the bushel heavier, and the yield of flour greater.

The period in which fruits ripen is materially accelerated by an increase of temperature, and their flavour is also improved. Hence the use of putting fruit under glass, or on slates of a dark colour, or wrapping it up in thin bags. The maturation is also accelerated by removing a ring of bark from the branch or stem, which leads to an accumulation of descending sap above the cut. When fruit trees belonging to a cold climate are transferred to a hot one, it frequently happens that no fruit is produced; the leaves become luxuriant, and the flowers, if they expand, are abortive. A high temperature sometimes seems to cause the production of unisexual male flowers only. Hence plants in hothouses when over stimulated by continued heat, are often abortive. They require a season of rest or repose in order to perform their functions properly.

IV .- PHYSIOLOGY OF THE SEED.

1. Muturation of the Seed, and Modes in which Seeds are scattered and deposited in the Soil.

The production of an embryo is the object of fertilization. In the case of flowering plants this embryo is contained in the seed, in which it attains a certain degree of development. In these plants after impregnation the ovule undergoes evident changes. The embryo plant enlarges, attracts nourishment from the surrounding tissues, and either absorbs all the contents of the ovule, or becomes surrounded by a store of perisperm (albumen) which is deposited within or on the outside of the embryo-sac, or in both situations. The nucleus of the ovule is either absorbed or becomes filled with various azotized and unazotized matters, while the coats (especially the outer one) become denser and firmer, and the foramen is closed. Lignine is often deposited on the walls of the cells of the episperm. The seed by means of these changes is rendered more fit to resist vicissitudes of temperature and other accidents which might injure the vitality of the embryo.

An aperispermic embryo (Fig. 334) has all the nutriment contained in its own substance, especially in its cotyledons, and when the coats of the seed are removed the embryo alone is found within. A perispermic embryo has a separate store of nutriment beside it, and when the seed-coats are taken off the embryo is found surrounded more or less completely by this nutritive matter or perisperm (Fig. 335). The perisperm consists of amylaceous, gummy, and saccharine matters, with oils, resins, nitrogenous substances, and

certain salts, such as phosphates, sulphates, and chlorides. The presence or absence of perisperm seems to be connected with the mode in which the seed germinates, and the nature of the perisperm varies according as the seeds sprout rapidly or lie long dormant in the soil. The store of nourishment laid up in the seed is greater than the embryo requires in ordinary circumstances. When the perisperm is not allowed to be fully formed before the seed is detached from the plant, it sometimes happens that owing to the soft and succulent condition of the albumen, the embryo sprouts rapidly. In such cases, however, the embryo does not germinate vigorously, and is apt to fail from want of a due supply of nutriment. Some seeds continue to be of a soft texture, while others assume a stony hardness, as is the case in the Date, and in the Ivory Palm. Some ripe seeds are of greater specific gravity than water, and sink when thrown on it. In other instances, especially when air is contained in the envelopes, as in the Indian Cress, the seeds float in water.

When the seed is ripe, it is either discharged from the seed-vessel, or the fruit remains indehiscent, and falls with the seed still contained in it. Fleshy fruits, such as Apples and Peaches, fall from the tree when ripe, and their succulent portion serves as nutriment for the young embryo while sprouting. Many dry fruits, especially such as are monospermal, (Fig. 317) fall along with the seed which they inclose. In the cereal grains the pericarpial covering and the integument of the seeds are incorporated, and in the fruit of Labiatæ and Boraginaceæ these two coverings continue attached when the seed is ripe. In Compositæ (Fig. 206) and Valerian the hairy calvx remains attached to the fruit, so as to be the means of dispersing it along with the contained seed, and in samaroid fruits (Fig. 322) there are winged appendages for the same purpose. In the case of the Dandelion (Fig. 155), the receptacle, which is at first succulent and flattened, becomes dry and convex, and the phyllaries, which are erect, become deflexed, so as to allow the fruit to be easily scattered. Other dry fruits dehisce in various ways, as already mentioned, so as to scatter the seeds. The opening of the seed-vessels takes place either as the result of a drying process, as in Mahogany, or from the effects of moisture, as in species of Mesembryanthemum, and in the pod of Anastatica hierochuntina, commonly called the Rose of Jericho. Some plants are called Hypocarpogean (ὑπὸ, under, καρπὸς, fruit, and γέα, earth), because their fruit is subterranean—that is, it is either produced on peduncles underground, or, after being ripened in the air, is pushed into the soil by a curvation of the fruit-stalk. Vicia amphicarpos and Lathyrus setifolius var. amphicarpos produce fruit both on aerial and subterranean branches. Arachis hypogæa, called Earth-nut, produces on its aerial branches abortive flowers, while on those underground it develops perfect pods. The peduncle of Linaria Cymbalaria at the time of flowering is straight and short, but it afterwards elongates and curves irregularly, until it comes to a fissure in the rock or wall on which it grows; there it inserts the capsule, which subsequently allows the seeds to escape. The extremity of the peduncle of Trifolium subterraneum is provided with a hard point, by means of which, after its curvation, it penetrates the soil and deposits its pods.

Seeds are sometimes provided with hairy and winged appendages, as seen in the case of Cotton, Willow, Asclepias (Fig. 329), Pine (Fig. 328), Mahogany, and Bignonia, for the purpose of being wafted to a distance by the agency of winds. The seeds of plants valuable as food have been dispersed by man over various quarters of the globe. Streams also convey to a distance the seeds of plants which grow on their banks. The pulpy covering of some fruits renders them fit for the food of birds and other animals, and when the seeds are hard and inclosed in a stony endocarp, they may escape the action of the gastric juice, and be deposited in a state fit for germination. Seeds are scattered in such a way as to reach

the soil best fitted for their growth, whether the plants are Botany. terrestrial or aquatic.

2. Germination.

Germination (Germinatio, springing), is the term applied to the sprouting of the embryo when placed in circumstances favourable for its growth. In the case of flowerless plants a cell or spore separated from the parent plant is developed into a new organism, while in flowering plants an embryo plant already in a certain stage of development within the seed, begins to send out first its root, and then its cotyledons and primary stem-bud. In the case of the latter class of plants, germination may be defined the act by which the fecundated embryo of a seed leaves the state of torpor in which it has remained for a longer or shorter period, starts into life, as it were, comes out from its envelope, and sustains its existence until such time as the nutritive organs are developed.

Requisites for Germination.—In order that germination may go on, certain conditions are necessary. The most important of these requisites are moisture, a certain temperature, and air. The absence of light is also favourable for the process, and, according to some, electricity promotes it. In general, seeds do not sprout until they are placed in the position which the plants are subsequently to occupy. Occasionally, however, seeds begin to germinate before being detached from the plant, as in the case of the Mangrove tree.

A certain amount of *moisture* is required for germination. If seeds are kept in a dry state they can be preserved for a long time without sprouting. Water is required for the solution of the nutritive matter of the seed, as well as for exciting the endosmotic action of the cells. No circulation nor movement of fluids can take place in the seed until water is taken up. The nourishment of plants is absorbed chiefly in a liquid state. Seeds imbibe a large quantity of water, and in so doing their cells become much distended. By this means they are enabled to burst the hard endocarpial coverings which often surround them, as in the case of what is called stone-fruit.

The amount of heat required for the development of the embryo varies much. Some seeds, as those of plants belonging to coldregions, require a moderate temperature, others belonging to hot countries demand an elevated one. It may be said in general that a temperature varying from 60° to 80° F. is the most favourable for germination. In cold regions the spores of Cryptogams germinate at a very low temperature. In other instances germination proceeds at high temperatures. Dr Hooker states, that on the edges of hot springs in the valley of Soane in India, the temperature of which was sufficient to boil eggs, there occurred sixteen species of flowering plants; he also mentions Ranunculus sceleratus as growing in the vicinity of hot springs near Monghyr in India, at a temperature of 90°.

The necessity of air for germination was demonstrated by Ray, Boyle, and others, before the chemical composition of the atmosphere was discovered. Scheele, Senebier, and Saussure showed that the presence of oxygen gas was required in order to aid in the changes which take place in the seed. When seeds were placed in an atmosphere of hydrogen, nitrogen, and carbonic acid, they did not germinate. When they are buried deeply in the soil, so as to be deprived of the access of air, they do not grow. In such circumstances, when the soil is turned up so as to bring the seeds near the surface, germination often commences. In this way seeds, which have been long dormant, spring up on the embankments of railways, and white Clover frequently appears when the soil is stirred. Some substances which supply oxygen, as weak solutions of chlorate of potass and of oxalic acid, are said to be useful in promoting germination, Chlorine acts in the same way by decomposing water and setting oxygen free.

Seeds germinate more rapidly in *shade* than in light, and in diffuse daylight more quickly than when exposed to the direct solar rays. Experiments have been made as to the effect of different rays on germination. Senebier found that the plants illuminated by the yellow rays grew most rapidly in height; next those in the violet rays; afterwards those in the red; and he concluded that the height and size of a plant was proportionate to the intensity of the illumination, while its verdure depended more on the quality of the rays. Hunt made experiments on the effects of coloured rays on the germination and growth of plants by passing the sun's rays through variously coloured glass. He concluded that the processes of germination and budding are essentially influenced by the chemical principle actinism, transmitted through the blue media; and that while the rays connected with blue light promoted germination, the luminous yellow rays impeded it.

While moisture, heat, air, and darkness, are favourable to germination, it is of importance that these requisites should be properly supplied. In nature seeds are sown in the earth to a moderate depth, so as to be excluded from light, and at the same time to be acted on by air; moisture is supplied by rains and dews, and a certain temperature is given. Such is the plan which we ought to imitate in garden and field operations. In order that seeds when scattered may be placed at a proper depth, the soil must be properly ploughed and pulverized. The preparation of the soil materially promotes germination; when properly ploughed the seeds sink to the same depth throughout the field. The advantage of equal machine-sowing is, that the seeds germinate about the same time, and the crop is also all ripened at once, and the diminution in the quantity of flour caused by allowing some part of it to remain long in a ripe state is avoided. When seed is sown broadcast by the farmer, a certain quantity remains uncovered even after harrowing, and hence it does not germinate freely. This may be one reason why dibbling is more successful as regards the number of seeds which germinate, and why with a smaller expenditure of seed an equal return is made.

The experiments made in regard to the depth at which seeds should be placed, agree in showing the advantage of shallow sowing. The more slightly the seed is covered by the earth, the more rapidly the bud makes its appearance, and the stronger afterwards is the stalk. The deeper the seed lies, the longer the shoot remains before it comes to the surface. Ugazi, from observations made in Bavaria, gives half an inch and one inch as being the best depths at which ordinary cereal grains, as well as Peas, Millet, Maize, Buckwheat, and Lentils, should be sown in argillaceous soils, while two to three inches is the depth proposed in sandy soils.

Draining.—In order that land may be productive in the case of cultivated grains, moisture must be supplied in proper quantity, and a certain amount of heat must be imparted to the soil. This is accomplished by the operation of draining, which has been carried to great perfection of late. Much injury is inflicted on the soil by stagnant water. The land is rendered cold, inasmuch as the sun's rays, in place of being expended in heating the soil, are absorbed by the water, the temperature of which is not raised so rapidly as that of the earth or of the air. There is thus a great loss of heat. Drained land in summer is from 10° to 20° warmer than water-logged land. Moreover, by the exclusion of air there is often an imperfect decay of vegetable and animal matters in the soil, so that acids are produced which are deleterious and hurtful to vegetation. The importance of giving bottom heat to plants cannot be too strongly insisted on.

The object of draining is not so much to get rid of the water, as to make it percolate freely through the whole of the soil, laterally as well as perpendicularly, and thus obtain from it the nutriment, in the shape of ammonia, carbonic

acid, &c., which it contains. As the water disappears, air occupies its place, and hence drained soil is aërated. The effects of draining are both mechanical and chemical. It gives rise to improved efficiency in ploughing, harrowing, and weeding, besides saving seed. It also aids the fertilizing power of manures, ameliorates the climate, raises the temperature of the soil, accelerates the harvest, and improves the herbage and other crops.

The depth of drains, and their distance from each other, must be regulated by the nature of the soil, and of the subsoil. Drains should of course never be shallower than the known depth to which the roots of annuals descend. By making deep, and at the same time efficient drains, we increase the quantity of soil available for the purposes of plants. In the case of deep-rooted plants, it is essential that water should be removed from the lower as well as from the upper portion of the soil. Drains must be kept clear, otherwise their good effects will be lost. Occasionally they become choked up, the roots of plants getting access to them. All that can be done to prevent this, is to make deep drains, and not to allow them to pass near trees; also to keep the land clean.

Vitality of Seeds.—Some seeds must be sown immediately after they are ripe, otherwise they lose their vitality, and decay. This is the case with the seeds of Magnolia, Coffee, Clove, and with those of an oily and mucilaginous nature. Even though the germinating power is lost, the seeds may be in a state fit for food. The seeds of the double Coco-nut (Lodoicea Seychellarum), when carried from the Seychelles Islands to the Maldives, and those of Entada (Pursætha) scandens, when borne by the Gulf-stream from the Antilles to the outer Hebrides, are to all appearance fresh, although they will not sprout when planted. Seeds with very delicate integuments can seldom be kept longer than a few weeks or months, while hard and bony seeds have been known to germinate after the lapse of many years. Certain seeds are known to retain their germinative powers for a long time. The seeds of Cucumber have germinated after seventeen years, those of Colsa and Malva crispa after eighteen, of Althæa rosea after twentythree, Maize after thirty, Haricots or French beans, after thirty-three, Melons after forty-one. For sixty years a bag of seeds supplied the Jardin des Plantes annually with Sensitive plants. Haricots taken from the Herbarium of Tournefort, and which were at least one hundred years old, were found to germinate, as were also seeds of Hieracium, fifty years old, from Fries' Herbarium. Grains of Rye have been found fertile after one hundred and forty years.

Seeds placed in particular circumstances have retained their vitality for a great number of years, and even for centuries. Savi saw for ten years young Tobacco plants continue to spring up in his garden from seed which had been sown naturally. All the young plants were regularly rooted out, and yet the supply continued for the length of time mentioned; showing that many seeds remained dormant, and only appeared as the soil was turned up and exposed to air. Duhamel noticed the re-appearance of Datura Stramonium, after twenty-five years, in a ditch which had been filled up and afterwards cleared. Miller noticed Plantago Psyllium grow in a ditch at Chelsea which had been newly cleared, and where it had never been known to grow in the memory of man. Lindley mentions the germination of Raspberry seeds found in 1834 or 1835 in an ancient barrow (tumulus) near Maiden Castle, along with coins of the Emperor Hadrian. The seeds were found in a coffin thirty feet below the surface, and may have been 1600 to 1700 years old. In Stirlingshire germinative seeds of the Corn Marigold (Chrysanthemum segetum) were found under six or seven feet of peat moss. When new land is turned up it frequently happens that seeds spring up which have lain long dormant. White Clover (Trifolium repens) appears

Botany. in these circumstances. Fumaria micrantha has been known to appear in large quantity on newly stirred ground near Edinburgh. After extensive conflagrations plants often make their appearance which had not been previously seen in the neighbourhood.

It is not easy to account for the manner in which the vitality of many seeds is thus preserved. Uniform temperature, moderate dryness, and exclusion from light and oxygen, appear to be essential requisites. If the temperature is elevated, and moisture and oxygen are present, then germination commences. The vitality of seeds in certain favourable circumstances may thus be preserved for a very extended period, but it is by no means easy to imitate these conditions. The statements made in regard to the preservation of Mummy Wheat have not been confirmed by careful observation. Even in the cases which appeared to be conclusive, fallacies have been detected. Thus Mummy Wheat, supplied by Sir G. Wilkinson to various parties, was found in some cases to contain grains of Maize, a plant of the New World, which leads to the conclusion that in this case the grains had been tampered with. We have no evidence that the Wheat now cultivated as Mummy Wheat was that deposited 3000 years ago in the mummy cases.

Preservation of seeds in a germinating condition is a matter of importance in as far as the introduction of plants from abroad is concerned. Seeds brought from India to Britain round the Cape rarely vegetate freely, while those brought overland succeed well. Seeds are best transported in their pericarps. The flinty coatings of many foreign legumes will preserve the living germ for an indefinite period. In preserving seeds an important requisite is to have them ripe and dry. Such seeds should be put into dry paper, and exposed during transportation to free ventilation in a cool place, as for instance in a coarse bag suspended to a nail in a cabin. Many seeds which cannot be transported when exposed to air, will retain their vital properties if buried in clay. Oily seeds, and those having much tannin in their composition, as Beech-Mast, Acorns, and Nuts, must not only be ripe and dry, but also must be excluded from the air. They are usually put into dry earth or sand pressed hard: or they are preserved in charcoal powder, and enveloped in tin or wax. Exalbuminous seeds, and those having dense and fleshy albumen, bear transportation best. Mr M'Nab has suggested a mode of transmitting seeds by having a strong box about ten inches square, with the sides three quarters of an inch thick, in which alternate layers of earth and seeds are placed, the whole being firmly pressed together. On the arrival of such a box the layers of earth and seeds are taken out in succession and put into separate boxes. Wardian Cases may also be employed for the transmission of seeds in earth. The seeds will thus be brought frequently in a germinating condition.

Alphonse De Candolle finding that there have been fal-lacies in regard to the vitality of seeds, from not attending to the particular circumstances in which they have been preserved, made experiments on the subject by taking seeds of different natural orders, collected simultaneously in the same garden, transported and preserved in the same manner, sown in equal numbers, and in similar conditions of soil, humidity, and temperature. The seeds were collected in the Florence Garden in 1831, and were sown on the 14th May 1846, being nearly 15 years old. He selected 368 species belonging to about 150 different genera, and 53 families. Twenty seeds of each were sown in peat mould in pots, and watered. The pots were kept under examination till autumn. The mean temperature in June, the period when several species sprung up, was 66.2° F, that of July 65.3° F., and the maximum reached 86° and 87.8° F. Out of the 368 species only 17 germinated; of the 17 species which came up, Dolichos unguiculatus was the only one

of 20; others had 1, 2, or 3 germinations in 20 seeds. La- Botany. vatera cretica approached nearest Dolichos, but there were only 6 out of 20 that germinated. Woody species seem to preserve the power of germinating longer than others, whilst biennials are at the opposite extreme. Perennials probably lose the power of germination more quickly than annuals. Large seeds appeared to De Candolle to preserve the power of germinating longer than small ones. The presence or absence of separate albumen did not seem to make any difference. Some albumens, such as those of Coffee and of Umbelliferæ, are difficult to preserve from special chemical Compositæ seem to lose their germinating conditions. power very early. From other experiments, De Candolle concludes, that the duration of the faculty of germination is frequently in an inverse proportion to the power of germinating quickly.

Time required for Germination.—The time required for the germination of seeds depends greatly on the texture of their coats, as well as their age. Some exalbuminous seeds, such as Cresses, which are also very hygroscopic, sprout in twenty-four hours, others require many days, or even months. Hard seeds, such as those of some Palms, lie long dormant. Large seeds are slower in germinating than small ones, because they require more water, and their absorbing surface does not increase in proportion to their size. Seeds having an osseous or stony spermoderm, and those which are sown naturally while contained in a hard pericarp, as nuts and achenes, germinate more slowly than others. The germination may be expedited by thinning or chipping the envelope, so as to allow water to penetrate more easily. Many of the seeds inclosed in a hard shell or stone germinate in the midst of a decaying mass, which must contribute to the decomposition of the shell. Soaking hard seeds in water, or causing them to pass through the digestive canal of animals, greatly accelerates germination. The seeds of Hawthorn, and others of a similar nature, are thus often deposited by birds in peculiar localities in a state fit for immediate germination.

Alphonse De Candolle examined the germination of seeds in the open air and in a stove, and the following table shows the general results :-

NAMES OF SPECIES.	NUMBER OF DAYS REQUIRED FOR GERMINATION.		
	In the open air, 464° to 53.6° F.	In a stove. 64.4° to 77° F.	
Erigeron caucasicum Thlaspi ceratocarpum Dolichos abyssinicus Zinnia tenuiflora. — coccinea Grahamia aromatica	10 8 10 11 22 14	2 4 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
Solidago hirta Lablab vulgaris Anthemis rigescens Rheum undulatum Duvaua dependens		10 6 7 16	

The rapidity with which some annuals germinate in arctic regions when the heat of summer returns is very remark-They pass through their periods of germination, flowering, and fruiting in a very short period. Such is also the case in warm countries after the dry season. After the dry season in the Brazilian plains, and when the first few showers have fallen, Gardner remarked that the annual Grasses pushed forth their blades with astonishing rapidity and vigour. Spruce states that on the sandy shores of the Amazon and Tapajoz, after the waters leave them, several small annual or rather ephemeral plants spring up. They start up from the sand, flower, and ripen their seeds in the that yielded more than one-half the seeds sown, viz., 15 out course of a few days, and then wither. Amongst them are

an Alisma, two or three Eriocaulons, a Xyris, and some minute Cyperaceæ.

Chemical changes during Germination.—During the germination of seeds, alterations take place in the nature of their contents. When the embryo occupies the entire seed, changes occur in the cotyledons, by means of which nutritive matter is prepared; when there is a separate store of perisperm, its constituents are acted upon by moisture, heat, and air, so as to undergo chemical changes. Alterations take place in the azotized matter, and part of the fibrin gives origin to diastase, which acts as a ferment; acetic acid is also formed, and the starchy matter is converted into dextrin and grape-sugar. Thus insoluble matters are rendered soluble, and a large amount of saccharine matter is produced. At the same time there is an evolution of carbonic acid, in consequence of a combination between the oxygen of the air and the carbon of the seed, and as the result of this chemical action a certain amount of heat is developed. The heat is carried off very rapidly by the soil in ordinary cases, so that it is difficult to ascertain its amount; but when seeds are laid in moist heaps the increase of temperature becomes

In the malting of Barley these changes are well seen. The grain is steeped in water in the first instance, so as to soften and swell; it is then laid in heaps 30 inches deep for 20 or 30 hours. In this situation it becomes warm, and germination commences. This is moderated by laying the grain in thin strata of a few inches thick, on large airy but shaded floors. There it remains 12 or 14 days, until germination is sufficiently advanced, being frequently turned in the meantime, in order to allow each grain to germinate equally, and to prevent entangling of the radicles of contiguous During this process sugar is formed, which is intended for the nourishment of the young plants, and if left long it would all be absorbed. This is prevented and germination stopped by exposing the grain in a kiln to a temperature rising from 100° to 160° or more. Thus the grain is

dried and its vitality destroyed.

During germination it is probable that there is a certain electric disturbance. Carpenter says, the conversion of the starch of the seed into sugar involves the liberation of carbonic acid, and of a small quantity of acetic acid. Now as all acids are negative, and as like electricities repel each other, it is probable that the seed is at that time in an electro-negative condition. Hence germination is said to be quickened by connecting the seed with the negative pole of a feeble galvanic apparatus, whilst it is retarded by being connected with the positive pole.

Acotyledonous germination.—When the spores of the lower Acotyledonous plants germinate, they send out cel-

lular processes of a more or less conical form, which serve the purpose of roots, and which often divide. These cellular prolongations may be formed from the entire walls of the spore, or from its inner covering. In Fig. 413. Germinating spores of a species of Liverwort (Marchantia) in which there is a protrusion of root-like processes. When these tubular prolongations are protrude through the context of the spore. from the entire walls



Fig. 413. Fig. 414.

tubular prolongations protrude through the outer coat of a spore, they exactly resemble the pollen tube, which may be considered as the result of the germination of a single cell placed on the stigmatic surface—the soil fitted for its growth (Fig 388). In Figure 414, the spore of a Seaweed (Fucus Botany. canaliculatus) is represented during germination, with its cellular roots protruded through the epispore. In these germinating spores one part appears as a root-like portion, while the opposite end is developed as a thallus bearing fructification.

In the case of Fungi, there is produced a peculiar subterranean axis called mycelium or spawn, on which the fructification is ultimately developed (Fig. 369 a). This mycelium spreads equally on all sides from the original point of development. In this respect it is analogous to the thallus of Lichens. In the case of many Agarics numerous pilei arise from the outer part of the mycelium in the form of a circle, and thus a fairy ring is formed; in the same way as in many Lichens the thallus spreads in a circle, and at its extremities produces fructification or apothecia. A large fairy ring, formed apparently from many individuals of one species of Fungus disposed in a circle, really constitutes the organs of fructification of a

single individual only.

The spores of many of the lower Acotyledons, such as Fungi, are so minute as to be easily scattered by the wind, and thus they are sometimes developed in very anomalous situations. Spores sometimes find a nidus in diseased structures in man and animals. Thus, in the disease of the skin called Porrigo favosa, as well as in Mentagra and Aphthæ, peculiar cellular bodies are produced, which appear to be altered and metamorphosed vegetable forms. In the case of the Silkworm, a Cryptogam called Botrytis Bassiana is found in a disease to which they are liable, and which has been called Muscardine. Caterpillars exhibit occasionally germinating spores of species of Sphæria. Sphæria Robertsii grows on the larva of Hepialus virescens in New Zealand. Other Sphærias are produced in similar situations. Species of Polistes are seen flying about in the West Indies with vegetable growths projecting from them. They are called vegetating wasps. Leida finds numerous fungal forms infesting the intestines of different species of Iulus, and also attacking the Entozoa in the intestinal tube of the animal. The spores of Fungi are diffused in the air, ready to alight on any body which can furnish a nidus for them. In this way various kinds of Mould are developed—the spawn or mycelium produced from the spore ramifying through the decaying matter, and sending up at intervals fructification. In some cases the mycelium becomes remarkably developed, and does not produce ordinary spore-bearing organs. Thus in vinegar and syrup a fungoid mass is often produced, which is probably a modified form of some kind of Mould. The Vinegar-plant seems to be a peculiar mycelial development of the Mould called Penicillium glaucum. During the germination of the spores, certain changes are induced in the fluid surrounding them. Thus a saccharine solution is converted into vinegar. The mycelium is sometimes formed in separate layers, which can be detached from each other, so as to form independent vegetating masses. The spores of a Fungus (Merulius lachrymans), when introduced into wood, germinate, and produce the disease called dry-rot.

In higher Cryptogams the spore produces first a cellular prothallus, whence roots and reproductive organs proceed. In Mosses the germinating spore forms, in the first instance, a cellular prolongation, which becomes a conferva-like germ, whence buds arise, bearing the leafy plant with its fructification. This is shown in Figure 415, where a germinating spore, a, of a Moss is seen protruding a cellular process, which elongates and divides, as seen at b, and finally, as shown in Figure 416, forms a jointed cellular prothallus, p, whence buds are produced, a, b, bearing the leaves and the organs of reproduction. In Ferns the spore gives origin to a thalloid expansion, the prothallus, whence roots proceed, and ultimately the sporangiferous frond. In

Figure 417 there is represented the spore, s, of a Fern Botany. forming a cellular prothallus, which gives out root-like processes, rr, and finally bears the organs of reproduction.

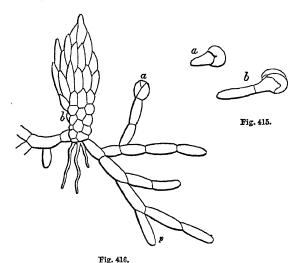


Fig. 415. Spore of a Moss (Funaria hygrometrica) germinating. The spore, a, gives out a cellular process, which elongates and divides, as seen at b. This produces the cellular prothallus.
... 416. The same Moss further developed, showing the cellular prothallus, p, or pro-embryo, with its roots, r, and buds, a, b, whence arise leafy stems bearing the organs of reproduction.

Monocotyledonous germination.—The embryo of a Monocotyledon has often at first sight no marked division of parts (Fig. 418). There is seen a slight projection at one end, r, which ultimately forms the root, and a uniform conical mass, which consists of the cotyledon, c, with the primary bud and axis; at the lower part there is a slit, s, which, as germination proceeds, gradually opens, so as to allow the plumule to protrude. The enveloping body is the single cotyledon.

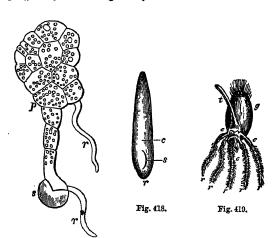


Fig. 417.

Fig. 417. Spore of Fern (Pteris serrulata) germinating. The spore, s, gives rise to a cellular prothallus, p, whence cellular roots are given off, r, r.

The prothallus bears the organs of reproduction, and gives origin to the sporangiferous frond.

418. Embryo of a species of Arrow-grass (Triplochin Barrelser), showing a uniform conical mass, with a slit, s, near the lower part. The cotyledon, c, envelopes the young bud, which protrades at the slit during germination. The radicle is developed from the lower part of the axis, r.

during germination. The radicle is developed from the lower part of the axis, r.

419. Grain of Wheat (Trificum) germinating. The embryo lies at one side of the grain, g. The radicular portion of the embryo gives off rootlets, r r r r, covered with cellular hairs. The principal root is the central one; the others being developed subsequently in succession. The roots pass through sheaths, c.c. The ascending axis, t, sheathed in the cotyledon, rises upwards.

In a monocotyledonous seed there is generally a supply Botany. of albumen, which is gradually dissolved and absorbed as germination proceeds. Sometimes the whole of the perisperm and its cells disappear; at other times, as in the seed of the Ivory Palm (Phytelephas macrocarpa), a portion is removed, and a sort of cellular skeleton is left within the seed. The radicular portion of the axis is more or less truncated, and sends off numerous rootlets, which pass through sheaths or coleorhizæ formed by the lower part of the axis. This is shown in the germinating grain of Wheat (Fig. 419), in which the rootlets, r, are covered with cellular hairs for the purpose of absorption. The central root is first developed, and the others come off in succession as secondary rootlets. When there is no albumen present, the cotyledon is usually pushed upwards beyond the seed.

In many perispermic monocotyledonous seeds the cotvledon is partly contained within the seed, and partly appears externally. That portion within the seed is called intraseminal, and corresponds to the blade or lamina of the leaf; the narrow protruded portion, which varies much in length, represents the petiolary portion, which often ends in a sort of sheath embracing the axis. In Figure 420, a representation is given of the seed of the Indian Shot in different stages of germination. A portion, c, of the single cotyledon remains within the seed, while another portion, a, protrudes, ending in a sheathing portion, s, which surrounds an axis, t, whence spring the radicles, rr, which pass through sheaths, col, and a primary bud, b, which rises to

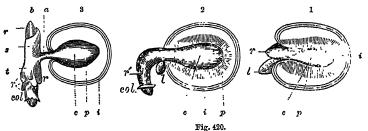


Fig. 420.

The seed of the Indian Shot (Canna indica) in different stages of germination. The embryo is seen surrounded by the perisperm or albumen, p, which is inclosed within the integuments of the seed, or the general spermoderm, t. The micropyle is the point where the first part of the embryo protrudes, and the opening shows a lid-like process, t, which is raised in order to allow the passage of the germinating part. I. The seed in its early germinating state, with the radicular axis. r, protruding, sheathed by the cotyledon. 2. The embryo enlarged and the perisperm diminished, the radicular portion, r, more fully protruded, and the radicular continuation of the cotyledon, and the perisperm, p, diminished, a narrow portion of the cotyledon, a, protruded, ending in a sheathing portion, s, which embraces the axis, t, whence proceed the radicles, rr, passing through coleonize, col; and the first bud of the ascending axis, plumule, b, ascending.

form the stem. A similar development is observed in the Coco-nut.

In Grasses, as shown in Figure 63, the cotyledon, c, enlarges within the seed, and, on one side of the perisperm, roots, r, are protruded through sheaths, co, while the plumule, g, rises upwards, consisting of sheathing leaves arranged alternately. The sheathing cotyledon, c, with the radicle and the plumule, are also represented in the Maize or Indian Corn, in Figure 60. In all cases of monocotyledonous germination, after the radicles have descended into the soil, the plumule or first bud of the axis is developed, and the leafy stem is gradually formed. The leaves are usually alternate, and are often sheathing.

Dicotyledonous germination.—In dicotyledonous germination the radicle is protruded through the foramen of the seed, and then the cotyledons are either protruded, so as to appear above ground as epigeal leaves of a green colour, or they remain within the covering of the seed as fleshy hypogeal lobes, containing much nutriment in their substance. The first kind of germination is seen in Figure 421, where the embryo of a Sycamore is depicted with its radicular axis, r, giving origin to roots, its ascending axis,

Botany. a, with the two cotyledons, cc, which are green, leafy, and epigeal, inclosing the first bud, b. The second kind

> of dicotyledonous embryo may be illustrated by the Bean and Pea (Fig. 61), where the fleshy lobes, cc, which form the great bulk of the seed, are hypogeal, and are gradually absorbed during the

growth of the plant.

The dicotyledonous seed is sometimes exalbuminous or aperispermic, as in the Pea (Fig. 61), in which the fleshy cotyledons have a store of nutriment laid up in them for the growth of the embryo; at other times the seed is albuminous or perispermic, as in the Pansy (Fig. 335), and then the nutriment is separate from the embryo, and is gradually dissolved and absorbed during germination. Sometimes the two cotyledons become united, and when the embryo germinates they appear as one; at other times divisions take place, so that the embryo becomes polycotyledonous, as in Firs (Fig. 341). After the cotyledons have appeared they separate so as to allow the first bud, called plumule or gemmule, to be developed between them (Fig. 421, b). This bud forms the axis on which the leaves and flowers are produced. In proportion as the permanent leaves increase, the cotyledonary leaves (after acting as temporary organs of nutrition)

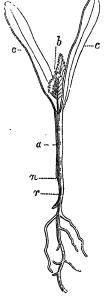


Fig. 421.

Fig. 421.

Dicotyledonus embryo of the Sycamore (Acer Pseudo-Platams) germinating. The radicular portion of the axis, τ , whence the rootlets proceed; n, the neck where the ascending and descending axis separace; α , the axis with the two leafy epigeal cotyledons, c c, between which is stuated the primary bud, δ , with the incipient primordial leaves.

wither and fall off, and if they are subterranean they are gradually absorbed. The leaves which are produced in succession sometimes differ in their form. Thus in Victoria regia the youngest leaf is linear and almost filiform, the next is hastate, the third sagittate, and the fourth is nearly ovate, with a deep incision at the base. The future leaves gradually assume a more or less circular form, generally with a distinct line showing the place of the union of the lobes. The rate at which the axis increases varies according to the amount of temperature and moisture which is supplied.

CHAPTER IV.

SOME GENERAL PHYSIOLOGICAL PHENOMENA CONNECTED WITH VEGETATION.

I.—PROPAGATION OF PLANTS BY BUDS AND SLIPS.

Besides the propagation by means of seeds containing an embryo, or by cellular spores, plants are also capable of extension by division. In unicellular plants, and others of the lowest class, it is common to find each cell possessing the power of producing a new individual, either by simple division or by the formation of a cellular bud. In higher plants this mode of propagation is carried out by means of an assemblage of cells, which are developed into an organ or bud of a more complicated nature, before it is detached. Multiplication by division of cells is very common among the lowest Algæ, such as Desmidiaceæ and Diatomaceæ (Fig. 13). In the case of Lichens the thallus produces gonidia (Fig. 365, g), which appear to be a collection of cellular buds capable of producing independent individuals. On the

thallus of Liverworts (Marchantia) cup-like bodies (Fig. Botany. 362, g), are produced containing gemmæ. In Mosses the

power of reproduction by gemmæ is very marked.

The higher classes of plants may be considered as consisting of numerous buds united on a common axis. These possess a certain amount of independent vitality, and they may be separated from the parent stem in such a way as to give origin to new individuals. In some instances buds are produced which are detached spontaneously at a certain period of a plant's life. The bulbils or bulblets of Lilium bulbiferum (Fig. 75), and the cloves formed in the axils of the scales of bulbs are gemmæ or buds which can be detached so as to form new plants. Such is also the case with corms, as in Colchicum (Fig. 74). In these instances the buds are developed in the usual way in the axils of leaves or scales, that is to say, at the points where they join the stem. Some leaves naturally produce buds on their surface, as may be observed in Malaxis, Aspidium bulbiferum, and Nymphæa micrantha. Other leaves, when placed in particular circumstances, give rise to leaf-buds at their margin. Thus the leaves of Bryophyllum calycinum, when placed on the surface of damp soil, exhibit little shoots all around their edge (Fig. 141). The leaves of Dionæa muscipula can also be made to produce buds, and so can those of species of Gesnera, Gloxinia, and Achimenes. In some instances plants. in place of producing seeds, bear peculiar bud-like bodies on their floral axis. This occurs in what are called viviparous or proliferous plants, such as Festuca ovina var. vivipara, Aira alpina, A. cæspitosa var. vivipara, Poa alpina, Cynosurus cristatus, Polygonum viviparum, and in some species of Allium. In these viviparous plant (which are often alpine) alterations take place in different parts of the flower by which young plants are produced.

Besides this natural mode of propagation by gemmæ, new plants are also produced by divisions of the stem and branches. Many of the lower class of plants increase by a constant division of their axis or filaments. In the higher plants similar modes of propagation occur. Thus the potato is naturally reproduced by means of tubers which are shortened under-ground branches, and sections of tubers containing buds (eyes) produce separate plants. When some underground stems are cut to pieces every fragment is capable of giving origin to buds and new plants. This may be seen in many Carices growing in sand, in creeping grasses, and in the Horse-radish. Hence the difficulty of eradicating these plants. By means of slips or cuttings of the stem, gardeners propagate plants, more especially important varieties. These slips may be at once put into the soil, as in the case of Willows and Cactuses, and be made to put forth roots, or to strike, as it is called. By cuttings gardeners propagate Gooseberries, Currants, Figs, Vines, and some other plants. In deciduous trees the operation is best performed in winter. Sometimes gardeners employ layering, by bending down a branch into the earth, keeping it there with pegs, allowing it to form roots, and then cutting it off from the parent stem. In order to cause layers to form roots, they sometimes make a slit or notch on the shoot, or put a ligature round it, or ring the bark. In striking cuttings of plants, it is of great importance to attend to heat, light, and moisture, and to supply them in proper

Grafting.—Another mode of propagating plants is by grafting, or by taking a part of one plant and making it grow upon another plant. This process sometimes takes place naturally. The branches of trees, when they come into contact, especially when there is an abrasion of the bark, unite. The subject of grafting has received particular attention from Thouin and D'Albret, and it is fully discussed in the article Horticulture. By means of this process we propagate many woody, resinous, soft, or herbaceous plants, which either supply seeds rarely, or are difficult to strike

Botany. from cuttings or layers; and we perpetuate certain varieties, valued either for their fruit, the structure and form of flower, their colour, perfume, the nature of their wood, their general aspect, or the shades and variation of their foliage.

There are certain important requisites which must be attended to in grafting. In the case of Dicotyledonous trees, care must be taken to bring the growing parts into contact—the two alburnums and the two libers. The plants on which grafting is practised must be botanically allied, or at all events there must be a similarity in the composition of their sap. Union may take place between plants which, in their natural state, require the same chemical ingredients in the same proportions. This is generally the case with varieties of the same species, more rarely with plants of different species, and least frequently with such as belong to

Several advantages are derived from the multiplication of vegetables by grafts. We are enabled to perpetuate remarkable varieties which could not be produced by seed; we procure quickly many valuable trees, which are with difficulty multiplied by other means; we hasten the period of fruit-bearing; and we improve and propagate varieties of fruit trees. In the case of cultivated Apples and Pears, the seeds of our best fruits, such as the Ribston Pippin, the Nonpareil, and the Jargonelle, if sown, will not produce plants bearing these varieties of fruit, but they will have a tendency to reproduce the original species, viz., the Crabapple or Pear. By means of grafting we are enabled to continue esteemed varieties, and at the same time to impart vigour to young slips by putting them on good and wellgrown stocks.

The seeds of certain plants have a tendency to sport, as it is called, especially when highly cultivated and supplied with abundance of good nutriment. This is the case with the seed of the Crab-fruit when sown in good soil. By the art of the gardener an improvement is produced in fruit naturally sour and inedible. The seeds of such fruits, especially after a long period of cultivation, have a tendency to produce plants which bear fruit of a better quality than the Crab. Plants showing such a tendency are carefully preserved, and slips are taken from them and grafted on well grown stocks, and thus additional vigour is imparted. Grafting has the effect of supplying to the scion a store of nutriment ready prepared and at once fitted for use. Moreover, the nature of the stock imparts often certain qualities

to the fruit borne by the graft.

Mr Knight entertained the idea that the only true mode of continuing plants was by seed, and that a young shoot taken from an old tree could not be made to live longer than the natural term of life of the tree from which it was taken. On this principle he accounted for the disappearance, or at least the scarcity, of many well-known fruits, such as the Red Streak, the Golden Pippin, and the Golden Harvey. According to Mr Knight's theory, the vegetable individual is a plant which has originated from the development of a single seed; this individual may consist of many detached portions, each of which may exist apart from the others. A cutting of a tree is a part of the individual from which it was taken, and although it may have become a tree, still, according to Knight's view, it is no more than a developed state of a portion of the original plant. All parts of a tree are viewed as having a common end of their life, and different trees raised from one and the same tree by grafts are considered as decaying about the same time as the

These views have not been confirmed by the observations of physiologists. Experiments show that young shoots of old trees, when used as grafts or slips, furnish as vigorous plants as the shoots of young trees. A whole series of cultivated plants, such as the Vine, the Hop, the Italian Poplar, and the Weeping Willow, are constantly propagated by

division without any decreased power of vegetation being Botany. observed. There is no truth in the statement that propagation by seed is the only natural method of reproduction in plants. Many are propagated naturally by stems, bulbs, and tubers. The Sugar-cane propagates by the stem, which, when blown down by a storm, emits roots at every joint, the Tiger-lily propagates by bulbils, the Jerusalem Artichoke and the Potato by tubers, and the species of Achimenes by scaly bodies like tubers. Such modes of propagation do not cause debility, and there is no evidence of plants multiplied by division wearing out. There is however no doubt that cultivated plants become feeble by the influence of various causes, such as exhaustion of the soil, improper food, mutilation, the effects of cold, &c. It is also true that seeds or slips taken from diseased and weak plants will partake often to a certain degree of the constitution of the plants from which they have been taken.

While numerous experiments have proved that the young shoots of old trees, when used as grafts, furnish as vigorous plants as the shoots of young trees, and that Knight's views in regard to there being one common period of death for all parts of a tree, are erroneous, there is still wanting definite information as to the age which trees attain. The duration of their life has not been accurately determined. It exceeds so much the limit of man's life that it is not easy to collect data on the subject. Some exogenous trees attain a very great age. Trees which, in individual cases, attain great ages, belong to the most different natural families. Among them may be mentioned the Baobab, the Dragon-tree, species of Eucalyptus, Taxodium distichum, Pinus Lambertiana, Hymenæa Courbaril, species of Cæsalpinia and Bombax, the Mahogany tree, the Banyan, the Tulip-tree,

the Oriental Planc, Limes, Oaks, and Yews.

Some maintain that the stock and scion are incapable of producing any influence upon each other respectively, and that each retains to the last its own peculiar quality. This seems to be true, so far as their visible organization is concerned; for when grafted trees are cut down, the timber of the stock and scion remains just what it is in cases where no grafting has taken place, and the shoots that proceed from them generally manifest in like manner exactly their original There can be no doubt, however, that the nature of the stock has a decided effect on the slip or scion, both as regards its nutritive and its reproductive organs. it is stated, that Pears grafted on the Mountain Ash are rendered more hardy, and bear fruit earlier; and when grafted on Quinces they become higher coloured. Apples grafted on the Siberian Bitter-sweet Apple are more highly coloured than when grafted on the Crab. Peaches on Plum stocks are coarser than on Peach stocks. Beurré-Diel grafted on the Thorn produces hard fruit. This shows that the stock has an influence on the graft, and points out the importance of selecting stocks of good quality. The plan of ennobling fruit trees proceeds on the principle of grafting on superior stocks.

In some instances it appears that the slip or scion has a decided effect on the stock. Thus, according to Hales, if we bud the variegated Jasmine on a non-variegated one, it sometimes happens that the buds sent out from the latter bear variegated leaves. It is reported that at Chelsea the variegated White Jasmine was budded upon a branch of a fine plant of Revolute Jasmine with green leaves, and in the succeeding year a slight appearance of variegation came out on the leaves of the Revolute Jasmine. The next year the branch which had been budded was cut out, so that the Revolute Jasmine was thus apparently deprived of all influence from the variegated bud. Nevertheless, the variegation in the remainder of the plant continued to increase, and the leaves and branches ultimately became all variegated, even more than the White Jasmine, whose bud was origi-

nally inserted.

II.—DEVELOPMENT OF HEAT, LIGHT, AND ELECTRICITY BY PLANTS.

Temperature of Plants.-We have already seen that, during the periods of flowering and germination, a considerable amount of heat is evolved. This seems to depend on the combination between the oxygen of the air and the carbon of the plant, and is accompanied with the formation of grape sugar and the evolution of carbonic acid. The heat at these stages of growth is often very evident, more especially in cases where numerous germinating seeds are placed together, and numerous flowers are inclosed in a common covering. The phenomenon requires to be noticed in circumstances in which the heat cannot be carried off rapidly by the air or the soil. It is a matter of interest to determine whether or not heat is produced during the ordinary vital actions going on in the cells and vessels of plants. The investigation of this point has called forth the labours of several physiologists. Hunter instituted a series of experiments respecting the temperature of trees. He bored holes to the depth of ten or twelve inches in the trunks of trees, and inserted thermometers. He found that in spring, autumn, and winter the temperature of the internal part of a tree was usually about two degrees above that of the air. The results, however, were variable, and no satisfactory conclusions were deduced. Schoepf, Bierkander, Maurice, Pictet, and Schubler, made similar experiments, and they agree in giving to trees with thick trunks a temperature lower than that of the air during great heat, and higher than that of the air during extreme cold. In all these experiments the results seem to depend on the effects of the sun's rays, on evaporation, on the temperature of the soil as influencing the ascending sap, and on the bad conducting power of the wood.

While the nutritive processes are going on in the plant there is a certain amount of heat produced. This, however, is speedily carried away by evaporation and other causes, and it is not easily rendered evident. Dutrochet, by means of Becquerel's thermo-electric needle, showed an evolution of heat in plants. In doing this he required to prevent evaporation by putting the plant in a moist atmosphere. In these circumstances the temperature of the active vegetating parts, the roots, the leaves, and the young shoots, indicated a temperature above the air of $\frac{1}{2}$ to $\frac{3}{4}$ of a degree Fahrenheit. Van Beek and Bergsma, in their experiments on Hyacinthus orientalis and Entelea arborescens, found the proper heat of the active parts of plants about 1.8° F. above that of the air. The vital or proper heat of plants, according to Dutrochet, is found chiefly in the green parts, and it undergoes a quotidian paroxysm, reaching the maximum during the day, and the minimum during the night. When stems become hard and ligneous, they lose this vital heat Large green cotyledons gave indications of a proper heat. The hour of quotidian maximum varied from 10 A.M. to 3 P.M. in different plants.

Rameaux repeated the experiments relative to the temperature of the trunks of trees, and likewise those relating to the heat of the active vegetating parts of plants, and he came to the conclusion that the temperature of plants depends on two distinct sources-1. Organic actions going on in the young, soft, and herbaceous parts of plants, and which give rise to a temperature so slight that it requires delicate instruments to show it. 2. Meteorological influences, either immediate, as exercised on parts of plants exposed to the air, or mediate, as exercised on the soil and on the sap which is drawn up from it; the former being the most energetic. He remarks that in a tree at any one instant there are as many different temperatures as there are points unequally accessible to external sources of heat; that the sum of all these temperatures, or the entire heat of the tree, augments and diminishes with the surrounding

temperature; that the variations of temperature are more Botany. rapid and more intense in the superficial than in the deep layers, and that parts having a small diameter are cooled and heated with more rapidity and energy than those whose diameter is great; that during day the temperature of the different concentric layers of a tree diminishes in going from the surface to the centre, and that this diurnal distribution is established more or less quickly and completely according to the nature of the surrounding temperature and the diameter of the tree; that during the night, on the contrary, the temperature of the different layers increases from the surface to the centre, the nocturnal distribution varying in the same way according to the surrounding temperature and the diameter; that the action of solar rays is the most powerful cause of the temperature of plants; and that the ascending sap increases or diminishes the temperature of the parts it traverses according as these parts have a temperature lower or higher than its own.

Luminosity of Plants.—Considerable differences of opinion exist as to the luminosity exhibited by plants. Light is undoubtedly given out by Fungi in certain circumstances, but the occurrence of luminous phenomena in the higher plants is still a matter of dispute. Luminosity has been noticed in many species of Agaricus growing on dead or decaying wood, such as Agaricus olearius, indigenous in the south of Europe; Agaricus Gardneri, in Goyaz, Brazil; Agaricus igneus, in the island of Amboyna; and Agaricus noctilucens, in Manilla. The first two are of an orange colour, the third of an ash colour, and the fourth white. The light of the Agaric of the Olive-grounds (Agaricus olearius) may be compared to that of phosphorus; it is a continued white light without scintillations, very bright when the plant is young and recently gathered. Agaricus igneus has a bluish light. The whole plant of Agaricus Gardneri gives out at night a bright phosphorescent light, somewhat similar to that emitted by the larger fire-flies, having a pale greenish hue. From this circumstance, and from growing on a Palm, it is called by the inhabitants of Villa de Natividade, Flor de Coco.

Drummond describes two species of light-giving Agaricus found in the Swan River district. They grew parasitically on trunks of trees such as Banksias. placed on paper, the Agarics emitted by night a phosphorescent light sufficient to allow a person to read by it, and they continued to do so for several nights with gradually decreasing intensity as the plant dried up. Another phosphorescent Agaric was noticed by Mr Drummond in Australia on the trunk of a dead Eucalyptus occidentalis. The upper surface of the pileus was nearly black, while the central portion and the gills were milk-white, the stipe being

attached to one side of the pileus.

Some species of Rhizomorpha (which appear to be mycelia of Fungi) are remarkable for the phosphorescence which they display. These plants vegetate in dark caverns, and in the coal mines of Germany. They are seen hanging from the roof in great numbers. Their luminous qualities are most developed in the furthest recesses of the mines. Prestoc has noticed that the spawn of the Truffle (Fig. 366) is luminous, and that it may thus be collected at night in the Truffle-grounds. These are instances of luminosity in living Fungi, which disappears with life. Luminosity has also been observed in plants in a state of putrescence, as in rotten wood and in half-decayed potatoes.

Tulasne has made observations on the light given out by Rhizomorpha subterranea. By preserving it in a proper state of humidity the phosphorescence was kept up for several evenings. When the Fungus began to dry it lost its luminosity. Tulasne considers the light as similar to the phosphorescence in decaying plants, and he concludes that the same agents, namely oxygen, water, and heat, furnish the combination necessary for producing phospho

Botany. rescence, both in organized living beings and in those which have ceased to live. In both cases the luminous phenomenon accompanies a chemical reaction, which consists chiefly in the combination between organized matter and the oxygen of air, that is to say, a slow combustion, giving rise to carbonic acid.

The younger Linnæus states that the flowers of Nasturtium, the African Marigold, the orange Lily and other orange flowers, give out, at the end of a hot summer day. intermittent phosphorescence resembling little flashes of light. Dowden also mentions a luminous appearance of a similar nature in the common Marigold (Calendula vulgaris). He noticed it on the 4th of August 1842 at 8 P.M. after a week of very dry warm weather. A gold-coloured lambent light seemed to play from floret to floret, and to make a course round the disk of the flower. The light given out by flowers has been remarked by various other observers. These luminous phenomena in flowers are considered by Professor Allman as being merely optical illusions. He says they are only seen in orange and gaudy flowers, and at twilight, not in darkness, and that they must be traced to an intermittent effect on the retina.

The sap of plants is said to be luminous in certain instances. Mornay describes a tree in South America called Cipo de Cunanam, with a milky juice, which gave out in the dark a bright light when wounded. The phosphorescent light appeared at every cut in the stem, and each drop of the milky juice was luminous. Martius also observed the same kind of light in the sap of Euphorbia phosphorea, a Brazilian plant, when wounded. When this was observed, the temperature was 97.25° F., but it ceased when the heat sank to 68° F.; he did not find that it affected the galvano-

Electricity of Plants.-Some observations have been made relative to the electricity of plants, which may be referred to at this place. Pouillet stated that electricity was developed during the ordinary process of growth in vegetables. Several pots filled with earth, and containing different seeds, were placed on an insulated stand in a chamber, the air of which was kept dry by quicklime. The stand was placed in connection with a condensing electrometer. At first no electric disturbance was manifested; but the seeds had scarcely sprouted when signs of it were evident; and when the young plants were in a complete state of growth they separated the gold leaves of the electrometer half an inch from each other. The exhalation from leaves may be considered as a cause of the development of electricity, as well as the changes effected by leaves on the oxygen and carbonic acid of the atmosphere. Plants are considered as generally in a negatively electrical state. Dr Graves thinks that in this way, in tropical climates, where the superincumbent atmosphere is rendered positively electrical by evaporation from the sea, the negative state of plants leads to thunder storms. It is said that the pith and bark, as well as the two extremities of fruits, are in opposite states of electricity.

Wartmann has made an extensive series of observations on the influence of atmospheric electricity, and that of the battery, in the development of plants; on the influence of electricity on the circulation of the sap; and on the electric currents existing in the soil and in plants. He states that there are electric currents in almost all parts of plants; that in the roots, stems, and branches, there exists a central descending current and a peripherical ascending one; that there are also lateral currents between the pith and the cambium; that the electric state of the soil, and probably also the exhalation which takes place by the organs furnished with stomata, influences the electricity of the atmosphere around. Becquerel says, that in the act of vegetation the earth acquires continually an excess of positive electricity, the bark and part of the wood an excess of nega-

tive electricity; that the leaves act like the green part of Botany. the parenchyma of the bark—that is to say, the sap which circulates in their tissues is negative with relation to the wood, to the pith, and to the earth, and positive with regard to the cambium; that the electric effects observed in vegetables are due to chemico-vital actions; and that the opposite electric states of vegetables and the earth give reason to think that, from the enormous vegetation in certain parts of the globe, they must exert some influence on the electric phenomena of the atmosphere.

III.—VEGETABLE NOSOLOGY, OR THE DISEASES AND INJURIES OF PLANTS.

It would be difficult to name any department of vegetable physiology concerning which so little is positively known, even to those most conversant with such matters, as the nature of the diseases to which plants are liable. The number of writings on the subject is inconsiderable, and the information afforded by them still more so. The subject, nevertheless, is one of great importance. It is intimately connected with the prosperity of our forests and the productiveness of agriculture. Plants, like all other organized bodies, are subject to a great many accidents and diseases. The most common causes of disease are improper soils, ungenial climates, frosts, long-continued rains, great drought, violent storms, parasitic plants, insects, and wounds of various kinds.

According to Schleiden, plants in a state of high cultivation are all more or less in a condition predisposed to disease. There is an unnatural and excessive development of particular structures or particular substances, and thus, the equilibrium being destroyed, the plants are liable to suffer from injurious external influences. The general morbid condition produced by cultivation is heightened into specific predisposition to disease when the conditions of cultivation are opposed too strongly or too suddenly to those of The outward forms of diseases are sufficiently known, but the internal appearances are less understood, and for their proper apprehension they require a knowledge of vegetable anatomy, and especially of the physiology of cells. The characters are essentially similar in all living vegetable cells. There is a wall or membrane, composed of cellulose, lined by a viscid layer (the primordial utricle), composed of an albuminous matter abounding in nitrogen; the cavity of the cell is filled with watery juice, containing little nitrogenous matter, but having all the other compounds, such as gum, sugar, vegetable acids, inorganic salts, &c., dissolved in it. The chemico-vital force of the plant appears to reside in the nitrogenous layer; all growth depends upon it, and it does not disappear until the cell-wall has become properly developed. diseased plants are examined in the early stage, the first morbid appearance occurs in the nitrogenous layer, which becomes discoloured, coagulated, and granular, and the disease then extends to the cellular wall.

The diseases of plants may be divided in the following way:-1. Diseases which are caused by an excess or deficiency of those agents which are necessary for the vigorous growth of plants; such as soil, light, heat, air, and moisture.

2. Those which are either originally caused, or, at all events, aggravated and modified by the attacks of parasites, more particularly belonging to the natural order Fungi. 3. Those due to the action of poisons, either taken up from the soil or from the atmosphere. 4. Those caused by mechanical injuries of different kinds, as by the attacks of animals, more particularly insects. Diseases caused by changes in the atmosphere are often epidemic, and spread over extensive districts of country. Those which are due to parasitic Fungi are propagated by contagion—the minute spores being carried by the winds. Exciting causes operate with great intensity in cases where plants are previously predis-

Botany. posed to disease. Thus, if a plant is in an enfeebled or weak condition, it is very liable to suffer both from epidemic and contagious diseases.

The cryptogamic diseases of plants must be considered contagious, since they are produced by the contact of one portion of organic matter with another. The contact of diseased cells produces disease in healthy cells. Thus, if a healthy plant of Cactus be inoculated with some of the fluid from a plant affected with moist gangrene, diseased action will immediately commence and extend more or less rapidly. The action is analogous to what takes place with ferment when introduced into a saccharine liquid. The liability of the plant to the development of epidemic disease is produced by the state of the atmosphere as regards moisture, the prevalence of hot or cold weather, the amount of light, and probably the electrical condition of the air and earth, The natural decay of plants also renders them liable to attacks of Fungi.

Some of the causes we have noticed may operate together in producing disease. If, from defect of nourishment in the soil, a plant is stunted or weak, it becomes predisposed to disease, and is very liable to the attacks of parasites. A sudden frost coming on in spring, after the sap has begun to flow, causes severe injury, and either kills the plant or renders it liable to disease. This occurrence is common in Britain, and is the cause why many half-hardy exotics require to be covered or kept in a dormant state until the season has advanced beyond the risk of frost. Many such plants grown on a wall with a southern exposure are stimulated by the heat of a fine day in early spring, and are thus unable to resist later frosts. Warm sun during the day, and frost at night, have proved fatal to many exotics introduced into Britain. Plants are fitted by their constitution for different climates. Some will bear a great range of temperature without injury; others can only bear a limited one. Some require a hot summer and a cold winter; others require a medium summer and a moderate winter.

It has often been stated that tender exotics may by long cultivation be made to bear the climate of Britain. It has been thought that they may become accustomed to it by degrees, and thus be acclimatized. Some have even hinted that by sowing the seeds of such plants, in the first instance, in a warm temperate region, then collecting the seeds produced by the plants and sowing them in colder districts, the species may be rendered hardy. We are constantly told that plants which, when first introduced into Britain, were put into stoves and greenhouses, are now growing in the open border freely, and that they can stand a climate which they could not do at first. Such statements do not rest on a sound basis; each species of plant bears a certain range of temperature, and we cannot extend its natural limits. The plants said to be acclimatized were not tried in the open air when first introduced, otherwise they would have been found to be hardy, without any previous process of cultivation in greenhouses. The well-known shrub Aucuba japonica was treated in a stove when first introduced, and was afterwards planted out, and found to stand our climate. This was not an instance of acclimatizing, but indicated an error regarding the constitution of the plant, which was brought from the colder parts of Japan, and was capable of enduring the cold of this climate naturally. Man did nothing in the way of changing its constitution and powers of endurance. A plant called Aponogeton distachyum flowers freely in the open pond of the Edinburgh Botanic Garden. This plant was introduced from Southern Africa, and was at first grown in stoves. A specimen was accidentally thrown into the garden pond many years ago, and there it has continued to thrive ever since, flowering during almost the whole year. The roots of the plant are deep in the water, and the pond is supplied by springs. Had it been put into the pond when first introduced, the same result

would have followed. We are too apt to suppose that plants Botany. coming from countries called hot, must necessarily be stove plants; not reflecting that they may have grown in very elevated and cold regions in these countries. Such is the case with many species introduced from Chili, Nepal, and Japan. There is no evidence that plants long cultivated in this country are able to withstand our winter cold better than formerly. The Dahlia, the Heliotrope, and the Potato, are affected in the same way by frost as when they were first introduced. Long cultivation has done nothing to increase their hardiness.

Cold and bad soils are fruitful sources of disease. When plants are grown without the influence of light, they assume a white or yellowish aspect, thus becoming blanched or etiolated. In certain instances plants, even when exposed to light, present a pale and sickly hue, which is often referrible to the nature of the soil, or to constitutional weakness. In many crops we observe plants having a pallid aspect owing to ungenial weather and damp soil in the first in-The diseased state thus induced is called by Berkeley chlorosis; some have recommended for its removal the application of a weak solution of sulphate of iron along with draining. Plants, whose natural habitat is shady, become diseased when excess of light is supplied. Frosts, as well as excess of heat, render the stamens and pistils abortive. Spotting of the leaves, and canker of the stem, are often due to similar causes. When moisture is supplied in too great quantity, the plants become dropsical; and when the transpiration exceeds the absorption, the leaves often fall off. The dry and hot atmosphere of rooms often causes defoliation and disease in plants. Excessive development of hairs is sometimes a consequence of growing plants in very dry air. Diseases caused by changes in the atmosphere are often epidemic, and attack large districts of country.

The influence of the sea breeze, carrying with it saline matter, is prejudicial to most plants. Plantations are frequently injured from this cause. A good illustration is seen at Gosford, near Edinburgh, where the trees, on reaching the top of a wall, are stopped in their growth by the sea breeze, and their tops form an inclined plane proceeding inwards from the wall as a base. Some plants withstand this influence better than others.

The attacks of parasitic Fungi cause extensive injury and disease in plants. Some think that the spores of Fungi coming into contact with the plant act both as the predisposing and exciting cause of disease; others, perhaps more correctly, think that some change is first produced in the cells of the plant, which enables the spores to find a nidus, and then the disease goes on rapidly, assuming a peculiar type on account of the presence of the Fungus. In the same way as vegetable organisms found in diseases of the skin are not to be looked upon as the origin of the disease, but as being developed in textures previously morbid, and as giving often a peculiar character to the disease. Many of the diseases of cultivated crops are attributed to Fungi. The spores of Fungi are very minute, and are constantly floating in the air. They can easily be applied to the surfaces of plants. When they find an appropriate soil they send out extensive filiform ramifications which spread under the epidermis of plants, raise blisters, and finally burst forth in the form of orange, brown, and black spots constituting the fructification. They attack the stem, leaves, flowers, and fruit. Different species are restricted to different plants, and even to different parts of the same plant. The forms which the same Fungus assumes seem to vary sometimes according to the plant on which it grows.

The disease called Bunt, Smutballs, or Pepper-brand, is occasioned by the plant called Uredo Caries by De Candolle, and Uredo fœtida by Bauer. It attacks the grains of Wheat, and may be detected in them in their earliest state. It is represented in Figure 422. It consists of excremely

Botany. minute globules of a dark colour, at first attached to a thread-

like matter or mycelium. The powdery matter or spores have a disgusting odour; hence the specific name given to it. The disease is propagated by contact.

Another disease, called Smut or Dust-brand, is caused by a Fungus called Uredo segetum. It resembles the Bunt Fungus in colour and shape, but its spores are not half so large, and it does not possess a fetid odour. This Fungus destroys the ear of Corn by first causing the innermost parts of the flower to become abortive, while the pedicels on which these are



The Fungus (Uredo Caries or Uredo fatida) which causes the disease called Bunt, Smutballs, or Pep-per-brand.

seated swell and become very fleshy. The Fungus then consumes the whole of this fleshy mass, and at length appears between the chaff scales in the form of a black soot-like powder.

The disease denominated Rust, Red-rag, Red-robin, and

Red-gum, is caused by a Fungus called Uredo Rubigo (Fig. 423). It forms yellow and brown oval spots and blotches upon the stem, leaf, and chaff. The spores burst through the epidermis, and are dispersed as very minute grains. The disease is common in Corn and in Grasses. Mildew is a disease caused by a Fungus denominated Puccinia graminis (Fig. 424). The ripe spore-. Fungus denominated

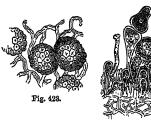


Fig. 424.

cases of this plant are small dark-brown club-shaped bodies, their thicker end being divided into two chambers, each filled with minute spores, and their lower end tapering into a fine stalk. The sori or clusters of spore-cases burst through the epidermis sometimes in vast numbers. The minute spores seem to enter the plant by the stomata. In the Vine a kind of mildew is traced by Berkeley to the attack of a Fungus called Oidium Tuckeri. For this disease sulphur, and the pentasulphide of calcium, have been recommended as remedies.

Henslow has shown by experiment, that if the diseased seeds of Wheat be steeped in a solution of sulphate of copper, they will not produce diseased grain, and that the sulphate of copper does no injury to their germination. The solution used is one ounce of sulphate of copper to a gallon of water for every bushel of Wheat. Grain also steeped in hot water did not reproduce these fungoid diseases. In East-Lothian, with the view of preventing Smut, seed Wheat is often steeped in stale urine, and afterwards some newly slaked lime sifted on it. Sometimes a solution of salt is used as a pickle.

Ergot is a monstrous state of the grain, in which the enlarged and diseased ovary protrudes in a curved form resembling a cock's spur; hence the name, from the French ergot, meaning a spur. The ovary is black externally, spongy internally, and contains much oily matter. Some consider it as produced by the attack of a Fungus, which induces a diseased condition in the ovarian cells. disease is usually met with in Rye,* and the name of CXXXVII. Spurred Rye is applied to it. It sometimes occurs in Wheat and in Barley, and it has also been noticed in other grains. Ergot consists of a very dense tissue formed by polygonal cells united intimately with one another, and filled

with an oily fluid. It is developed in the unimpregnated Botany. ovule of Rye; for although extremely dilated by the entophyte, and rendered difficult of recognition, the integuments of the ovule increase without completely losing the form which they would have assumed if they had grown into a true grain. The solid mass which has been called Sclerotium Clavus by De Candolle, and the filamentous portion called Sphacelia, by Leveillé and Fee, and Ergotætia by Quekett, are only, properly speaking, organs of vegetation. The Fungus destined to grow from this apparatus is an elegant Sphæria, probably that called by Fries Cordyliceps

purpurea.

The disease which has recently attacked the Potato in

various parts of the world, is by many attributed to the attack of Fungi. This view has been strongly advocated by Berkeley, who describes the Fungus as Botrytis infestans (Fig. 425). The spores are supposed to enter the stomata, and to cause disease in the leaves in the first instance, which afterwards extends to the tubers. The effects produced on the leaves by this disease resemble much those caused by poisonous gases, such as hydrochloric, poisonous gases, such as hydrochloric, sulphurous, and nitric acids. Berkeley attributes the Potato disease entirely to Fungi. He states that the disease commenced in the leaves. They were attacked by the Mould, which ran its course in a few hours, and from the rapidity of the action the period for examination of the leaves was often passed over. The Fungus acted by feeding on the juices

Fig. 425.

Fingus (Botrytis infestants), which occurs on diseased leaves of Potatoes, and Townley, to be the original cause of the late of the private of the leaves, and Townley, to be the original cause of the leaves, and Townley, to be the original cause of the leaves preading through the leaf, fructification bearing numerous spores. Fungus acted by feeding on the juices



Fig. 425. spores.

of plants, preventing the elaboration of the sap in the leaves, obstructing the admission of air and the emission of transpired fluids. While there is no doubt that the Botrytis is developed in the progress of the Potato disease, the question arises whether or not it is the originating cause. The view which seems to be most consonant with the phenomena is, that changes are induced in the cells of the Potato by cultivation, which render the leaves liable to disease. Atmospheric influences are thus enabled to act upon them, so as to cause alterations in their cells; and the attack of a Fungus such as the Botrytis accelerates the morbid action, and causes it to assume a peculiar form.

Crum attributed the disease of the tubers of the Potato to rupture of the starch cells and mixture of their contents with nitrogenous matter, thus causing fermentation, as in the Apple and Grape. Solly objects to the Fungus theory of Potato disease. He thinks that the disease is caused by the presence of putrifying azotized matter in the stem, just below the surface of the soil; that this is carried to all parts of the plant, causes a struggle between vital and chemical forces, and induces decomposition by a process of fermentation. The azotized matter, in a condition to act as ferment, is produced by the state of the season, by deficiency of light, and by other meteorological causes. Liebig attributed the Potato disease to diminished or suppressed transpiration depending on the hygrometric state of the atmosphere. He refers to Hales' accurate researches in regard to the Hop-blight, in which the disease is traced to the want of correspondence between absorption and transpiration, and a consequent stagnation and decomposition of the juices. The same thing, he thinks, takes place in the Potato in consequence of cold and an atmosphere loaded with moisture. Klotzsch proposes to check the Potato disease by repeatedly pinching off the extreme points of the branches and twigs. This check to the stem and branches leads, he thinks, to increased development of tubers, and strengthens the

Plate

*Plate

Botany. leaves and stalks. Tombelle Lomba of Namur says that he has saved Potatoes from disease by cutting off the stems, after flowering, with a very sharp sickle, and then covering the ground with earth to the depth of not less than one and a half inch. The top dressing thus applied was not disturbed until the Potatoes were ripe. The haulm was removed after being cut. It is said that the tubers acquired a good size, and were of excellent quality. If these facts are true, it would appear that, while leaves are necessary to the development of tubers, the latter, on acquiring a certain size, can continue their growth by their own proper and unassisted vitality. Bollman suggests drying the tubers at a high temperature as a remedy for the disease.

The general conclusions to be drawn from all that has been said relative to the Potato disease are, that changes are induced in the cells and vessels of the Potato by certain obscure meteorological and epidemic causes, that an alteration takes places in the cellulose and in the contents of the cells, which speedily leads to decay; that parasitic Fungi find a nidus in the decaying organic matter, so as to accelerate and give a character to the disease, and that as yet no

remedy has been devised.

Dry rot is a disease to which the wood of trees is liable. It may be traced in the first instance to some alteration in the woody tissue produced by moisture or other causes, and the subsequent development of a Fungus which spreads its mycelium through the texture, and produces rapid disorganization. Trees growing in wet and ill-drained soil are subject to rot. The more abundant the alburnum or sapwood, the more liable are trees to decay. The disease which has recently attacked the Larch is attributed by some to the roots reaching ungenial soil, and to the production of dry rot. In dry rot the decay takes place in the first instance in the contents of the woody tubes, and thus a suitable soil is supplied for the spores of Fungi, such as Merulius lachrymans or vastator, and Polyporus destructor. When these plants begin to grow, they spread their mycelium with great rapidity. If air is allowed to circulate freely around wood, dry rot does not attack it. But if it is placed in a damp situation without a circulation of air, then decay takes place. The spawn of the dry-rot Fungus deprives the woody tubes of their contents, for the purpose of getting the nourishment it requires, and the wood loses its consistency and toughness, the walls of the tubes becoming brittle and ruptured.

The great cause of decay in wood is moisture. Wood in a dry state may be preserved for a long time, as may be seen in the case of wood in some old buildings as Westminster Hall. To have timber in the driest state, it ought to be felled between the fall of the leaf and the spring, the nearer the former time the better. The timber of some trees is much more subject to decay than that of others. The wood of the Cypress is very durable. A great error in building is painting wood early, and thus inclosing within it the elements of decay by not allowing the escape of moisture. In olden times the wood was left bare, and exposed to currents of air which kept it dry, and hence its durability.

Various means have been proposed for preventing timber from being attacked by dry rot. Boucherie caused growing trees to absorb fluids of different kinds, which he considered as acting on the contents of the woody tubes in such a way as to render them less liable to disease. The solutions he employed were acetate of lead, pyrolignite of iron, and corrosive sublimate. He also found that trees, immediately after being cut down, when their extremities were immersed in these solutions, absorbed them with rapidity. Timber, after being cut, has been subjected to various processes for the purposes of rendering it durable. Kyanizing is performed by subjecting the wood to the action of corro-

sive sublimate, by means of which it is probable that the

albuminous matter is coagulated, fermentation is prevented, and hence the wood is rendered less liable to decay and to the attacks of Fungi. Kyan's solution is made to pass rapidly through wood in vacuo. Sir William Burnett found that the application of chloride of zinc to vegetable matters, such as wood and canvas, had the property of effectually guarding them against all the ordinary causes of destruction, without communicating any bad property to the substance prepared from it. Canvas so acted on was kept long in damp cellars, and exposed to various vicissitudes, without being injured, while ordinary canvas in similar circumstances became rotten. The process has received the name of Burnettizing. Burnett's antiseptic solution, of one pound of chloride of zinc to five gallons of water, has been tried in Woolwich Dockyard with success. Mr Bethell uses creasote for the preservation of wood. The creasote acts by coagulating the albumen, and preventing putrefactive decomposition.

Phanerogamous parasites are also injurious to plants.

Among them may be noticed especially species of Cuscuta* or Dodder (Fig. 426), which prove destructive to crops of Flax and Clover. Their seeds are sown with these crops, and germinate like other plants. Ere long they become attached to the stems of the plants in their vicinity by means of suckers, and then they act as true parasites, living on the sap of the plants, and finally destroying them. Other parasites, as Broom-rapes, and Mistleto, in a certain degree injure the plants on which they grow, but they are by no means so injurious as the Dodders. Loranths in Guatemala, by growing on the ends of branches of trees, cause the woody matter to be developed in a horizontal manner, so as to give rise to remarkable curved processes not unlike carvings.

Many substances act as poisons to plants as well as We have already animals. given full details in regard to the effects of poisonous gases CXXV.

Fig. 426.

A parasitic plant called Dodder (Cuscuta), which grows from seed in the usual way, with its roots in the soil, but afterwards twines round other plants, such as Treil and Flax, and attaches itself to them by means of suckers, a. It loses all connection with the soil, and lives on the plant, which it finally destroys. on vegetation. The experiments of Turner and Christison distinctly show that irritant gases, such as sulphurous, hydrochloric, and nitric acid, act by destroying first the parts to which they are applied, more especially those where there is abundance of moisture; while narcotic gases, like hydrosulphuric acid, have a general effect on the irritability of the plant. Marcet and Macaire experimented on the influence of fluid poisons on plants. They concluded that metallic poisons acted on vegetables in the same way as on animals. They were absorbed, and destroyed

the organs to which they were applied; while narcotic vegetable poisons destroyed the whole vitality of the plants, without any local irritation.

Injurious effects are produced on plants by insects of various kinds. Some of them feed on the plants; others form habitations for themselves in the leaves and flowers; others puncture different organs with the view of depositing their ova. Earcockle, Purple, or Peppercorn, is a disease caused by a minute animal called Vibrio Tritici, or the Eel of the Wheat. The disease was noticed by Needham more than a century ago. The infected grains turn dark green

Botany. at first, and ultimately nearly black. They become rounded, resembling a small Peppercorn, but with one or more deep furrows on their surface. The husk of the chaff spreads open, and the awns are twisted. The blighted grains are full of a moist, white, cottony substance, and contain no flour. When the cottony matter is placed in a drop of water under the microscope, a multitude of minute eelshaped animalcules are seen in active motion. They retain their vitality long. The mass may be allowed to dry, so that the slightest touch would reduce it to powder, and yet, when moistened with water, the animalcules will revive and become active. They may be dried and revived many times before they are killed.

Many trees, especially the Oak and Willow, are liable to the disease called Galls, which is due to attacks of insects (species of Cynips, &c.) The insects wound the bark and leaves while depositing their ova, and the irritation causes a formation of a deposit around them. The galls of commerce are produced on Quercus infectoria. In blue galls the insect is still in the interior, while in white galls the insect has escaped by a perforation. The Oak spangle is an appendage of the leaf attached by a central point to its under

surface; the inner side is smooth, the outer red, hairy, and Botany. fringed. Each contains a single insect, which retains its habitation till March, long after the leaves have fallen to the ground. These spangles resemble parasitic Fungi in their appearance, and have often been mistaken for them. The species of Spruce (Abies) are liable to a peculiar disease produced by the attacks of an insect called Adelges Abietis. This disease consists of an alteration in the colour and form of the leaves, which are aggregated together in the shape of cone-like excrescences.

The remedies proposed for the attacks of insects are numerous. Quick-lime, Sulphur, Turpentine, Tobacco, have all been recommended. In the case of Aphides the vapour of Tobacco is useful. It is not easy to get rid of the species of Coccus with their cottony covering. The only remedy seems to be the cleaning of the leaves and other parts of the plant by the hand. The vapour of sulphur will kill many insects, but then it acts injuriously on plants. A solution of Tobacco, the crushed leaves of the Cherry Laurel which give out a hydrocyanated vapour, ammoniacal liquor, coal tar, and many other substances, have been employed in different instances.

PART II.

TAXOLOGICAL BOTANY, OR THE CLASSIFICATION OF PLANTS.

CHAPTER I.

GENERAL REMARKS ON CLASSIFICATION.

In examining the Vegetable Kingdom, we observe that the individuals composing it are formed by the Almighty in accordance with a principle of order, as well as a principle of special adaptation. We have already remarked the order pursued in the arrangements of the various parts of the root, stems, leaves, and flowers of plants, and we have traced, in some degree, the modes in which they are fitted to perform their different functions. We now proceed to apply the facts of Vegetable Anatomy and Physiology to the classification of plants, and to consider the plan according to which they are grouped together in classes and families.

We see around us various kinds or sorts of plants which more or less resemble each other—or, in other words, are more or less related to each other. In Taxological or Systematic Botany we endeavour to mark these resemblances, and to determine their relations. It is impossible to give a scientific arrangement of the plants of the globe without a thorough knowledge of structure and morphology, and without an extensive acquaintance with the vegetation of all parts of the world. We cannot expect to determine the system on which plants have been grouped until we are familiar with all the forms which they present. Hence, in the present state of our knowledge, there must be imperfection in our attempts at systematizing. The Floras of many regions in Africa, India, China, Australia, and America, are still unknown, and we may therefore conclude that in all systems there will be gaps to be filled up as our knowledge increases. Sufficient, however, is known to enable us to group plants according to certain evident alliances.

The necessity for arrangement is evident, when we reflect that there are more than 120,000 known species of plants on the earth. In order to make these available for scientific purposes, it is absolutely essential that they should be named and classified. In associating plants in certain groups we naturally proceed on an idea of resemblance or likeness. While in ordinary language this idea is vague,

and is often founded on imperfect data, it is clear that in science it must be strict and rigorous. It is not enough to say that one plant resembles another in its general aspect, we must ascertain the particulars of agreement, and the points in which they differ; we must weigh well the importance of the characters, and must compare organs which are equivalent in value; and thus we shall often find, that plants which to common observers appear alike, are in reality totally different. The study of organography gives us a strict and accurate technical language which must be rigidly adhered to in classification.

Plants as they occur in nature are viewed as individuals resembling or differing from each other. Some individuals are so decidedly alike, that we at once give them the same names. Thus a field of Wheat is composed of numerous similar individuals which can be separated from each other, but cannot be distinguished by any permanent or marked difference. Although there may be some difference in size and other minor points, still we at once say they are stalks of Wheat. Every grain of Wheat when sown produces a stalk of Wheat; these stalks yield grains which produce individuals like their parents. The shoots or buds given off from the base of Wheat by tillering, also produce stalks of Wheat. On such universal and inevitable conceptions as these, our idea of Species is founded.

A Species may be defined as an assemblage of individuals presenting certain constant characters in common, and derived from one original protoplast or stock. The individuals are thus considered as having arisen from one parent stock. They may differ slightly in size, or in colour, and other unimportant respects, but they resemble each other more closely than they resemble any other plants, and their seeds produce similar individuals. Observation and common daily experience demonstrate, in the actual circumstances in which we exist, the permanence of the types which constitute the species of living bodies. There is no evidence whatever of a transmutation of species. The erroneous statements regarding the conversion of Oats into Rye have proceeded on imperfect observations. The individuals, however, of a species may present certain differences in regard to size,

Botany. colour, &c., these differences depending on soil, and on different conditions of heat, light, and moisture. Such differences are not incompatible with the idea of a common origin, and moreover, there is always a tendency to return to the original type. What are called *Varieties*, therefore, are variations in species which are not in general of a permanent character, and cannot be kept up in ordinary circumstances by seed. By cultivation, however, such varieties are sometimes perpetuated. This is usually accomplished by means of cuttings or grafts, and in certain instances even by seed. Thus the varieties of the cereal grains and of culinary vegetables have been propagated so as to constitute permanent races.

Plants which are cultivated are liable to sport, as it is called, and the peculiarities and variations thus produced are sometimes kept up. All the varieties of Cabbage, Cauliflower, Brocoli, Savoys, and Curled Greens are derived from one stock, Brassica oleracea. This plant grows wild on the sea-shore, and when cultivated it undergoes remarkable changes. Thus it forms a heart, as in ordinary Cabbage; its flower-stalks become thickened and shortened, as in Cauliflower and Brocoli; or its parenchyma is largely developed between the vessels, so as to give rise to the crisp and curled appearance of Greens. This tendency in the plant to produce monstrosities was early noticed by cultivators, and care was taken to propagate those individuals which showed abnormal appearances. The seeds of such were saved, put into good soil, and no plants were allowed to remain except such as presented the required form. In this manner certain races of culinary vegetables have been established. If, however, these cultivated plants are allowed to grow wild and scatter their seed in ordinary soil, they will in the progress of time revert to the original type or species. Instances such as these show the remarkable effects of cultivation in perpetuating varieties by seed.

In regard to the cereal grains, Wheat, Barley, Oats, &c., they have been so long cultivated that we are at a loss to know the original types or species. We have been forced, in the mean time, to call them species, although they are probably mere cultivated varieties of unknown species, perpetuated as races. That Wheat is an abnormal state of some plant, it has been remarked, might be conjectured from the fact that it does not become wild; if left to itself it disappears. Fabre has stated recently that the Wheat is a cultivated variety of the grass called Ægilops ovata. This plant first undergoes a change by which it becomes what has been called Ægilops triticoides, and then in successive years is converted into true Wheat. This discovery, as Lindley says, does not invalidate the characters by which the genera Ægilops and Triticum (as taken from wild species, such as Triticum maritimum, &c.) are separated, any more than the existence of a Peloria in Linaria invalidates the characters derived from the distinction between regular and irregular flowers.

It is of great importance to distinguish between mere varieties and true species, and to determine the limits of variation in different species. By not attending to this, many varieties have been described as species, and by their change or disappearance have given rise to great confusion and incorrectness both in descriptions and in arrangements. Another source of fallacy arises from hybrids being occasionally reckoned as true species.

Certain species not identical in origin, have common features of resemblance, and are associated together under what is called a Genus. A genus, then, is an assemblage of nearly related species, agreeing with one another, in general structure and appearance, more closely than they accord with other species. Thus the Scotch Rose, the Dog Rose, the China Rose, and the Sweet-briar, are all different species included in one genus, Rosa. It may happen that a single species may be reckoned as forming a genus, when

the peculiarities are as marked as those constituting other Botany. genera. Thus, if there was only one species of Oak, it would be sufficient to constitute a genus, as much so as at present when it includes 200 species. It is distinguished by its acorn from other allied genera, such as the Beech, the Hazel, and the Chestnut. The species in a genus present one general plan, and may be said to be formed after the same pattern. Some species of a genus, having special points of resemblance, may be grouped together in a Sub-

On looking at genera, it will be seen that some of them, such as Oaks, Hazels, Beeches, and Chestnuts, have a strong resemblance or family likeness, and that they differ remarkably from such genera as Firs and Pines, Maples and Ashes. Certain genera may in this way be grouped so as to form Orders or Families. While genera are groups of allied species, Orders are groups of allied genera, or, in reality, more comprehensive genera. Thus, Firs, Pines, and Larches, belong to different genera, but all agree in being cone-bearing, and are grouped under Coniferæ. The Rose, the Raspberry, the Bramble, the Strawberry, the Cinquefoil, the Cherry, and the Plum, all agree in their general organography, and are united under Rosaceæ. Certain genera have more points in common than others, and are grouped together under sub-divisions of orders called Sub-orders. Thus, the Plum and the Cherry have a drupe as their fruit, and are more nearly allied to each other than they are to the Apple; again, the Strawberry, Raspberry, and Bramble, are more allied to each other than to the Cherry or Apple. We have thus Sub-orders of Rosaceæ, namely, Amygdaleæ, including the Plum, Peach, Cherry, and Almond; Pomeæ, including the Apple, Pear, Medlar, and Quince; Potentilleæ, including the Strawberry, Cinquefoil, and Raspberry; and Roseæ, comprehending the Roses.

Certain orders agreeing in evident and important general characters are united together so as to form Classes; and subdivisions of classes are made in the same way as in the case of orders. There are thus Sub-classes associating certain orders included in one Class. The usual divisions are Classes, Orders, Genera, and Species. 'These occur in all systems of classification. A more minute subdivision may be made as follows:-

I. Classes. a. Sub-classes. II. Orders or Families. a. Sub-orders. b. Tribes. c. Sub-tribes.

III. Genera. a. Sub-genera or Sections. IV. Species. a. Varieties.

An enumeration of the marks by which one Class, Order, Genus, or Species is distinguished from another is called its Character. In giving the characters of any division, we notice merely those which are necessary to distinguish it from others. This is called its Essential Character. A plant may also be described completely, beginning at the root, and proceeding to the stem, branches, leaves, flowers, fruit, seed, and embryo. This is not essential, however, for the purposes of classification, and would be quite superfluous in that point of view. In the character of the Classes the important points of structure on which they are constituted are given. In the character of Orders (the ordinal character) we give the general structure of the included plants, especially of their flowers and fruit. In the Generic character we notice the modification of the ordinal character in a given genus-the character being taken from the parts of the flower and fruit, as in the order. In the Specific character are included certain less important modifications of form, whether in the stem, leaves, or flowers, which serve to distinguish allied species.

The essential character of a genus, when given in Latin, is put in the nominative case, that of a species in the ablative. The names of the Classes are variously derived, ac-

cording to the views of the authors in regard to the classification. They express some points of structure or development which are of marked importance or permanence. Orders are named from some characteristic genus included in them, except in artificial methods, where some organ is taken as the means of distinction. Genera are derived either from the Latin name of one of the species, from the structure or qualities of the included species, or from the name of some botanist, &c. Thus Prunus is a genus including the Plum, the Sloe, &c.; Rosa, the Rose; Papaver, the Poppy; Hookeria is a genus named after Hooker; Lithospermum, from two Greek words signifying a stone and seed, is given to a genus, the species of which have hard stony nuts or achenes.

In giving the name of a plant we mention its genus and species. Thus the common Dog-rose is called Rosa canina, the first being the generic name, the second the specific. Specific names may indicate the country in which a plant is found, the locality in which it grows, the form of its roots, stem, or leaves, the colour of its flowers, &c. A species named in honour of its discoverer or describer has the specific name usually in the genitive, as Veronica Jacquini, named after Jacquin. When the name is given in compliment to a botanist, without reference to the discovery, then the specific name is in the adjective form, as Veronica Lindleyana. Sometimes a generic name is used specifically, and then it is put as a noun after the genus, with a capital letter, and the two names may not agree in gender; thus we have such names as Cratægus Oxyacantha, Æthusa Cynapium, Viburnum Opulus, Veronica Chamædrys. To the genus and species are added certain letters, indicating the botanist who founded them. Thus Valeriana L. is the genus Valerian, as constituted by Linnæus, and Valeriana officinalis L. is the officinal Valerian, as described by Linnæus; Oxytropis, DC., is the genus so called by De Candolle. Sometimes authors happen to describe the same plant by different names. It is of importance, therefore, to give the Synonymes of other botanists, with their names. Thus Salvadora persica of Garcin is S. Wightii of Arnott, and S. indica of Wight's Illustrations. After the description of a plant we usually mention its Habitat, that is, the country or province in which it grows, with the nature of the locality, whether alpine or lowland, dry or moist, &c.

The following are some of the common abbreviations and symbols used by botanists:-

The names of Authors are abridged in Botanical works, by giving the first letter or syllable, &c. Thus, L. stands for Linnæus; DC. for De Candolle; Br. for Brown; Lam. and Lmk. for Lamarck; Hook. for Hooker; Hook. fil. for Hooker junior; Lindl. for Lindley; Arn. for Arnott; H. and B. for Humboldt and Bonpland; H. B. and K. for Humboldt, Bonpland, and Kunth; W. and A. for Wight and Arnott; Berk. for Berkeley; Bab. for Babington, &c.

The symbol ∞ or 00 means an indefinite number; in the case of stamens, it means above 20.

○ ① ① or A. means an annual plant.

of ⊙⊙ ⊕ ② or B. means a biennial plant,

24 △ or P. means a perennial plant.

b 5 or Sh. means a Shrub; T. a Tree.

) turning to the left; (turning to the right.

- 0 = Cotyledons accumbent, radicle lateral.
- o | Cotyledons incumbent, radicle dorsal. o≫ Cotyledons conduplicate, radicle dorsal.
- o | | | Cotyledons plicate or folded twice, radicle dorsal.
- 0 | | | | Cotyledons folded thrice, radicle dorsal.
- Hermaphrodite flower, having both stamens and pistil.
- 5 Male, staminiferous, staminate, or sterile flower.
- Premale, pistilliferous, pistillate, or fertile flower.
- ₹ Unisexual species, having separate male and female flowers. → Q Monœcious species, having male and female flowers on the same plant.

- 5: Q Directions species, having male and female flowers on dif- Botany.
- 우 ㅎ우 Polygamous species, having hermaphrodite and unisexual flowers on the same or different plants.
- ! Indicates certainty as to a genus or species described by the author quoted.
- ? Indicates doubt as to the genus or species.
- O indicates absence of a part.
- v. v. s. Vidi vivam spontaneam, indicates that the author has seen a living native specimen of the plant described by him.
- v. v. c. Vidi vivam cultam, indicates that he has seen a living cultivated specimen.
- v. s. s. Vidi siccam spontaneam, indicates that he has seen a dried native specimen.
- v. s. c. Vidi siccam cultam, indicates that he has seen a dried cultivated specimen.

CHAPTER II.

SYSTEMS OF CLASSIFICATION.

There are two systems pursued in the arrangement of plants; one is called the Artificial method, and the other the Natural method. In both of them the genera and species, or the minor divisions, are the same, but the higher divisions of classes and orders are totally unlike, and are founded on entirely different principles. The genera and species are very differently arranged in the two systems. In artificial methods one or two organs are selected in an arbitrary manner, and they are taken as the means of forming classes and orders; while in the natural method plants are grouped according to their alliance in all their important characters. Plants belonging to the same class and order in the former system may have nothing in common except the number of the stamens and pistils, or the form of their flowers, or some other arbitrarily selected character; while in the latter, plants in the same class and order are related by true affinity, and correspond in all the essential points of their structure and organography. When a student knows the artificial class and order to which a plant is to be referred, he does not thereby become acquainted with its structure and properties; plants diametrically opposed in these respects may be associated together. When he determines, on the other hand, the place of a plant in the natural system, he necessarily acquires a knowledge of its tsructural relations and affinities. Hence a knowledge of the latter system is that which must be the aim of every botanical student.

I.—ARTIFICIAL SYSTEMS OF CLASSIFICATION.

Attempts at an artificial methodical arrangement of plants were made by Cæsalpinus, Morison, Rivinus, and Tournefort, but the system which was most universally adopted was that of Linnæus, which was founded on the sexes of plants, and hence has been denominated the sexual system. It is called an artificial method because it takes into account only a few marked characters in plants, and does not propose to unite them by natural affinities. It is an index to a department of the book of nature, and as such is useful to the student. It does not aspire to any higher character, and although it cannot be looked upon as a scientific and natural arrangement, still it has a certain facility of application which commends it to the tyro. In using it, however, let it ever be remembered, that it will not of itself give the student any view of the true relations of plants as regards structure and properties, and that by leading to the discovery of the name of a plant, it is only a stepping-stone to the natural system.

In the artificial system of Linnæus, plants are divided into Flowering and Flowerless—the latter being included in the twenty-fourth class, under the name of Cryptogamia, and

Botany. the former, or Phanerogamia, being divided into twenty- in flowering plants they are determined by the number of Botany. three classes, the characters of which are founded on the number, the insertion or position, the relative length, and the connection of the stamens. Among flowerless plants

the styles, the character of the fruit, the number and connection of the stamens in those classes where these characters are not already taken into consideration, and on the herthe orders are similar to those of the natural system, while maphrodite or unisexual nature of the flowers.

The following are the Classes and Orders of the Linnæan artificial system:-

A. FLOWERING PLANTS, PHANEROGAMIA.

- I. Stamens and Pistils in every flower.
 - 1. Stamens unconnected.

a. Stamens either of equal length, or at all events need to in number. Class I. Monandria. 2 II. Diandria. 3 III. Triandria. 4 IV. Tetrandria. 5 V. Pentandria. 6 VI. Hexandria. 7 VII. Heptandria. 8 VIII. Octandria. 9 IX. Enneandria. 10 X. Decandria. 12 to 19,	ther didynamous nor tetradynamous:— Order 1. Monogynia 1 free Style. — 2. Digynia 2 free Styles. — 3. Trigynia 3 — — 4. Tetragynia 4 — — 5. Pentagynia 5 — — 6. Hexagynia 6 — — 7. Heptagynia 7 — — 8. Octogynia 8 — — 9. Enneagynia 9 — — 10. Decagynia 10 — — 11. Dodecagynia 12 to 19 — 12. Polygynia 20 or more.		
b. Stamens differing in length in certain proportions:—			
Two long and two short XIV. Didynamia	Order 1. Gymnospermia Fruit. Achenes		
Four long and two short XV. Tetradynamia	Order I. Siliculosa Fruit, a Silicula. 2. Siliquosa Fruit, a Siliqua. Fruit, a Siliqua.		
2. Stamens connected—			
By their Filaments in one a parcel or tube	Order Triandria 3 Stamens. — Pentandria 5		
By their Filaments in two parcels	— Pentandria 5 — — Decandria 10 —		
By their Filaments in three or more parcels XVIII. Polyadelphia	— Polyandria		
By their Anthers (Composite flowers)	 Order 1. Polygamia æqualis, florets all §. — 2. Polygamia superflua, florets of the disk ĕ, those of the ray ♀, but fertile. — 3. Polygamia frustranea, florets of the disk ĕ, those of the ray abortive. — 4. Polygamia necessaria, florets of the disk ħ, those of the ray ♀, and fertile. — 5. Polygamia segregata, each flower with a separate involucre. 		
With the Pistil on a column XX. Gynandria	Order Monandria		
II. Stamens and Pistils in separate flowers.			
On the same Plant XXI. Monœcia On separate Plants XXII. Diœcia	Order Monandria		
III. Stamens and Pistils in the same and in separate flowers on the same or on separate Plants	Order 1. Monœcia, &, &, and Q on the same plant. — 2. Diœeia, &, &, Q, on two plants. — 3. Triœcia, &, &, Q, on three plants.		
B. Flowerless Plants.			
Organs of reproduction XXIV. Cryptogamia	Order 1. Filices, Ferns. — 2. Musei, Mosses. — 3. Hepaticæ, Liverworts. — 4. Lichenes, Lichens. — 5. Algæ, Seaweeds. — 6. Fungi, Mushrooms.		
The system of Linnæus, even when regarded simply as	flower, it is impossible to determine its class and order.		

The system of Linnæus, even when regarded simply as an index to the vegetable kingdom, is by no means complete. The parts of flowers often vary in number, and cannot be confined within the strict rules required by this method of arrangement; moreover, unless the stamens and pistils are perfect and complete, and the plant is in full VOL. V.

When the system is rigidly adhered to, we find that species belonging to the same genus are separated. Thus the genus Lychnis has most of its species hermaphrodite, with ten stamens and five styles, but there is at least one British species diœcious. In order, therefore, to keep the genus

Botany. entire, and not separate the species, Linnæus adopted the plan of putting Lychnis in the class Decandria and order Pentagynia, and under the class Diœcia order Decandria, placing the name of the diœcious species, and referring the student to the 10th class for a description. In this way the genera-which are founded on natural affinities, and are not constructed by a mere arbitrary method—are preserved in their integrity. All the species of one genus are placed together, whether they accord or not with the characters of the class and order; the place of the genus being determined by the characters of the majority of the species. The names of the anomalous species are given in italics, in the classes and orders to which they belong according to the Linnæan method, and reference is made to the description of them as given under the genus.

II.—NATURAL SYSTEM OF CLASSIFICATION.

In arranging plants according to the Natural System, the object is to bring together those which are allied in all essential points of structure. It is called natural, because it proposes to follow the system of Nature, and thus takes into account the true affinities of plants on a comparison of all their organs. One of the first natural methods of classification was that proposed by Ray about 1682. He separated flowering from flowerless plants, and divided the former into Dicotyledons and Monocotyledons. His orders were founded on correct views of the affinities of plants, and he far outstripped his contemporaries in his enlightened views of arrangement. He may be said to have laid the foundation of that system which has been elucidated by the labours of Jussieu, De Candolle, Brown, Lindley, Endlicher, and others.

In arranging plants according to a natural method, we require to have a thorough knowledge of structural and morphological botany, and hence we find that the advances made in the latter departments have materially aided the efforts of systematic botanists. We may regard plants in various points of view, either with reference to their elementary tissues, their nutritive, or their reproductive organs. The first two are the most important, as being essential for the life of individuals, while the latter are concerned in the propagation of the species. These sets of organs bear a certain relation to each other, and we find that plants may be associated by a correspondence in all of them. In comparing the characters of plants, we must take care that we contrast organs belonging to the same class of functions, and the value of the characters must depend upon the importance of the functions performed by the organs.

Cellular tissue is reckoned of the highest value, as being of universal occurrence, and as carrying on, in many instances, all the functions of plants. In considering the elementary tissues alone, we divide all plants into Cellular and Vascular—the former including the lower tribes, such as Lichens, Seaweeds, and Mushrooms, the latter including the higher flowerless plants with scalariform vessels, and all the flowering plants with spiral vessels. In the nutritive and reproductive organs there is nothing which can be considered of the same value as cellular tissue. In the nutritive organs the embryo occupies the highest place, and by examining it we divide plants into Acotyledonous, having no cotyledons, but occasionally producing a prothallus, Monocotyledonous, with one cotyledon, and Dicotyledonous, with two cotyledons. Proceeding to the secondary organs in the nutritive class, we find that the root gives rise to the divisions of Heterorhizal, Endorhizal, and Exorhizal of Richard. Next the stem is Cellular or Thallogenous, Acrogenous, Endogenous, and Exogenous. The thallus is veinless, the frond of Acrogens has often a forked venation, the leaves of Endogens are parallel reined, and those of Exogens reticulated. In the reproductive system the sta-

mens and pistils occupy the highest place, as being the Botany. essential organs of flowering plants (Phanerogamia), while antheridia and archegonia have the same value in flowerless plants (Cryptogamia). Succeeding these organs in value comes the fruit, which is either a theca with spores, or a pericarp with seed. The floral envelopes are the next in the series; they are absent in Cryptogamous plants, and present in Phanerogamous; their arrangement is ternary ir Monocotyledons, quinary and quaternary in Dicotyledons The inflorescence and bracts, as found in flowering plants, occupy the lowest place in the subordination.

We thus find, that by comparing these different organs in plants, we arrive at certain great natural divisions, including plants which are associated by affinity of structure and function, as exhibited in the following table:-

Cellular Plants without Vessels or Stomata.	Vascular Plants with Scalariform Vessels, and Stomata.	Vascular Plants with Spiral Vessels, and Stomata
Acotyledonous { Heterorhizal. Thallogenous. No Venation.	Acotyledonous, with Prothal- lus. Heterorhizal. Acrogenous. Forked Venation.	Monocotyledon- ous. Endorhizal. Endogenous. Parallel Vena- tion. Dicotyledonous. Exorhizal. Exogenous. Reticulated Venation.
Cryptogamous. Thecæ with Spores, or naked Spores	Cryptogamous. Thecæ with { Spores.	Phanerogamous. Angiospermous or Gymnospermous.
Flowerless.	Flowerless. {	Floral Envelopes Ter- lopes Ter- nary. Flor. Env. Quater- nary or Quinary.
No Inflorescence nor Bracts.	No Inflores- cence nor Bracts.	Having Inflorescence and Bracts.

It is impossible to represent the affinities of plants in a linear series. Different groups touch each other at several different points, and must be considered as alliances connected with certain great centres. We find also that it is by no means easy to fix the limits of groups. There are constantly aberrant orders, genera and species, which form links between the groups, and occupy a sort of intermediate territory. In this, as in all departments of natural science, there are no sudden and abrupt changes, but a gradual transition from one series to another. Hence exact and rigid definitions cannot be carried out. In every natural system there must be a certain latitude given to the characters of the groups, and allowance must be made for constant anomalies, in as far as man's definitions are

Having examined the general principles upon which the natural system is founded, we shall now give a sketch of some of the more important Taxological plans which have been propounded. Jussieu divided plants into three primary groups-Acotyledones, Monocotyledones, and Dicotyledones, and included under them fifteen classes. One of the classes is Acotyledonous, three Monocotyledonous, and eleven Dicotyledonous. The three Monocotyledonous classes are distinguished by the position of the stamens, whether inserted on the thalamus (hypogynous), attached to the calyx (perigynous), or to the ovary (epigynous). Dicotyledonous plants are divided into Apetalous (monochlamydeous), plants having a calyx only; Monopetalous (gamopetalous), plants having united petals; Polypetalous, plants having separate petals; and Diclinous, plants which are unisexual and incomplete; the last constitutes the fifteenth class, while the other ten classes of Dicotyledons included in the other three divisions are determined chiefly by the position of the stamens and the corolla in relation to the ovary. Under these classes he included 100

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Tabular View of Jussieu's Natural System.

ACOTYLEDONES. Class I. Acotyledones. Stamens Hypogynous, II. Mono-hypogynæ. MONOCOTYLE-Stamens Perigynous, III. Mono-perigynæ. DONES. IV. Mono-epigynæ. Stamens Epigynous, Stamens Epigynous, V. Epistamineæ. Apetalæ, Stamens Perigynous, VI. Peristamineæ. (No petals). Stamens Hypogynous, VII. Hypostamineæ. Corolla Hypogynous, VIII. Hypocorollæ. Corolla Perigynous, IX. Pericorollæ. DICTOYLEDONES X. Epicorollæ, Syn-Monopetalæ, (Petals unitantheræ (Anthers united). Corolla Epigynous, ed). XI. Epicorollæ, Corisantheræ (Anthers separate). XII. Epipetalæ. Polypetalæ, Petals Epigynous, (Petals sepa-Petals Hypogynous, XIII. Hypopetalæ. Petals Perigynous, rate). XIV. Peripetalæ. Flowers unisexual, or without a Pe-XV. Diclines. rianth,

De Candolle's system is in many respects similar to that of Jussieu. He has the same primary divisions. Under Dicotyledons there are four groups, under Monocotyledons two groups, and under Acotyledons two groups. Among Dicotyledons the sub-classes are founded on the number of the floral envelopes, the union or separation of the petals, and the insertion of the stamens. Among Monocotyledons he included some Cryptogamous plants, and he formed two divisions, according as the floral envelopes were present or absent. The Acotyledons or Cellular plants were divided into those having leaves and those without leaves.

Tabular View of De Candolle's Natural System.

A. VASCULARES OF COTYLEDONEÆ.

Class I. Dicotyledones or Exogenæ.

Sub-class 1. Thalamifloræ. Petals distinct, stamens hypogynous. 2. Calycifloræ. Petals distinct or united, stamens perigynous or epigynous. Corollifloræ.

Petals united, hypogynous, usually bearing the sta-

4. Monochlamydeæ. Having a calyx only, or no floral envelope.

Class II. Monocotyledones or Endogenæ. 5. Mono-Phanerogamæ. Having floral envelopes.

6. Mono-Cryptogamæ. Without floral envelopes.

B. Acotyledoneæ of Cellulares.

7. Foliosæ. Having leaves. ••• 8. Aphyllæ. Leafless.

The following is the arrangement adopted by Lindley in his recent work on the Vegetable Kingdom:-

Class I. THALLOGENS—Asexual or Flowerless plants without proper stems or leaves, such as Fungi

II. Acrogens—Asexualor Flowerless plants, with stems

and leaves, such as Ferns.
III. RHIZOGENS—Sexual or Flowering plants, with Acotyledonous embryos and fructification springing from a thallus, such as Rafflesia.

... IV. Endogens — Monocotyledonous flowering plants with Endogenous stems, parallel venation, and ternary symmetry. This class is subdivided into

> 1. Plants with glumaceous flowers formed by imbricated bracts, such as Grasses.

Petaloid unisexual flowers, such as Palms.

3. Petaloid hermaphrodite flowers adherent to the ovary, such as Narcissus.

4. Petaloid hermaphrodite flowers free from the ovary, such as the Lily.

V. DICTYGGENS-Monocotyledonous plants with reticulated venation, including such orders as Dioscoreaceæ and Smilaceæ.

Class VI. Gymnogens—Polycotyledonous Exogens with naked Botany. seeds, as Coniferæ and Cycadaceæ.

... VII. Exogens—Dicotyledonous plants with seeds in a seed-vessel. Under this class he puts the following sub-classes :-

Sub-class 1. Diclinous Exogens, or Dicotyledons with unisexual flowers, and no tendency to form hermaphrodite flowers, such as Amenti-

Sub-class 2. Hypogynous Exogens, or Dicotyledons with hermaphrodite or polygamous flowers, and stamens entirely free from the calyx and corolla, such as Ranunculaceæ.

Sub-class 3. Perigynous Exogens, or Dicotyledons with hermaphrodite or polygamous flowers, the stamens growing to the side of either the calyx or the corolla, ovary superior, or nearly so, such as Rosaceæ.

Sub-class 4. Epigynous Exogens, or Dicoty-ledons with hermaphrodite or polygamous flowers, the stamens growing to the side of either the calyx or corolla, ovary inferior, or nearly so, such as Umbelliferæ.

The following is the arrangement which we propose to follow-De Candolle's system being taken as the basis, and some of the divisions being derived from Jussieu and Lindley:-

CLASS I. DICOTYLEDONES, EXOGENÆ, or ACRAM-PHIBRYA, in which spiral vessels are present; the stem is exogenous; stomata are present, the venation of the leaves is reticulated; the flowers have stamens and pistils, and the symmetry is quinary or quaternary; the ovules are either in an ovary or naked; and the embryo is dicotyledonous. In this class there are included four Sub-classes:

Sub-class I. THALAMIFLORE. - Flowers usually dichlamydeous, petals separate, inserted on the thala-

mus, and stamens hypogynous.

Sub-class II. Calversus.—Flowers usually dichlamydeous, petals either separate or united, stamens either perigynous or epigynous. This sub-class has two subdivisions-

1. Polypetalæ or Dialypetalæ—in which the

petals are separate.

2. Monopetalæ or Gamopetalæ—in which the petals are united.

Sub-class III. Corolliflor — Flowers dichlamydeous, petals united, corolla hypogynous. In this sub-class there are two subdivisions :-

1. Hypostamineæ—in which the stamens are inserted into the receptacle and not united to the corolla.

2. Epicorollæ or Epipetalæ—in which the stamens are inserted on the corolla.

Sub-class IV. Monochlamydeæ, or Apetalæflowers either with a calyx only or achlamydeous. In this sub-class there are two subdivisions

1. Angiospermæ-in which the ovules are contained in a pericarp, and are fertilized by the action of the pollen on the stigma.

a. Spermogenæ, having true seeds and a cotyledonous embryo.

b. Sporogenæ, having spore-like seeds and an acotyledonous embryo.

2. Gymnospermæ—in which the ovules are not contained in a true pericarp, and are ferti-lized by the direct action of the pollen without the intervention of a stigma, and the

embryo is polycotyledonous.

CLASS II. MONOCOTYLEDONES, ENDOGENÆ, or AM-PHIBRYA, in which spiral vessels are present; the stem is endogenous; stomata occur; the venation is usually parallel, sometimes slightly reticulated; the flowers have stamens and pistils, and the symmetry is ternary; the ovules are contained in an ovary; the embryo is monocotyledonous. Under this Class are included three Sub-classes:-

Botany.

Sub-class I. Dictyogenz-plants with reticulated venation in their leaves.

Sub-class II. Petaloider, or Floride-in which the leaves are parallel-veined; the flowers usually consist either of a coloured perianth or of whorled scales. This sub-class is divided into

1. Epigynæ—in which the Perianth is adherent. the ovary is inferior, and the flowers are usually hermaphrodite.

2. Hypogyna-in which the Perianth is free, the ovary is superior, and the flowers are usually hermaphrodite.

3. Incomplete-flowers incomplete, often unisexual, with no proper perianth, or with a few verticillate scales.

Sub-class III. GLUMIFER E-flowers glumaceous, consisting of imbricated bracts, venation parallel.

CLASS III. ACOTYLEDONES, or ACROGENÆ, and THAL-LOGENÆ, or THALLOPHYTA and ACRO-BRYA, in which the plants are either entirely cellular, or consist partly of scalariform vessels; the stem when woody is Acrogenous; stomata occur in the higher orders; the leaves are either veinless or have a forked venation; no flowers are present; the reproductive organs consist of Antheridia and Archegonia; spores or cellular embryos are produced which have no cotyledons. Under this class there are two divisions:-

Sub-class I. Acrogenæ, Acrobeya, or Cormogenæ —with a distinct stem, bearing leaves or branches. Sub-class II. Thallogene, Thallophyta, or Cel-LULARES-having no distinct stem nor leaves, but forming a cellular expansion of various kinds which bears the organs of reproduction.

CHAPTER III.

ARRANGEMENT AND CHARACTERS OF THE NATURAL ORDERS.

Having now considered the primary divisions of the natural system, we proceed to give the characters of the natural orders, which are associated under the different classes and sub-classes. We have already stated, that in a linear series it is impossible to group the orders according to their affinities. Each order is allied, not merely to those which immediately precede and follow it in such a series, but to various other orders which are necessarily removed from it. On the confines of classes and sub-classes, orders occur which have characters common to two or more of the groups, and we constantly meet with aberrant genera which form a connecting link between two orders. In Botany, as in all departments of natural science, there are no rigid lines of demarcation, but one division seems to pass into another by an insensible gradation. Our definitions express the most marked and important characters of the groups, without attempting to embrace all the anomalies; and as our knowledge of the vegetation of the globe advances, we are enabled to improve the definitions of the groups, and to form intermediate divisions.

I.—PHANEROGAMEÆ, COTYLEDONEÆ, OR FLOWERING PLANTS.

CLASS I.—DICOTYLEDONES, EXOGENÆ, OR ACRAM-PHIBRÝA.

SUB-CLASS I .- THALAMIFLOR E.

Natural Order 1 .- RANUNCULACEE, the Buttercup order (Figs. 427 to 429).—Herbs, rarely shrubs, with an acrid watery juice, and generally with much-divided, exstipulate leaves, the petioles of which are dilated, and sheathing (Figs. 117, 118, and 120). Sepals 3-6, usually deciduous, sometimes deformed. Petals 3-15, sometimes anomalous (Figs. 214, 215, 216), at other times suppressed. Stamens usually ∞ , with adnate anthers (Fig. 428). Carpels numerous, one-celled

pistil, Fruit, achenes (Fig. 317), follicles (Fig. 298), or baccate. Seeds anatropal, with horny albumen, and a minute embryo (Fig. 429). The plants of this order characterize a cold, damp climate, and when met with in the tropics, they occur on the sides and summits of mountains. They have narcotico-acrid pro-

perties, and are usually more or less poisonous. The acridity varies at different seasons, and in different parts of the plant;

Diagram of flower of Ranunculus, with five sepals, five petals, numerous stamens and carpels.

(Figs. 181 and 277), or united into a single, many-celled Botany.

Fig. 427.

it is frequently volatilized by heat, and destroyed by drying. Among the plants of this order may be noticed Aconitum Napellus, Monkshood, used to allay pain in neuralgia; Delphinium Staphisagria, Stavesacre; Helleborus officinalis (the black Hellebore of the ancients), H. niger, fætidus,* and *Pl. CX. other species, famed as drastic purgatives; and Podophyllum peltatum, May-apple, used in North America as a cathartic.

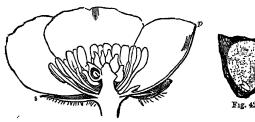


Fig. 428.

Fig. 428. Section of flower of Ranunculus, showing sepals, s, petals, p, numerous stamens, with adnate anthers, placed below the carpels.
429. Anatropal seed of Aconite, cut vertically, showing abundant homogeneous albumen, and a small embryo.

Nat. Ord. 2.—DILLENIACEÆ, the Dillenia order.—Trees, shrubs, or under-shrubs, with alternate, exstipulate leaves, five persistent sepals in two rows, five deciduous imbricated petals, indefinite stamens often turned to one side, a 2-5carpellary apocarpous or syncarpous fruit, arillate anatropal seeds, and homogeneous albumen. The species occur chiefly in Australasia, India, and Equinoctial America. They have astringent qualities, and some of them are large trees, which afford excellent timber.

Nat. Ord. 3.—Magnoliaceæ, the Magnolia order (Fig.

430).-Trees or shrubs, with alternate coriaceous sometimes dotted leaves, and convolute stipules, which cover the buds, and are deciduous. They are remarkable for the beauty of their foliage, and the fragrance of their flowers. Sepals, usually 3-6, deciduous. three or more, imbricated. Stamens o, distinct, with adnate anthers. Carpels, one-celled, nume-



Fruit, of numerous, dry or succulent, dehiscent or indehiscent, carpels. Seeds often arillate, and suspended from the fruit by a long funiculus; albumen fleshy and homogeneous; embryo minute. Magnolias abound in North America. The plants of this order have bitter, tonic, and aromatic quali-*Pl. OXI. ties. Drimys Winteri* yields Winter's bark; Illicium anisatum, on account of its flavour and the stellate arrangement of its fruit, receives the name of Star-Anise, Liriodendron tulipifera is the Tulip-tree (Fig. 430), remarkable for

its abrupt or truncated leaves. Nat. Ord. 4.—Anonaceæ, the Custard-apple order.— Trees or shrubs with alternate, entire, exstipulate leaves, three persistent sepals, six petals in two rows, usually valvate in

Botany, estivation, sometimes combined, numerous stamens covering a large hypogynous receptacle, numerous carpels containing one or more ovules, a succulent or dry fruit, consisting of a number of one or many-seeded carpels, distinct or combined, seeds with a brittle spermoderm, ruminate albumen, and a minute embryo. The species occur in tropical regions, and many of them furnish valuable fruits. The plants of this order are generally aromatic and fragrant. Anona squamosa yields the sweetsop, A. muricata the soursop, and A. reticulata the netted Custard-apple; A. Cherimolia produces the Peruvian Cherimoyer, said to be one of the finest fruits known.

Nat. Ord. 5.—Schizandraceæ, the Schizandra order.-Trailing shrubs, with alternate exstipulate leaves, allied to Anonaceæ, but differing in their habit, their unisexual flowers, their imbricate æstivation, and their homogeneous albumen. The stamens are often monadelphous, and the fruit consists of numerous baccate carpels. The species occur in India, Japan, and the hotter parts of North America.

Nat. Ord. 6.—MENISPERMACEÆ, the Moon-seed order.— Trailing shrubs with alternate, simple, usually entire leaves, and unisexual (often diœcious) flowers. Symmetry generally ternary. Stamens distinct or monadelphous, and attached to an androphore. Carpels supported on a gynophore, one-celled, containing a single curved ovule. Fruit drupaceous, one-celled, curved around a placental process. Seed solitary and curved; embryo with the cotyledons coiled up in a peripherical form. The woody matter is often closely compacted in wedges, separated by large medullary plates, giving the stem a peculiar aspect on a cross section. Menispermads are common in the tropical woods of Asia and America, and they climb among the trees to a great height. The plants of this order have narcotic and bitter properties; some of them are very poisonous. Anamirta paniculata yields the bitter narcotic fruit known in commerce as Cocculus indicus, and which has been sometimes illegally used to impart bitterness to malt liquor; Jateorrhiza palmata (Cocculus palmatus) supplies the bitter tonic root known as Calumba; Cissampelos Pareira, furnishes the tonic and diuretic root, known by the name of Pareira brava.

Nat. Ord. 7.—LARDIZABALACEÆ, the Lardizabala order. -Twining shrubs, with alternate exstipulate leaves, ternary symmetry and unisexual flowers, resembling Menispermads, but differing in their compound leaves, ovules sunk on the inner surface of the ovary, and minute embryo in abundant solid albumen. They are found in the cooler parts of South America and China.

Nat. Ord. 8.—Berberidaceæ, the Barberry order (Fig. 431).—Shrubs or herbaceous perennial plants, with alternate compound leaves, which are often spiny from nondevelopment of the parenchyma. Sepals, three, four, or six, deciduous, in a double row. Petals equal to the sepals in number, and opposite to them, or twice as many. Stamens equal in number to the petals, and opposite to them, anthers with two cells, each opening by a recurved valve from below upwards (Figs. 257 and 261). Carpel solitary, one-celled; stigma orbicular. Fruit baccate or capsular. Seeds anatropal; albumen fleshy and horny (Fig. 57). They are found in



Fig. 431, The flower of the Bar-berry, showing its se-pals, petals, and irrit-able stamens having ap-

temperate parts of the northern and southern hemispheres. In their properties they are acid, bitter, and astringent. The fruit of Berberis vulgaris, the common Barberry, contains oxalic acid, and is used as a preserve; while its bark and stem are astringent, and yield the bitter yellow crystalline matter Berberine.

Nat. Ord. 9.—Cabombaceæ, the Cabomba or Water- Botany. shield order.—Aquatic plants with floating peltate leaves. Sepals and petals three or four, alternating. Stamens 6-36. Carpels distinct, two to eighteen. Seeds definite; embryo in a vitellus, outside abundant fleshy albumen. They are allied to Nymphæaceæ and Nelumbiaceæ, and differ in their distinct carpels, definite ovules, abundant albumen, and nearly complete absence of a torus. They occur in America and New Holland.

Nat. Ord. 10.—NYMPHEACEE, the Water-Lily order (Figs. 432 to 434).—Aquatic herbs with large showy flowers,

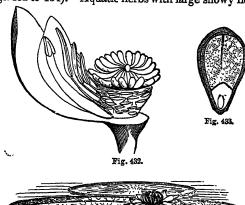




Fig. 434.

Fig. 432. Section of flower of Nymphesa alba, showing peduncle, torus or disk, petals, stamens with petaloid filaments, and radiating stigmas.

... 433. Seed of Nymphesa alba, cut vertically, to show the embryo in the vitellus or embryo-sac, with perispermic albumen.

... 434. Victoria Regia, the largest known Water-Lily.

and cordate or peltate leaves arising from a prostrate rhizome, which is sunk in the mud. Sepals usually 4, persistent. Petals numerous, deciduous, inserted on a fleshy torus, and passing by a gradual transition out of the sepals into the stamens, which are numerous, have petaloid filaments, and are inserted into the torus (Fig. 432). Ovary surrounded by the torus, many-celled, many-seeded, with radiating stigmas. Fruit indehiscent, pulpy when ripe. Seeds anatropous, attached to spongy dissepiments; embryo small, in a vitellus, outside farinaceous albumen (Fig. 433). There are considerable differences of opinion as to the position of this order. The structure of the rhizome resembles that of Endogens. The Water-lilies chiefly inhabit quiet waters in the northern hemisphere; they are rare in the southern hemisphere. The order possesses bitter, astringent, and some say narcotic properties. The plants contain much starch in their rhizomes, which are used for food in the same way as potatoes. Their petioles have large air-tubes, as well as spiral fibres, which can be separated and used for wicks. Victoria regia, Victoria Water-lily (Fig. 434), is found in the still waters of the whole of the warm parts of

Eastern South America. Its flowers, when expanded, are a foot and more in diameter. Its leaves vary from four to six or eight feet in diameter.

Nat. Ord. 11.—NELUMBIACEÆ, the Nelumbium or Water-Bean order (Fig. 435).—Aquatic herbs resembling Waterlilies, but differing in their large exalbuminous embryo, and their remarkation, larged tabular torus, in the hollow of which the nuts are half buried, and finally waters

Found in quiet waters

The enlarged honey combed torus of Neumbium with the nuts immersed in it. nous embryo, and their remarkably enof temperate and tropical regions in the southern hemi-



the order are remarkable for their large showy flowers and Their nuts are eatable.

Nat. Ord. 12.—Sarraceniaceæ, the Water-Pitcher or der.—Perennial herbs growing in bogs, with hollow pitcher-shaped or trumpet-shaped leaves (Fig. 139). Calyx usually consists of five persistent sepals. Petals five or 0. Stamens co. Style often expanding at its summit into a large peltate plate, with a stigma beneath each of its five angles. Fruit, a 2-5-celled capsule with axile placentas, bearing numerous albuminous seeds. The pitchers formed by the petioles of the leaves contain a peculiar secretion, the use of which is unknown. Sarracenia receives the name of Sidesaddle flower, in allusion to its tubular leaves. The plants are found abundantly in North America. Heliamphora occurs in Guiana.

Nat. Ord. 13.—PAPAVERACEE,* the Poppy order (Figs.

*PL CXII., and CXIII. figs. 6-11.

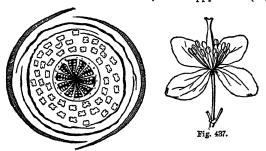


Fig. 436. Fig. 436. Diagram of the flower of the Poppy, showing two sepals, four crumpled petals, numerous stamens, pistil with parietal placentas.

437. Tetrapetalous corolla of Celandine and numerous stamens inserted below a pod-like pistil.

436 to 438).—Herbs with milky or coloured juice, and alternate exstipulate leaves (Fig. 121). Sepals two, rarely three, caducous (Fig. 208). Petals four (Fig. 437), rarely six, usually crumpled in æstivation. Stamens 8-24 or more. Fruit unilocular, siliquæform (pod-like), with 2-5 parietal placentas, or capsular (Fig. 309), with numerous placentas. Seeds numerous, with embryo in the midst of fleshy and oily albu-embryo and albu-men (Fig. 438). The order is chiefly confined

Fig. 438.

men (Fig. 438). The order is chiefly confined to Europe. Narcotic properties characterize the order. Some of the plants yield an acrid juice. Papaver somniferum is the Opium Poppy, the unripe capsules of which yield a milky juice, which, when concrete, constitutes opium. The active principle of opium is the alkaloid called Morphia, which is combined with meconic acid. Turkey opium is that chiefly used in Britain.

Nat. Ord. 14.—Fumariaceæ, the Fumitory order (Fig. 439 and Fig. 160).—Herbs with brittle stems, a watery juice, alternate, cut, exstipulate leaves, and irregular unsymmetrical flowers. Sepals two, deciduous. Petals four, cruciate, irregular, one or two of them often saccate or spurred, and the two inner frequently cohering at the apex, so as to include the anthers and stigma. Stamens either four and free, or six and diadelphous, each bundle being opposite the outer petals, and the central anther being two-celled, while the two outer are one-celled. Fruit, a round and indehiscent nut, or a one-celled and two-valved pod. Seeds crested, with a minute embryo and fleshy albumen. Fumeworts occur chiefly in temperate regions of the northern hemisphere. Some of them, as Dickstra spectabilis, are phous, each bundle being opposite the outer

Some of them, as Dickytra spectabilis, are very showy. They possess very slight bitterness and acridity. Nat. Ord. 15.—CRUCIFERÆ or BRASSICACEÆ, the Cruci-

sphere; very frequent in the East Indies. The plants of ferous or Cabbage order (Figs. 440 and 441).—Herbaceous Botany. plants with alternate, exstipulate leaves, racemose or corymbose flowers, usually yellow or white, and an ebracteated inflorescence. Sepals four, deciduous. Petals four, cruciate (Fig. 441). Stamens tetradynamous (Fig. 177). Fruit, a siliqua





Fig. 441. Fig. 440.

Fig. 440. Diagram of a Cruciferous flower, with four imbricate sepals, four petals, six stamens, tetradynamous, the two short ones solitary and opposite the lateral sepals, the four long in pairs opposite the anterior and posterior sepals, sulquose fruit, with two divisions to the right and left of the axis, separated by a replum, seeds attached by a funiculus to each side of the placentas. The floral symmetry is quaternary, but the stamens become six by collatoral chorisis of two of them, and the fruit bicarpellary by abortion of two of the carpels.

carpels. 441. Cruciferous flower of Brassica Eruca.

(Fig 314), or silicula (Figs. 315, 316). Seeds exalbuminous (Fig. 334); embryo with the radicle folded on the cotyledons (Figs. 337, 338). The plants are generally distributed, but abound in cold and temperate regions, especially in Europe. The order has been divided into sections, according to the nature of the fruit and of the embryo. The following are the divisions founded on the nature of the fruit:—1. Siliquosæ,—a siliqua, opening by valves (Fig. 307). 2. Siliculosæ, Latiseptæ,—a silicula, opening with two flat or convex valves, replum in the broadest diameter (Fig. 315). 3. Siliculosæ, Angustiseptæ,a silicula with folded or keeled dehiscent valves, replum in narrow diameter (Fig. 316). 4. Nucumentaceæ, -an indehiscent silicula, often one-celled, having no replum. 5. Septulatæ,-valves with transverse phragmata on their inside. 6. Lomentaceæ,—a pod dividing transversely into single-seeded portions, the beak sometimes containing one or two seeds, while the true pod is abortive. The divisions founded on the nature of the embryo are:—1. Pleurorhizeæ (Fig. 337),—cotyledons accumbent o — 2. Notorhizeæ (Fig. 338),—cotyledons incumbent o | . 3. Orthoploceæ, —cotyledons conduplicate o≫. 4. Spirolobeæ, —cotyledons twice folded o | | | . 5. Diplecolobeæ,—cotyledons thrice folded o | | | | . Crucifers are antiscorbutic and pungent, and occasionally acrid in their properties. None of them are poisonous. The order contains many of the culinary vegetables in constant use, such as Cabbage, Cauli-flower, Turnip, Radish, Sea-kale, Cress, and Mustard. The plants have much nitrogen and sulphur in their composition. Many garden flowers, as Wallflower, Stock, Rocket, and Honesty, belong to this order.

Nat. Ord. 16.— CAPPARIDACEÆ, the Caper order.— Herbs, shrubs, or trees with alternate leaves and tetramerous flowers; allied to Crucifers, but distinguished by the stamens being often indefinite, and if six, scarcely ever tetradynamous, by the want of a replum in the one-celled ovary, which is often supported on a gynophore, and by their reniform seeds. Capparids are chiefly tropical plants. In their properties, they resemble Crucifers. They have pungent, stimulant, antiscorbutic qualities. Capparis spinosa, in the southern parts of Europe, C. rupestris in Greece, C. Fontanesii in Barbary, and C. ægyptiaca in Egypt, supply Capers, which are the flower-buds of the plants.

Nat. Ord. 17.—RESEDACEÆ, the Reseda or Mignonette order.—Herbaceous plants, rarely shrubs, with alternate leaves having minute glands at their base, and racemose or spiked inflorescence. Sepals 4-7, sometimes united. Petals 2-7, lacerated and unequal, with broad or thickened claws (Fig. 213). Stamens definite, inserted on a fleshy disk. Fruit usually one-celled, opening early at the apex, with

Botany. 3-6 parietal placentas. Sometimes it appears as carpellary leaves surrounding a central placenta. Seeds several, reniform, or curved and exalbuminous; embryo arcuate. The plants of the order chiefly inhabit Europe and the adjoining parts of Asia and Africa.

Nat. Ord. 18.—FLACOURTIACEÆ or BIXACEÆ, the Arnotto order.-Shrubs or small trees, with alternate exstipulate leaves, often marked with round transparent dots. Sepals and petals 4-7, the latter sometimes 0. Stamens, same number as the petals or a multiple of them. Ovules attached to parietal placentas. Fruit one-celled, either fleshy and indehiscent, or a 4-5-valved capsule containing pulp, in which numerous albuminous seeds are enveloped. The plants are almost entirely natives of the hottest parts of the East and West Indies and of Africa. Some of the plants of the order are bitter and astringent, others yield edible fruits. Bixa Orellana has angular seeds covered with an orange-red pulp, which constitutes Arnotto, and is used for a red dye.

Nat. Ord. 19.—CISTACEÆ, the Rock-rose order (Figs.

442 and 443).—Shrubs or herbs, often viscid, with simple, entire leaves, and showy flowers. Sepals 3-5, persistent, unequal, the three inner with twisted æstivation. Petals five, very rarely three, caducous, often crumpled, twisted in an opposite direction from the sepals. Stamens definite or co, distinct. Fruit a one-celled capsule with parietal placentas, or imperfectly 3-5-celled by means of dissepiments arising from the middle of the valves, and bearing placentas the valves, and bearing placentas at or near the axis (dehiscence being loculicidal). Seeds



usually orthotropal, with mealy albumen; embryo curved or spiral. The plants are found chiefly in the south of Europe and



and other species

(C.ladaniferus, C. petals, indefinite stamens, ovary with numerous ovules, short style and peltate stigma.

Ledon), furnish the resinous substance called Ladanum, which is used as a stimulant and emmenagogue.

Nat. Ord. 20.-VIOLACEÆ, the Violet order (Figs. 444 and 445).—Herbs or shrubby plants, with usually alternate,

stipulate leaves (Fig. 136 and 169), having an involute vernation, and flowers ofter irregular. Sepals five, persistent, attached above their base. mens five, with short and broad

north of Africa.

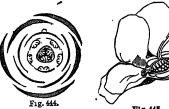
The Rock - roses

are generally resi-

nous and balsamic.

creticus,

Cistus



Petals five, often mequal, one bespals, five petals, five stamens with appending spurred. Stamens five with which section of the flower of a Violet characteristic five petals. centas.

445. Section of the flower of a Violet, showing the spurred petal, with a staminal appendage within it, and the ovary with numerous ovules.

filaments, which are often elongated beyond the introrse anther lobes; in the irregular flowers two of the stamens have appendages (Fig. 262); anthers sometimes united. Style declinate, with an oblique hooded stigma (Fig. 289). Fruit

a three-valved capsule, with parietal placentas in the middle Botany. of the valves (loculicidal). Seeds definite or ∞ , albuminous, anatropal, with a straight embryo. The species are found in Europe, America, Siberia, and Africa. The Violetworts are generally emetic, and some have purgative properties. In the roots of many of them a principle called Violin, similar to Emetin, has been found.

Nat. Ord. 21.—Droseraceæ, the Drosera or Sun-dew order.-Herbaceous marsh-plants, often covered with glandular hairs (Fig. 107); they have alternate leaves, with fringes at their base, and a circinate vernation. Sepals five, persistent. Petals five, imbricate. Stamens as many as the petals, or two or three times as many, distinct, withering. Styles 3-5, sometimes united. Fruit a onecelled, 3-5-valved capsule, with loculicidal dehiscence. Seeds numerous; embryo small, in the base of fleshy albumen. The plants are found in marshy grounds in various parts of the world, and have acid and slightly acrid properties.

Nat. Ord. 22.—Polygalaceæ, the Milkwort order (Fig. 446).—Herbs or shrubs with simple exsti-

pulate leaves. Pedicels have three bracts. and the flowers are irregular, unsymmetrical, and falsely papilionaceous. Sepals five, irregular, odd one posterior, two inner ones (wings) usually petaloid. Petals more or less united, usually three, of which one (the keel) is anterior, larger, and sometimes crested. Stamens 6-8, usually combined into a tube which is split on the upper side; anthers one-celled, opening by pores. Ovary usually two-celled, with a single pendulous, anatropal ovule in each cell; style curved. Capsule flattened with albuminous, carunculate seeds, containing a straight embryo. The order is considered by St Hilaire and others as considered by St Hilaire and others as



Fig. 446.

allied to Sapindaceæ, and some authors place it near Leguminosæ, from which it differs in its hypogynous stamens, and in the odd sepal being superior and the odd petal inferior. The plants are scattered over various quarters of the globe. They are generally bitter and acrid, and their roots yield a milky juice. Polygala Senega, Snake-root, is a North American species, the root of which is used as an emetic, cathartic, and sialagogue.

Nat. Ord. 23.—KRAMERIACEE, the Rhatany order.— The genus Krameria is the only one in this order which differs from Polygalaceæ in the want of the falsely papilionaceous flowers, in its simple one-celled ovary, and in the absence of albumen. Krameria triandra, which yields the Rhatany-root, is a native of South America. The root is very astringent.

Nat. Ord. 24.—Tremandraceæ, the Porewort order.— The plants of this order are slender, heath-like shrubs, with hairs usually glandular. They are allied to Polygalaceæ, and differ in their regular symmetrical flowers, valvate calyx, and hooked appendages at the apex of their seeds. They are found in New Holland.

Nat. Ord. 25.—TAMARICACEÆ, the Tamarisk order.— Shrubs or herbs usually growing by the sea-side, with entire, scale-like leaves, and spiked or racemose flowers. Calyx 4-5-parted, persistent. Petals 4-5, withering, imbricate. Stamens 4-5, or twice that number, free or united; anthers introrse, opening longitudinally Styles three. Fruit, a three-valved, one-celled capsule, with three basal or parietal placentas, bearing numerous anatropal, comose, exalbuminous seeds. Embryo straight. The species abound in the basin of the Mediterranean, and are confined to the northern hemisphere of the Old World. They have an astringent, and slightly bitter and tonic bark.

Nat. Ord. 26.—Frankeniaceæ, the Frankenia order.—

flowers embosomed in leaves. They are allied to Caryo-phyllaceæ, and differ in their parietal placentation, and straight embryo. They have a tubular furrowed calyx, and long-clawed petals with appendicular scales. They occur chiefly in the north of Africa and south of Europe. Their

properties are mucilaginous.

Nat. Ord. 27.—ELATINACEÆ, the Elatine or Waterpepper order.—Small annuals growing in marshes, with opposite leaves, interpetiolary membranaceous stipules, and minute axillary flowers. Sepals and petals 3-5. Stamens as many, or twice as many as the petals, distinct. Fruit a 3-5-celled septicidal capsule. Seeds numerous, attached to a central placenta, exalbuminous; embryo straight. order is perhaps allied to Rutaceæ, in which alliance it is placed by Lindley. The plants are found in all quarters of the globe. Their properties are said to be acrid; hence the English name of the order.

Nat. Ord. 28.—CARYOPHYLLACEÆ, the Clovewort order (Figs. 447 to 449).—Herbaceous plants with stems tumid

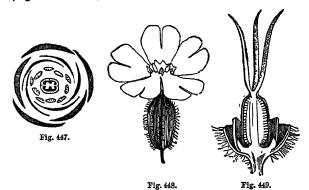


Fig. 447. Diagram of the flower of Dianthus, showing five imbricated sepals, which are united below, five imbricated and contorted petals, ten stamens in two rows, ovary at first with partitions, but finally one-celled with a free central placents.

448. Flower of Lychnis with gamosepalous calyx, five unguiculate and bifid petals having scales at the throat.

449. Flower of Lychnis out longitudinally, showing the capsule with its central placents and numerous ovules. Three out of five styles are left.

at the articulations, entire, opposite leaves, and cymose inflorescence (Fig. 168). Sepals 4-5, distinct or united (Fig. 203). Petals 4-5 (Fig. 448), unguiculate, sometimes 0. Stamens as many, or twice as many as the petals, sometimes fewer. Ovary often supported on a gynophore, usually one-celled, with a free central placenta (Fig. 449). Styles 2-5, papillose on their inner surface. Fruit a capsule opening by 2-5 valves, or by teeth at the apex (Fig. 308), which are twice as many as the stigmas. Seeds usually indefinite; embryo curved round mealy albumen (Fig. 336). The various species of Pink (Dianthus), and Chickweed (Stellaria), are included in this order. The plants are found principally in temperate and cold

Nat. Ord. 29.—VIVIANIACEÆ, the Viviania order.—Herbaceous or suffruticose plants, with opposite or whorled ex-stipulate leaves and regular flowers in corymbose cymes. They are characterized by a ten-ribbed valvate calyx, a marcescent corolla, ten free stamens, a three-celled loculicidal capsule, and albuminous seeds, with a curved embryo.

They are found in South America.

PI.CXIV. Nat. Ord. 30.—MALVACEÆ, the Mallow order (Figs. 450 and 451).—Herbs, shrubs, or trees, with alternate, stipulate, palmately-divided leaves, often stellate hairs, and showy involucrate flowers on axillary peduncles (Fig. 172). Sepals five, rarely three or four, united at the base, valvate, often having an epicalyx. Petals of the same number as the sepals, twisted. Stamens oc, monadelphous (Fig. 451), united to the claws of the petals; anthers one-celled, reniform, in-

Botany. Herbs or undershrubs, with opposite exstipulate leaves, and trorse, opening transversely (Fig. 249); pollen hispid (Fig. Botany. 266). Ovary many-celled, with placentas in the axis; or several ovaries, separate or separable when ripe; styles equal in number to the carpels, distinct or united. Fruit composed

of several monospermal or polyspermal carpels, either combined or separate. Seeds with little albumen; embryo curved with folded cotyledons. The plants abound in tropical regions, and in the hotter parts of the temperate zone. The properties of the Mallowworts are mucilaginous and demulcent. They supply various kinds of fibres. Althæa officinalis, Marsh Mallow, is used medicinally to supply mucilage. Various species of Gossypium
furnish cotton, which consists of the
hairs attached to the seeds. These
hairs are usually hollow cells, but
occasionally they become flattened.

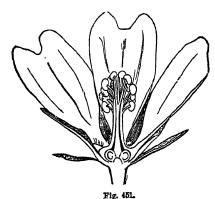
Fig. 450.

Diagram of flower of Mallow, showing three parts of epically or involuce, five parts of the valvate callyx, five ontorted petals, numerous control petals, numerous control



Fig. 450.

There are probably four distinct species of plants furnishing the Cotton of commerce:-1. Gossypium herbaceum, the



Vertical section of the flower of Mallow, showing epicalyx, calyx, corolla, monadelphous stamens, and the carpels.

common Cotton plant of India, a variety of which supplies the Chinese or Nankin Cotton. 2. G. arboreum, the Tree-Cotton of India. 3. G. barbadense, Barbadoes Cotton, called in India Bourbon Cotton; this supplies the highly-esteemed Sea Island Cotton. 4. G. peruvianum of Cavanilles, or G. acuminatum, which supplies the Pernambuco or Brazil Cotton. The inner bark of Hibiscus canabinus furnishes a kind of Sun-hemp in India.

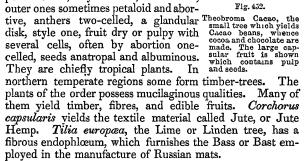
Nat. Ord. 31.—Sterculiaceæ, the Silk-cotton order.— Large trees or shrubs, with simple or compound leaves, and occasionally unisexual flowers, resembling the Malvaceæ in their general characters, particularly in their columnar stamens, but differing in their two-celled extrorse anthers. They are tropical plants. The Sterculiads resemble the Malvaceæ in their properties. Adansonia digitata, the Baobab tree, Monkey-bread or Ethiopian Sour-gourd, is one of the largest trees in the world, its trunk attaining a diameter of 30 feet. Bombax Ceiba, the Silk Cotton-tree, has a cottony matter surrounding its seeds, which is used for stuffing cushions and other domestic purposes. Durio zibethinus, the Durian, yields an edible fruit with a civetlike odour.

Nat. Ord. 32.—BYTTNERIACEÆ, the Chocolate order (Fig. 452).—Trees, shrubs, and undershrubs, with simple leaves, resembling the Sterculiaceæ and Malvaceæ, but differing from the former in their introrse anthers, slightly mona delphous, and often partially sterile stamens; and from the latter in their usually definite not columnar stamens, two celled anthers, and smooth pollen. The fruit is a capsule comFig. 452.

Botany, posed of a few carpels. They are chiefly tropical or subtro-

pical plants. In their properties Byttneriads resemble Malvaceæ. Theobroma Cacao, the Cacao-tree (Fig. 452), is a small tree which abounds in the forests of Demerara. From the seeds called Cacao-beans, the substances called Cocoa and Chocolate are prepared.

Nat. Ord. 33. TILIACEÆ, the Linden order.—Trees or shrubs with alternate leaves having deciduous stipules (Fig. 105), floral envelopes tetramerous or pentamerous, calyx valvate, stamens o, outer ones sometimes petaloid and abor-



Nat. Ord. 34.—DIPTEROCARPACEÆ or DIPTERACEÆ, the Sumatra-Camphor order.—Large trees with resinous juice, alternate, involute leaves, convolute stipules; long winglike, imbricate, unequal, calvx lobes; contorted petals; indefinite, distinct, or polyadelphous stamens, subulate anthers; coriaceous, one-celled fruit, surrounded by the calyx, the enlarged divisions of which form winged appendages; single, exalbuminous seed. Tropical Indian trees. The plants of this order yield a resinous balsamic juice which assumes various forms. Dryabalanops Camphora or aromatica, supplies the hard Camphor of Sumatra, and a resinous oily fluid called the liquid Camphor, or Camphor-oil of Borneo. The wood of Shorea robusta is much used in India under the name of Sál. Vateria indica furnishes the Piney Resin of India.

Nat. Ord. 35.—Chlænaceæ, the Leptolæna order.—Trees or shrubs with alternate, feather-veined, entire leaves, convolute stipules, involucrate flowers, which have three imbricate sepals, five convolute petals, numerous stamens, often monadelphous, a three-celled ovary, a capsular fruit, and albuminous seeds. They are found in Madagascar.

Nat. Ord. 36.—Ternströmiaceæ, the Tea order (Figs. 453 and 454).—Trees or shrubs with alternate coriaceous,



Fig. 454. Fig. 453. Thea Bohea, or Cantonensis, the plant which yields Black and Green
Tea at Canton.
454. Thea viridis, the plant of the best Tea districts of China, which supplies the Black and Green Tea generally used in Britain.

usually exstipulate, and entire leaves, showy and generally unsymmetrical flowers. Sepals 5-7, with imbricate æstivation. Petals 5, 6, or 9, often combined at the base. Stamens, ∞ , distinct or united. Fruit a 2-7-celled capsule, usually with a central column. Seeds large, very few, with

or without albumen. They are ornamental plants, found Botany. chiefly in Tropical America and in Eastern Asia. Those cultivated in Britain are principally from North America and China. The plants of the order have stimulating and slightly narcotic properties. Numerous varieties of Camel-lia japonica are cultivated, which are highly esteemed by florists. Thea is the genus which includes the various species and varieties of Tea. According to Fortune, there are two species of Tea, Thea Bohea (Fig. 453), and Thea viridis (Fig. 454), from each of which Black and Green Tea is manufactured. The latter species is that which supplies the Tea sent from China to Britain. The difference in the appearance and quality of Teas depends partly on the climate and species, but chiefly on the time of gathering, and the mode of manufacture. The young leaves, quickly dried and subjected to a particular kind of manipulation, supply the Green Tea, while the older leaves dried more slowly, and after undergoing a process of fermentation, constitute the Black Tea. In some instances Tea is dyed of a green colour by means of a mixture of Turmeric, Prussian Blue, and Gypsum.

Nat. Ord. 37.—OLACACEÆ, the Olax order.—Trees or shrubs, often spiny, with alternate, exstipulate leaves, a cup-shaped calyx, being enlarged with the fruit and often covering it, five valvate petals, 5-10 stamens, partly sterile, five fertile ones being opposite the petals, a disk, a succulent fruit with a hard endocarp, and an albuminous seed without integuments (exutive). An order of mostly tropical shrubs, containing few species. Some yield edible fruits.

Nat. Ord. 38.—ICACINACEÆ, the Icacina order.—Evergreen trees and shrubs allied to Olacaceæ, but differing in the calyx not enlarging with the fruit, stamens being alternate with the petals, ovary plurilocular, with axile placentation, and seeds having the usual integuments (indutive). The order is chiefly tropical.

Nat. Ord. 39.—CYRILLACEÆ, the Cyrilla order. Evergreen shrubs with exstipulate leaves, allied to Olacaceæ and differing chiefly in their imbricate not valvate petals, which are not hairy. They are found in North America.

Nat. Ord. 40.—AURANTIACEÆ, the Orange order (Figs. 455 and 456). Trees or shrubs with alternate, compound,

exstipulate, dotted leaves (Fig. 133), and fragrant flowers. Calyx short, urceolate or campanulate, 3-5-toothed. Petals, 3-5. Stamens equal in number to the petals, or a multiple of them, inserted along with the petals on a hypogynous disk cylindrical; stigma





Fig. 456.

(Fig. 456); filaments sometimes united in one or more bundles.

Ovary free; style cvlindrical: stigma

thickish. Fruit a hesperidium, sometimes, as in fingered Citrons and horned Oranges becoming monstrous by the separation of the carpels, or by the multiplication of carpels, so that one fruit is included within another. Seeds exalbuminous, often polyembryonous. Chiefly East Indian plants. The leaves and the rind of the fruit contain a volatile fragrant oil, and the pulp of the fruit is more or less acid. Ægle Marmelos, the Indian Bael or Bela, yields a delicious fruit; its root and bark are antispasmodic; the decoction and jelly of the fruit are used in diarrhœa. Citrus Aurantium, the Sweet Orange, has been so generally distributed over different quarters of the globe, that its native country can scarcely be

of the fruit yields an oil called Oil of Orange, while the flowers supply another kind of oil. The pulp of the fruit contains malic acid. C. vulgaris (C. Bigaradia of some authors), the Bitter or Seville Orange, is probably a variety. It differs from the Sweet Orange in the larger wing of its petiole, its more fragrant flowers, its darker fruit, and its more bitter rind and pulp. In the young state, the fruit is known as Orangettes or Curaçoa Oranges. The flowers yield an essential oil called Neroli oil. The distilled water of the flowers has hypnotic qualities. C. Limonum, the Lemon, yields an acid antiscorbutic juice. It contains citric acid. C. Limetta produces the Lime, and var. Bergamia, the Bergamot; C. medica is the source of the Citron; C. Decumana furnishes the Shaddock; C. paradisi the forbidden fruit; C. Pompelmos the Pompelmoose; and C. japonica, the Kumquat of China.

Nat. Ord. 41.—HYPERICACEÆ, the St John's Wort order (Fig. 457).—Herbs, shrubs, or trees, with a resinous juice,

regular flowers, opposite, entire, exstipulate leaves, usually with transparent dots and blackish glands. Sepals 4-5, persistent, two outer often smaller. Petals 4-5, unequal-sided, twisted in æstivation, often bordered with black dots. Stamens generally ∞ and polyadelphous. Carpels 3-5 partially united. Fruit a capsule with septicidal dehiscence. Seeds numerous and exalbuminous. The order is generally distributed both in warm and temperate regions. There are 280 known species. The properties of the plants are usually purgative; some are tonic and astringent. Many species of Hypericum species of H gent. Many species of Hypericum mia yield a gum-resin like Gamboge.



yield a yellow juice and an essential oil. Species of Vis-

Nat. Ord. 42.—GUTTIFERÆ or CLUSIACEÆ, the Gamboge order.—Trees or shrubs with a resinous juice, opposite coriaceous entire leaves, and occasionally unisexual flowers. Sepals and petals 2, 4, 5, 6, or 8, the former often unequal, the latter equilateral. Stamens numerous, often united. Disk fleshy. Ovary one or many-celled.; stigma usually sessile and radiate. Fruit dry or succulent, one or manycelled. Seeds exalbuminous, often immersed in pulp. Natives of humid and hot places in tropical regions, chiefly South America. The properties of the order are in general acrid and purgative. The plants yield a yellow gum re-Cambogia Gutta (Hebradendron cambogioides of Graham) is the source of Ceylon Gamboge. Different species of Garcinia yield a substance like Gamboge. Garcinia cochinchinensis has been said to be the source of the Siam Gamboge, the best commercial specimens of which are in the form of pipe Gamboge, but this is very doubtful. Garcinia elliptica, found in Sylhet and Tavoy, also supplies a kind of Gamboge. Coorg or Wynaad Gamboge is also the produce of a Garcinia, perhaps G. pictoria. Gamboge is used as a pigment and as a drastic purgative. Garcinia Mangostana, a native of Malacca, produces the Mangosteen, one of the finest known fruits. Mammea americana produces the Mammee Apple.

Nat. Ord. 43.—MARCGRAVIACEÆ, the Marcgravia order. Trees or shrubs allied to Guttiferæ, and differing chiefly in their alternate leaves, unsymmetrical flowers, and versatile anthers. Some of the plants have remarkable pitcherlike bracts. They are found in equinoctial America chiefly.

Nat. Ord. 44.—HIPPOCRATEACEE, the Hippocratea order.—Shrubby plants with opposite simple leaves having deciduous stipules. Sepals and petals five, imbricate. Stamens three, monadelphous. Fruit either consisting of three winged carpels or baccate. Brown and Lindley put the or-

Botany. determined. It has been naturalized in Europe. The rind der near Celastraceæ, notwithstanding its hypogynous sta-Botany. mens. They are principally South American plants; some occur in Africa and India. The nuts of Hippocratea comosa are oily and sweet. The fruit of Tontelea pyriformis is eaten in Sierra Leone.

Nat. Ord. 45.—Malpighia order.— Trees or shrubs, often climbing, with opposite or alternate leaves, and short deciduous, sometimes intrapetiolar, stipules; occasionally showing peltate hairs. Sepals five, combined at the base, glandular. Petals five, unguiculate. Stamens ten, often monadelphous. Ovary generally of three carpels. Fruit a drupe, a woody nut, or a samara. Seed orthotropal, suspended by a cord, exalbuminous, embryo straight or curved. Malpighiads are nearly all tropical plants. Their properties are generally astringent. Many are handsome trees or climbers with showy flowers. The wood is sometimes formed in an anomalous manner (Fig.

Nat. Ord. 46.—ERYTHROXYLACEÆ, the Erythroxylon order.—Allied to Malpighiads, and distinguished by the flowers growing from among imbricated scales, the absence of calycine glands, the presence of plaited scales at the base of the petals, and by the ovules being anatropal and cordless. They are West Indian and South American plants. Some of them have stimulating qualities, others yield a tonic bark. Erythroxylon Coca, a Peruvian plant, called Ipadú by the Indians of the Rio Negro, is famed for exciting the nervous system.

Nat. Ord. 47.—ACERACEÆ, the Maple order.—Trees with opposite, simple, often palmate, exstipulate leaves, and corymbose or racemose unsymmetrical flowers. Calyx usually of five parts. Petals as many as the sepals, or none. Stamens generally eight, inserted on or around a hypogynous disk. Ovary of two carpels, more or less united; ovules in pairs. Fruit samaroid. Seed solitary, exalbuminous; embryo coiled. Found in the temperate parts of Europe, Asia, and America. Their properties are saccharine, the trees yield light and useful timber. Acer Pseudo-platanus is the Common Sycamore or Greater Maple, which thrives well even when exposed to the sea. A. saccharinum, the Sugar-Maple, supplies the maple sugar of.America.

Nat. Ord. 48.—Sapindaceæ, the Soapwort order.— Trees, shrubs, or climbers with tendrils, rarely herbs; having alternate or opposite, usually compound leaves, and unsymmetrical, generally irrregular and polygamous flowers. Calyx with 4-5 sepals. Petals 4-5, occasionally 0, sometimes with an appendage inside. Disk fleshy. Stamens usually 8-10. Ovary 2-3-celled; style undivided, or 2-3cleft. Fruit capsular or fleshy, sometimes winged. Seeds exalbuminous, arillate; embryo usually curved. Found chiefly in the tropical parts of South America and India. The Hippocastaneae or Horse-chestnuts, distinguished by opposite leaves (Fig. 131), and two ovules in each cell, one erect, and the other suspended, occur in the north of India, Persia, and the United States. The properties are various. Many of the plants have saponaceous qualities, hence the name of the order. Some are astringent; others yield edible fruits and seeds, and not a few are poisonous. The bark of *Esculus Hippocastanum*, the Horse-chestnut, is febrifugal. *Cupania (Blighia) sapida*, furnishes the Akee fruit, with its remarkable succulent edible arillus. Nephelium (Euphoria) Litchi, supplies the Li-chi fruit of China. Ophiocaryon paradoxum is the Snake-nut-tree of Demerara. Paullinia sorbilis is the Guarana plant, the seeds of which supply an important tonic beverage in

Nat. Ord. 49.—RHIZOBOLACEÆ, the Suwarrow-nut order. -Trees with opposite, digitate, exstipulate leaves. Sepals, 5-6, more or less combined. Petals 5-8, unequal. Stamens ∞ , arising with the petals from a hypogynous disk.

Botany. Fruit of several combined indehiscent, one-seeded nuts. Seed reniform, exalbuminous, with a cord dilated into a spongy excrescence; radicle very large. Found in South America. The plants of the order are large timber trees, some of which yield edible fruit. Caryocar butyrosum (Pehea tuberculosa) is a gigantic tree of Demerara, producing the Souari, Suwarrow, or Surahwa nuts, the kernels of which are esteemed the most agreeable of all the nut kind.

Nat. Ord. 50.—Meliaceæ, the Melia order.—Trees or shrubs with alternate, exstipulate, simple or compound leaves. Sepals 3, 4, or 5, more or less united. Petals, the same number. Stamens twice as many as the petals. Disk, cuplike. Ovary, with cells varying from 3 to 12. Fruit succulent or capsular. Seeds not winged, with or without albumen; embryo with leafy cotyledons. They are chiefly tropical plants, and are found in Asia, America, and Africa. The properties of the order are bitter, astringent, and tonic. Some of the plants act as powerful purgatives and emetics. Melia Azedarachta, the Neem-tree or Pride of India, has febrifugal qualities. The pericarp yields an oil used for lamps.

Nat. Ord. 51.—HUMIRIACEÆ, the Humirium order.— Balsamic trees or shrubs, with alternate, simple, exstipulate leaves. Calyx in five divisions. Petals five, imbricate. Stamens on monadelphous; anthers two-celled, with a membranous connective beyond the lobes. Disk often present. Ovary five-celled. Fruit a drupe. Seed albuminous; embryo orthotropal. Natives of tropical America. The Balsam of Umiri is procured from Humirium floribundum,

by making incisions into its trunk.

Nat. Ord. 52.—CEDRELACEÆ, the Mahogany order.— Trees with alternate, pinnate, exstipulate leaves, allied to Meliaceæ, and chiefly distinguished by their indefinite and winged seeds. The fruit is capsular, the valves separating from a thick axis. They are common in the tropical parts of America and India. The properties of the order are fragrant, aromatic, and tonic. Many yield timber. Cedrela febrifuga has a febrifugal bark. Soymida febrifuga, the Red-wood tree, is febrifugal and astringent. Swietenia Mahagoni, the Mahogany, grows in dense forests, and forms one of the most lofty and gigantic tropical trees.

Nat. Ord. 53.—VITACEÆ or AMPELIDEÆ, the Vine order



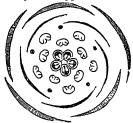
The Vine (Vitis vinifera). showing the leaves with radiating venation, the clusters of flowers, and the tendril or cirrhus, coiled up in a spiral form.

(Fig. 458).—Shrubby plants climbing by tendrils, with tumid joints, simple or compound leaves, opposite below, alternate above, and small green flowers arranged in a racemose or

umbellate manner. Calyx small, nearly entire. Petals 4-5, induplicate, inserted outside a disk, sometimes cohering at their tips, and caducous (Fig. 218). Stamens 4-5, opposite the petals, inserted on the disk (Fig. 238). Ovary usually two-celled, with two erect ovules in each cell. Fruit a uva. Seeds with a bony spermoderm; embryo small in horny The tendrils in this order are abortive branches (Fig. 72). Vineworts inhabit the milder and hotter regions of the globe. They are common in the East Indies The Grape Vine (Vitis vinifera) is said to be a native of the shores of the Caspian, whence it has been widely distributed. The plants of this order have acid leaves and a pulpy fruit more or less acid at first, but developing grapesugar as it ripens. They have frequently large dotted vessels abounding in sap, and they bleed copiously. Spiral vessels with air are common in the Vine.

Nat. Ord. 54.—GERANIACEÆ, the Cranesbill order (Fig. 459).—Herbs or shrubs, with tumid joints, opposite or al-

ternate leaves, usually palmatelyveined and lobed, often stipulate. Sepals 5, imbricate, one sometimes spurred. Petals 5, unguiculate, contorted in æsti-Stamens usually 10, monadelphous, occasionally some sterile. Ovary of five bi-ovular carpels placed round an elonone-seeded carpels, which finally separate from the base of the central axis or beak, and curve upwards by means of the attached styles (Fig. 183); the firmit is conducted. gated axis to which the styles

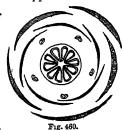


and the long beak or carpophore gives origin to the name of the order. Seed exalbuminous; embryo curved and doubled up, with plaited cotyledons. Distributed over various parts of the world. The species of *Pelargonium* abound at the Cape of Good Hope. The order has astringent and aromatic properties. Many of the plants are fragrant. Some have a musky odour.

Nat. Ord. 55.—LINACEÆ, the Flax order (Fig. 460).-Herbs with entire, sessile, alternate or opposite or verticil-

late leaves, which are exstipulate or have occasionally a pair of minute glands at their base. Flowers regular and symmetrical. Sepals 3-5, imbricate. Petals 3-5, contorted in æstivation. Stamens united at the base, 3-5, usually with intermediate abortive ones in the form of teeth opposite the petals. Ovary 3-5-celled; styles 3-5 (Fig. 278). Fruit a plurilocuar capsule, in which the cells are more or less completely divided into two by spurious divisions proceeding from the dorsal sutures. Seeds, one in each cell, anatropal, Seeds, one in each cell, anatropal,

seeds are demulcent and oilv.



with little or no albumen; embryo straight, cotyledons

flat. Distributed over various quarters of the globe, but most abundant in Europe and the north of Africa. The order is distinguished by its mucilaginous properties, and by yielding valuable fibres. Some species are purgative and diuretic. Linum catharticum,* is called Purging-flax, *Pl. CXV. from its properties. L. usitatissimum,* the cultivated Flax, fig. 1. yields tenacious fibres, used in the manufacture of linen. Its *Pl. CXV.

Nat. Ord. 56.—OXALIDACEÆ, the Wood-sorrel order (Fig. 461).—Herbaceous or shrubby plants with alternate, rarely opposite, simple or compound leaves, and regular

Botany. flowers. Sepals five, imbricate. Petals five, twisted. Stamens ten, more or less monadelphous, of different lengths. Fruit usually a five-celled capsule, sometimes drupaceous. Seeds with a fleshy outer coat, which bursts in an elastic

manner when ripe, so as to expel the seeds; embryo straight and large in thin albumen. The plants are allied to Geraniaceæ, and differ chiefly in their gyncecium. The plants of the order are met with both in hot and in temperate regions. They are very common in America and at the Cape of Good Hope. The shrubby species are confined to warm climates. The Oxalids or Wood-sorrels have generally acid properties, from the presence of oxalic acid in the form of binoxalate of Potass, which is called the salt of sorrel. Some of them have sensitive leaves. Averrhoa Bilimbi, the Blimbing of the East



Fig. 461.

Oralis Acetosella, the common Wood-sorrel, with ternate leaves, and obcordate leaflets. By some it is considered as the true Irish Shamrock.

Indies, has an acid fruit, which is used as a pickle. Oxalis crenata bears tubers which are used as potatoes. O. Deppei has fleshy roots, which are used as culinary vegetables.

Nat. Ord. 57.—Balsaminaceæ, the Balsam order (Fig.

462).—Annual succulent herbs, with simple, exstipulate leaves, and irregular flowers. Sepals five, coloured, irregular, the odd one spurred. Petals five, irregular, distinct or cohering. Stamens five. Ovary of five united carpels; stigmas sessile. Fruit, a capsule opening septifragally by five elastic valves, which become coiled up (Fig. 462). Seeds exalbuminous; embryo straight. The flowers are usually showy. The ripe capsules burst elastically when touched, so as to scatter the seeds; hence the name of Impatiens noli-me-tangere given to one of the species. plants abound in India.



Nat. Ord. 58.—Trop. EOLACE E, the Indian Cress, or Nasturtium order (Fig. 463).—Trailing or

twining herbs, with alternate, exstipulate, and peltate or palmate leaves. Calyx spurred, formed by five united sepals. Petals five, the two upper arising from the throat of the calyx, remote from the three lower unguiculate petals. Stamens usually eight, distinct. Ovary of three united, one-seeded, carpels. Fruit indehiscent,



Fig. 463. monospermal, carpidia separating from a common axis. Seeds exalbuminous, filling the cells; embryo large. They are chiefly South

American plants. The properties of the order are acridity and pungency, resembling in this respect some of the Cru-Tropæolum majus is the common Indian Cress, or garden Nasturtium, the unripe fruit of which is pickled, and used as a substitute for Capers. The roots of T. tuberosum are eaten in Peru.

Nat. Ord. 59.—LIMNANTHAGEÆ, the Limnanthes order. -The plants of this order differ from Tropæolaceæ in their regular flowers, their erect ovules, and in the tendency to Botany. adhesion between the stamens and the calyx. Probably the order should be placed among Perigynous Exogens. It contains a few North American species, which have properties similar to Indian Cresses.

Nat. Ord. 60.—PITTOSPORACEÆ, the Pittosporum order. Trees or shrubs, with alternate, simple, exstipulate leaves. Sepals and petals, 4-5, distinct, or slightly cohering. Stamens five; anthers often porose. Ovary 2-5-celled; style one. Fruit, a capsule or berry. Seeds numerous, anatropal, often covered with a resinous pulp; embryo minute, in fleshy albumen. New Holland plants chiefly. They have more or less resinous qualities. The berries of some Billardieras are eatable. In Cheiranthera linearis the anthers are thrown to one side, and have a hand-like

Nat. Ord. 61.—BrexIACEÆ, the Brexia order.—Trees. with alternate, simple, stipulate leaves, and green flowers in axillary umbels. Calyx five-parted. Petals five, contorted. Stamens five, arising from a narrow cup, with teeth between them. Style one. Fruit drupaceous, five-cornered, five-celled, rough. Seeds numerous, albuminous Madagascar plants, of which little is known.

Nat. Ord. 62.—Zygophyllaceæ, the Bean-caper and Guaiacum order (Fig. 464).—Herbs, shrubs, or trees, with

opposite, stipulate, usually pinnate, not dotted leaves. Calyx 4-5-parted, convolute. Petals unguiculate, at first minute, afterwards large, imbricate. Stamens 8-10, often arising from the back of scales. Ovary 4-5-celled. surrounded by glands or a disk; style simple. Fruit usually a capsule, 4-5angled, opening in a loculicidal manner by 4-5 valves. Seeds usually albuminous (Tribulus is exalbuminous); embryo green. Bean-capers are geembryo green. Dean-capers and some are peculiar to America; others are found in Europe India Africa, and New Hol-



land. The plants have diaphoretic and anthelmintic properties. The wood of the arborescent plants of the order is very hard and durable. Guaiacum officinale (Lignum Vitæ), a West Indian tree, supplies the resin called Guaiac, which exudes from it spontaneously and after The resin and the wood are stimulant and diaphoretic. Zygophyllum Fabago, Bean-caper, is so called on account of its flower-buds being used as substitutes for

Nat. Ord. 63.—RUTACEÆ, the Rue order (Figs 465 and





Fig. 465.

Fig. 465. Diagram of Ruta graveolens, common or garden Rue; showing five divisions of the calyx, five twisted petals, ten stamens in two rows, five divisions of the ovary with two ovules in each.

466. Flower of Rue, showing the hooded petals, the stamens, the hypogynous punctated disk, and the ovary with its carpels; the flower being pentamerous.

466).—Herbs, shrubs, and trees, with exstipulate dotted leaves and perfect flowers. Calyx in 4-5 divisions. Petals 4-5, occasionally 0. Stamens, as many, or twice, or thrice as many, as the petals, placed outside a hypogynous disk. Ovary, sessile or stalked, 3-5-lobed; styles united, occasionally separated at the base. Fruit of several car-

Botany.

Botany. pels, either combined, or more or less distinct, often separating when ripe, and dehiscing by one or both sutures. Seeds, one or two in each carpel; the true Ruteæ (European plants) have albuminous seeds, while the Diosmeæ (from the Cape and New Holland) have exalbuminous seeds. The plants are found in Europe, Cape of Good Hope, New Holland, and America. The order is characterized by its peculiar penetrating odour. The plants are employed medicinally as antispasmodics, tonics, and febrifuges. leaves of Correa alba are used in Australia for tea. Dictamnus Fraxinella, False Dittany, abounds in volatile oil. Diosmas are the Bucku or Buchu plants found at the Cape of Good Hope, which are remarkable for their overpowering and penetrating odour, owing to the presence of a yellowish volatile oil. Galipea officinalis furnishes a tonic, febrifugal bark called Angustura. Ruta graveolens, common Rue, has antispasmodic properties.

Nat. Ord. 64.—XANTHOXYLACEÆ, the Prickly-Ash order. -Trees or shrubs, with exstipulate, dotted leaves, resembling the Rutaceæ, and distinguished by their polygamous flowers. They are chiefly found in tropical America. They have pungent and aromatic qualities, and have been used medicinally as stimulants, sialagogues, and tonics. They yield a volatile oil, and a bitter principle called Xanthopicrine.

Nat. Ord. 65.—OCHNACEÆ, the Ochna order.—A small group of undershrubs or trees allied to Rutaceæ, and distinguished by their simple, dotless, stipulate leaves, and their enlarged fleshy gynobase or torus. They are found in the tropical parts of India, Africa, and America. The order is characterized by bitter, tonic properties. The plants want the aromatic qualities of the Rueworts.

Nat. Ord. 66.—SIMARUBACEÆ, the Quassia order (Fig. 467). - Trees or shrubs, with alternate, exstipulate, dotless, usually compound leaves. Calyx in four or five divisions. Petals 4-5, imbricated. Stamens 8-10, arising from the back of hypogynous scales. Ovary 4-5-lobed, stipitate; style simple. Fruit, consisting of 4-5 drupes arranged around a common receptacle. Seeds, one in each drupe, pendulous, anatropal, exalbuminous. Natives chiefly of the tropical parts of India, America, and Africa. Bitterness prevails in this order, the plants being used as tonics. Picrasma (Picræna) excelsa, Bitterwood, is a large tree, the wood of which is the common Quassia of the shops. It is bitter and tonic, and is sometimes used as a substitute for hops. Quassia amara, (Fig. 467) the true Quassia plant, is a tall shrub found in Surinam, having

Fig. 467. Fig. 467.

Quassia amara, true
Quassia plant of Surinam—a, showing its
impari-pinnate leaves
with winged petioles,
and racemose flowers;
b, its stipitate fruit,
consisting of five
drupes surrounding a
common receptacle
with a simple style.

pinnate leaves with winged petioles. Simaba Cedron is a tree of New Grenada, which has long been celebrated as an antidote to snake bites. The bark of the root of Simaruba amara or officinalis is used as a substitute for Quassia.

Note.—Apetalous species occur in the following Thalamifloral orders:—Ranunculaceæ, Menispermaceæ, Papaveraceæ, Flacourtiaceæ, Caryophyllaceæ, Sterculiaceæ, Byttneriaceæ, Tiliaceæ, Malpighiaceæ, Geraniaceæ, Rutaceæ, Xanthoxylaceæ. Some species belonging to the orders Anonacem and Rutacem are Gamopetalous.

SUB-CLASS II.—CALYCIFLORÆ.

1. Polypetalæ, or Dialypetalæ.

Nat. Ord. 67.—Stackhousiaceæ, the Stackhousia order. -Herbs, occasionally shrubs, with simple, alternate, stipulate leaves. Calyx five-cleft, tube inflated. Petals five,

arising from the top of the calycine tube, claws united. Stamens five, distinct, perigynous. Styles 3-5. Fruit of 3-5 monospermal, indehiscent carpels, with a central column. Seed anatropal, albuminous. The order contains a few New Holland plants.

Nat. Ord. 68.—Celastraceæ, the Spindle-tree order. —Shrubs or trees, with alternate, rarely opposite, simple, stipulate leaves. Sepals and petals 4-5, imbricate. Stamens 4-5, inserted on a large disk which surrounds the ovary. Fruit superior, 2-5-celled capsular or drupaceous. Seeds usually arillate, albuminous, with a large straight embryo. Chiefly natives of the warm parts of Europe, North America, and Asia; also of the Cape of Good Hope. The order is more or less acrid, and some of the plants yield oil. Catha edulis is the Kat or Khât of the Arabs, the leaves of which are stimulant. Celastrus scandens has a purgative and emetic bark. Euonymus europæus, the common Spindle-tree, has a beautiful scarlet arillode.

Nat. Ord. 69.—STAPHYLEAGEÆ, the Bladder-nut order. -Shrubs allied to Spindle-trees, and distinguished by their compound leaves, with stipules and stipels, more or less separate carpels, and a bony spermoderm. Some consider them as having hypogynous stamens, and place them near Sapindaceæ. They are scattered over the globe. They receive the name of Bladder-nut from the membranous inflated fruit of some species, such as Staphylea pinnata-Their bark is often bitter, while their seeds are oily and

Nat. Ord. 70.—CHAILLETIACEÆ, the Chailletia order.— Trees or shrubs with alternate stipulate leaves. Calyx 5parted; æstivation induplicato-valvate. Petals five, alternate with the divisions of the calyx, sometimes united; stamens five, with glands at their base. Ovary superior, 2-3-celled; ovules two, pendulous. Fruit 1-3-celled, dry. Seeds solitary, exalbuminous. Natives of tropical America and Africa, and of the East Indies. Chailletia toxicaria has a poisonous fruit called Ratsbane in Sierra Leone.

Nat. Ord. 71.—RHAMNACEÆ, the Buckthorn order.-Shrubs or trees, often spinose, with simple, alternate leaves, and small flowers. Calyx 4-5-cleft, valvate. Petals 4-5, cucullate or convolute, inserted on the throat of the calvx. sometimes 0. Stamens 4-5, opposite the petals. Ovary sometimes adherent to the calycine tube, immersed in a fleshy disk; ovules solitary. Fruit a capsule, berry, or drupe. Seeds erect, albuminous, not arillate. Generally distributed. The properties of the order are usually acrid and purgative. Some are bitter, tonic, and astringent; others yield dyes. The fruit of some is edible. Hovenia dulcis is remarkable for the enlargement of its peduncles, which become succulent, and are used as a fruit in China. Rhamnus, Buckthorn, is the type of the order. R. ca tharticus yields a cathartic fruit. Jujube paste is pre pared from the fruit of Zizyphus Jujuba and vulgaris. Z. Lotus is the Lote-bush, the fruit of which is used by the

Nat. Ord. 72.—Anacardiace E, the Cashew order (Fig. 468).—Trees or shrubs, with alternate, exstipulate, dotless leaves, and small, sometimes unisexual, flowers. Sepals 3-5, united. Petals 3-5, imbricate. Stamens equal in number to the petals, and alternate with them, or twice as many or more, perigynous or attached to a disk. Ovary one-celled; styles and stigmas usually three; ovule solitary, with a long curved cord attached to a basal placenta. Fruit indehiscent, a nut or drupe. Seed exalbuminous; embryo curved. The order forms a part of the Terebinthaceæ of Jussieu.

Fig. 468.

Diagram of the flower of the slower of the cally, five imbricate petals, five alternating stamens, a one-colled ovary, with a solitary ovule. of the Terebinthaceæ of Jussieu. Chiefly found in tropical America, Africa, and India.

Fig. 468.

* Plate

CXVII.

poisonous juice, which often becomes black in drying. The fruit, however, in some cases is eatable. Anacardium * Pl.CXVI. occidentale, the Cashew-nut, * has a fleshy edible peduncle supporting a nut, the kernel of which can be eaten, while the pericarp is acrid. Mangifera indica produces the Mango, a highly valued tropical drupaceous fruit. Pistacia Lentiscus and atlantica yield the resin called Mastich. P. Terebinthus, the Terebinth-tree, is the source of Chian turpentine. P. vera produces the Pistachio nut. Rhus Toxicodendron, the Poison-oak, has been used as a remedy in paralysis. R. Cotinus, Venetian Sumach, often produces hairs in place of flower-stalks (Fig 158), and is called the Wigtree. Its wood is known as young fustic.

Nat. Ord. 73.—AMYRIDACEÆ, the Myrrh order.—Trees or shrubs, with alternate or opposite compound, occasionally stipulate and dotted leaves. Calyx 2-5-divided. Petals 3-5, valvate. Stamens twice as many as the petals. Ovary 1-5celled, surrounded by an annular disk; ovules in pairs; placenta apicilar. Fruit 1-5-celled, hard and dry; exocarp splitting into valves. Seeds anatropal, exalbuminous. Some consider the order as allied to Aurantiaceæ. Natives of tropical India, Africa, and America. The order abounds in balsamic resin. Some of the plants are bitter, others poisonous. Amyris hexandra and A. Plumieri are two of the sources whence Elemi is procured. Balsamodendron Myrrha, or an allied species, appears to be the source of the Myrrh of commerce, which is an aromatic, bitter gum-resin, containing volatile oil. Boswellia thurifera (serrata) and B. glabra supply Olibanum.

Nat. Ord. 74.—CONNARACEÆ, the Connarus order.— Trees or shrubs with alternate, compound, dotless, and usually exstipulate leaves. Calyx 5-parted, imbricate. Petals 5, usually imbricate. Stamens 10, perigynous or hypogynous, opposite the petals, usually united. Carpels one or more; style terminal; ovules 2, orthotropal. Fruit follicular. Seeds with or without albumen, often arillate. Tropical American plants. The aril of some Omphalobiums is eaten, and Zebra-wood is furnished by O. Lamberti.

Nat. Ord. 75.—Leguminosæ or Fabaceæ,* the Leguminous order (Figs. 469 to

471).—Herbs, shrubs, or trees, with alternate, usually compound, stipulate leaves (Figs. 129, 130). Calyx 5-divided, hypogynous, odd segment inferior (anterior). Petals. usually five, sometimes one or usually five, sometimes one or more abortive, papilionaceous (Figs. 221 and 222), or regular, odd petal (if any) superior (posterior). Stamens definite or indefinite, perigynous, rarely hypogynous, distinct or more than 10 mitted in the control of the calify with the odd segment anterior, five irregular petals, consisting of vexillum, two alse and carine, the odd petal being posterior, ten stamens, diadelphous, and a one-celled overy, which becomes the legume in fruit.



united in one or more bundles (Figs. 470). Ovary superior, one-celled, one or many-seeded, sometimes consisting





Fig. 470. Fig. 471. Fig. 470. Section of the flower of Lathyrus, showing the essential organs inclosed in the carina, and the verillum above.

471. Flower of Cercis Siliquastrum, Judas-tree, showing the vexillum or upper petal interior, as in the sub-order Casalpinies.

of one carpel (Fig. 272), sometimes of two or five. Style and stigma simple. Fruit a legume (Fig. 274), or a drupe. Seeds with or without albumen; embryo with large coty-

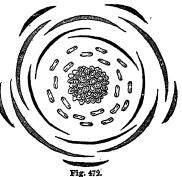
Botany. The plants abound in a resinous, or milky, acrid, and ledons (Fig. 61). The order is a very extensive one, and Bot the plants belonging to it are found in all parts of the world. They are most abundant in warm regions, and diminish on approaching the poles. Leguminous plants have been divided into three sub-orders.—Sub-order 1. Papilionaceæ, petals papilionaceous, imbricate, upper one exterior (Fig. 221). Sub-order 2. Cæsalpineæ, petals imbricated, upper one interior (Fig. 471). Sub-order 3. Mimoseæ, petals valvate in æstivation.

The properties of the order are very various. Some are nutritious, others tonic and astringent, others purgative, and some poisonous. The plants supply timber, fibres, gums, dyes, and various other economical articles. Among the plants of the order may be noticed Beans, Peas, Lentils, Kidney-beans, and Pulse of various kinds, Lupins, Clover, Lucerne, Medick, Saintfoin, Liquorice, Tragacanth, Indigo, Kino. The greater number are more or less nutritious or wholesome. There are, however, some poisonous plants, as *Coronilla varia*, the seeds and bark of Laburnum, the Calabar bean, and others. Eschynomene paludosa supplies Indian Rice-paper, the Shola of India. Astragalus gummifer, verus, and other species, furnish Gum Tragacanth. Butea frondosa, the Dhak-tree or Pulas of India, yields a kind of Kino. Glycyrrhiza glabra supplies Liquorice-root. Indigofera tinctoria, and I. carulea, supply the Indigo of commerce. The Legumes of Mucuna pru-riens and prurita, Cowitch, are covered with irritating hairs, which are used mixed with syrup as a vermifuge. Myrospermum peruiferum yields the Balsam of Peru, and M. toluiferum that of Tolu. Pterocarpus Marsupium, an Indian tree, is the source of Malabar Kino. Cæsalpinia brasiliensis furnishes the Brazil-wood. Divi-divi, or Libi-divi, is the twisted legumes of C. coriaria, which are used in tanning. Species of Cassia, such as C. acutifolia, lanceolata, elongata, and obovata, furnish the various kinds of Senna. Ceratonia Siliqua, the Algaroba-bean or Carob-tree, has an edible legume, which is used as food for horses. Various species of Copaifera yield the West Indian and Brazilian Balsam of Copaiva. Hamatoxylon campechianum, the Logwood-tree, is used as a dye. Tamarindus indica, the Tamarind-tree, contains in its pod a laxative pulp, which is a secretion from the endocarp. Various species of Acacia, such as A. Ehrenbergii, tortilis, vera, and arabica, yield Gum Arabic and Gum Senegal.

Nat. Ord. 76.—MORINGACEÆ, the Moringa order.—This order is considered as allied to Leguminosæ, the plants differing chiefly in their petaloid sepals, stamens arising from a perigynous disk, a pod-like capsular fruit with three valves, three parietal placentas, and loculicidal dehiscence, with the seeds buried in the substance of the valves. Trees with pinnate or tripinnate leaves, found in the East Indies and in Arabia. The properties of the order are usually stimulant

and pungent. Some species yield a fragrant. oil. Moringa pterygosperma, Horse - radish tree, has winged seeds. Its root has the taste of Horse-radish, and its seeds are called Ben - nuts, supplying Ben-oil, used by perfumers and watchmakers.

Nat. Ord. 77.-Ro-SACEÆ, the Rose order (Figs. 472 to 474).—



Trees, shrubs, or herbs, biagram of the flower of the Strawberry, showing five outer calycine segments (epicalyx) five inner segments, odd one superior, tive petals, numerous stamens and carpels.

regular, rarely unisexual, flowers. Calyx 4-5-lobed, sometimes calvculate, fifth lobe posterior. Petals 5 (Fig. 220), Botany. rare y O. Stamens definite or indefinite. Disk lining the tube of the calyx, or surrounding its orifice. Ovaries

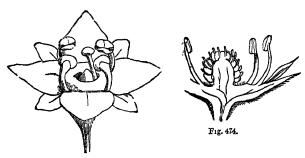


Fig. 473.

Fig. 473. Flower of Alchemilla with a double tetramerous calyx, 4 stamens, and a basilar style.

... 474. Flower of the Strawberry cut vertically, showing calyx, petals, stamens attached to the calyx, numerous one-seeded carpels on an elevated receptacle.

solitary or several, one-celled, with one or few anatropal ovules. Styles lateral (Figs. 288, 473), or terminal. Fruit achenes (Fig. 474), drupes (Fig. 302), follicles (Fig. 273), or pomes (Fig. 325). Seeds one or more, exalbuminous, with a straight embryo having flat cotyledons. This order is generally distributed over the globe, but the species are most abundant in temperate climates, where they supply many important fruits. The following are the divisions of the order: -Sub-order 1. Chrysobalaneæ, trees or shrubs, carpel solitary, cohering more or less to one side of the calvx, ovules two, erect, style basilar, fruit a drupe, stipules not united to the petiole. Ex. Chrysobalanus. Sub-order 2. Amygdaleæ, or Drupiferæ, trees or shrubs, with a deciduous calyx-tube, carpel solitary, free, style terminal, fruit a drupe, stipules not united to the petiole. Ex. Amygdalus, Prunus. Sub-order 3. Roseæ, herbs and shrubs, carpels not adhering to the tube of the calyx, styles terminal or lateral, fruit achenes or follicles, stipules united to the petiole. Under this sub-order there are four tribes:—Tribe I. Spiræidæ, fruit a whorl of follicles, not inclosed within the calycine tube (Fig. 273). Ex. Spiræa. Tribe 2. Potentillidæ (Dryadeæ of some), calyx-tube short or nearly flat, not inclosing the fruit; fruit achenes or drupes (acini), five or more, upon a flat or convex receptacle (Fig. 474 and 184). Ex. Rubus, Fragaria, Potentilla. Tribe 3. Sanguisorbidæ, achenes 1-2, inclosed within the dry calyx-tube, petals often 0 (Fig. 473). Ex. Alchemilla. Tribe 4. Rosidæ, achenes numerous, inclosed within the fleshy calycine tribe, which is contracted at the orifice (Fig. 185). Ex. Rosa. Suborder 3. Pomeæ, trees or shrubs, carpels 1-5, adhering more or less to the tube of the calvx and to each other; fruit a pome; stipules not united to the petiole (Fig. 325). Ex. Pyrus.

Astringent properties are exhibited by the bark and root of most of the plants of the order. Prussic acid occurs in the sub-orders Amygdaleæ and Pomeæ. Many of the plants supply edible fruits, such as the Apple, Pear, Quince, Medlar, Loquat, Plum, Cherry, Peach. Chrysobalanus Icaco, the Cocoa-plum, is a West Indian stonefruit. Amygdalus communis, the Almond-tree, is a native of Asia and Barbary, and is cultivated extensively to the south of Europe. There are two varieties, -one producing sweet, and the other bitter almonds. The kernels of the former contain a fixed oil and emulsine, while those of the latter contain in addition a nitrogenous substance called Amygdaline, which, by combination with emulsine, produces a volatile oil and Prussic acid. Cerasus Laurocerasus, Cherry-laurel, or common Bay-laurel, yields a hydrocyanated oil. Prunus communis is the source of the common Plum. Brayera anthelmintica, Cusso or Kousso, an Abyssinian plant, is used as a vermifuge. Rosa centifolia, the common Cabbage-rose, and its varieties R. damascena and R. moschata, yield a fragrant essential oil, called Attar of Roses, which is distilled from the petals.

Nat. Ord. 78.—CALYCANTHACEÆ, the Calycanthus order.—Shrubs with quadrangular stems, having four woody axes surrounding the central one, opposite, entire, exstipulate leaves, and solitary lurid flowers. Calyx of numerous coloured sepals confounded with the petals, and all united below into a fleshy tube, bearing numerous stamens on its rim. Outer stamens extrorse; inner, sterile. Ovaries several, one-celled, adherent to the calycine tube; ovules one or two. Fruit, achænia inclosed by the calyx. Seed exalbuminous; cotyledons convolute. The plants are found in North America and Japan. Their flowers have an aromatic fragrance, and their bark is sometimes used as a carminative. Calycanthus floridus, Carolina Allspice, furnishes a bark which is sometimes used in place of Cinnamon.

Nat. Ord. 79.—LYTHRACEÆ, the Loosestrife order.—Herbs, rarely shrubs, often with quadrangular branches, with usually opposite, and entire exstipulate leaves. Among the allied exalbuminous perigynous orders it is distinguished by its tubular calyx inclosing a 2-6-celled ovary which is free from it, its united styles, membranous capsular fruit, and stamens inserted on the calycine tube below the petals. The plants are chiefly tropical; some are found in Europe and in North America. Astringency is met with in many plants of the order. Some of them furnish dyes. Lawsonia inermis is the Henna or Alkanna of Cyprus and Egypt, which is used in the East for dyeing the nails, the palms of the hand, and the soles of the feet, of an iron-rust colour.

Nat. Ord. 80.—Rhizophoraceæ, the Mangrove order.—Trees or shrubs, with simple, opposite leaves, having deciduous interpetiolary stipules. Calyx adherent, with 4-12 valvate lobes. Petals 4-12. Stamens twice or thrice as many. Ovary 2-4-celled, with 2 pendulous ovules in each cell. Fruit monospermal, indehiscent, crowned by the calyx. Seed exalbuminous; embryo germinating in the pericarp. The plants grow in the unhealthy maritime swamps of the tropics. Mangroves have usually astringent barks, employed as febrifuges and for tanning. Some are used for dyeing black. *Rhizophora Mangle*, the Mangrove tree (Fig. 67), has remarkable aerial roots. Its bark is used for tanning.

Nat. Ord. 81.—Vochyslaceæ, the Vochysla order.— Trees or shrubs, with their young branches often quadrangular, leaves entire, usually opposite and stipulate. Sepals 4-5, upper one spurred. Petals 1-5, unequal. Stamens 1-5. Fruit a triquetrous, 3-celled capsule, with a central placenta. Seeds exalbuminous, usually winged. Found in equinoctial America. Some of the plants are timber trees.

Nat. Ord. 82.—Combretaces, the Myrobalan order.—Trees or shrubs, with alternate or opposite, entire, exstipulate leaves, often apetalous. They are distinguished from the orders near them by their one-celled ovary, containing 2-4 suspended ovules, but only a single seed in the fruit, and convolute cotyledons. Natives of tropical regions. The plants of this order have astringent properties. Some species are cultivated for ornament; others yield timber. Terminalia belerica, and T. Chebula, yield the astringent fruit known by the name of Myrobalans.

Nat. Ord. 83.—MELASTOMACEM, the Melastoma order.—Trees, shrubs, or herbs, with opposite, ribbed leaves, and showy flowers. The anthers are long, rostrate, and bent down parallel to the filaments in æstivation, lying in spaces between the calyx and ovary. The plants differ from Lythraceæ in the calyx-lobes not being valvate, and from Myrtaceæ in the leaves not being dotted. Memecylon has sometimes been made the type of a separate order on account of its adherent calyx, ribless leaves, and convolute cotyledons. The plants of this order are chiefly tropical. They possess

edible fruits. None are poisonous. Nat. Ord. 84.—Alangiace, the Alangiam order.— Trees or shrubs, with branches often spiny, leaves entire, alternate, exstipulate, and without dots. Čalyx adherent, 5-10-toothed. Petals 5-10, linear, reflexed. Stamens equal in number to the petals, or two or four times as many; filaments villous at the base; anthers adnate, linear. Fruit a drupe adherent to the calyx. Seed anatropal, pendulous, albuminous; cotyledons flat. Natives of India and North America. Many of the plants supply timber; others have edible fruits. Some are aromatic.

Nat. Ord. 85.—PHILADELPHACEÆ, the Syringa order.-Shrubs, with opposite, deciduous, exstipulate, dotless leaves. Calyx adherent, 4-10-lobed, valvate. Petals alternate with the calycine segments. Stamens indefinite. Styles distinct or united. Fruit a half-inferior 4-10-celled capsule, with an axile placenta. Seeds albuminous. The species are scattered over Europe, North America, and India. The flowers of *Philadelphus coronarius*, common garden Syringa, have an overpowering odour, and yield an oil. It is called Mock Orange in America. The leaves of the plant taste like Cucumbers. The leaves of the species of *Deutzia*, especially D. scabra, are covered with beautiful star-like hairs or scales.

Nat. Ord. 86.—MYRTACEÆ, the Myrtle order (Fig. 475). Trees or shrubs, with entire, exstipulate, usually opposite and dotted leaves, often having an intramarginal vein. Calyx adherent (Fig. 476), cleft, sometimes operculate. Petals

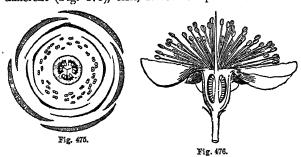


Fig. 475. Diagram of the flower of Myrtus, showing five segments of the calyx, five petals with quincuncial estivation, numerous stamens, a three-celled ovary with seeds attached to a central placents.

... 476. Flower of the Myrtle cut vertically, showing adherent calyx, separate petals, numerous stamens inserted into the calyx, inferior ovary with ovules and a simple style.

4-5, sometimes none. Stamens usually ∞ with long filaments and ovate anthers. Style simple. Fruit baccate in true Myrteæ and capsular in Leptospermeæ. Seeds usually numerous, exalbuminous. Tropical and sub-tropical plants. The plants of this order are generally aromatic, and yield a pungent volatile oil. Some of them are astringent, others yield gummy and saccharine matter. The unexpanded flower-buds of Caryophyllus aromaticus constitute the Cloves of commerce. Eugenia Pimenta bears an aromatic fruit. having the flavour of Cloves, Cinnamon, and Nutmeg, and which, when dried, constitutes Allspice, Pimento, or Jamaica Pepper. The leaves of Melaleuca minor furnish the green pungent oil of Cajeput. Species of Psidium supply the fruit called the Guava. Punica Granatum yields the Pomegra-

Nat. Ord. 87.—CHAMÆLAUCIACEÆ, the Fringe-Myrtle order.—Small heath-like bushes, with evergreen leaves abounding in oil. Allied to Myrtaceæ, but differing in their fringed or feathery calyx, sterile staminal row, and 1-celled ovary. They are fragrant New Holland plants.

Nat. Ord. 88.—LECYTHIDACEÆ, the Monkey-pot order. -Large trees, with stipulate leaves and showy flowers. Allied to Myrtaceæ, but distinguished by their large almondlike seeds, their alternate, dotless leaves, and by their stamens being in part collected into a hooded plate. The fruit

Botany. a slight degree of astringency. Some yield dyes, others is a woody capsule, often with circumscissile dehiscence Botany. (Fig. 311). Natives of the warm regions of South America. Many of the plants yield edible seeds. Their seed-vessels are sometimes used as cups and bowls, and their wood is put to economic uses. The seeds of Bertholletia excelsa are the Brazil or Castanha nuts of the shops. Lecythis ollaria is one of the largest trees in the Brazilian forests. Its seed-vessel receives the name of Monkey-pot-

seeds are called Sapucaya nuts.
Nat. Ord. 89.—Barringtoniaceæ, the Barringtonia order.-Trees or shrubs referred by most authors to the Myrtle alliance, but distinguished by the presence of a large quantity of albumen, alternate, dotless, and often serrated leaves. The fruit is pulpy. Natives of the tropics. The bark of some of the plants is bitter and tonic.

Nat. Ord. 90.—Onagrace E, the Evening-Primrose order

(Fig. 477).—Herbs or shrubs, with alternate or opposite, simple, exstipulate, dotless leaves, and showy tetramerous flowers. Calyx superior, tubular, limb 4-lobed, valvate. Petals usually 4, twisted in æstivation. Stamens epigynous, generally 4 or 8; pollen triangular (Fig. 269). Ovary 2-4-celled; styles united; stigma capitate or 4-lobed. Fruit capsular or baccate. Seeds exalbuminous. Chiefly natives of the temperate parts of America. The plants of this order have mucilaginous and astringent properties. Some yield edible roots and fruits. Fuchsia is remarkable for its coloured calvx and succulent subacid fruit. Enothera, Evening Primrose, is so called, because many of the species open their flowers at night.

Nat. Ord. 91.—HALORAGEACEÆ, the Hippuris or Mare's-tail order.—Herbs or undershrubs, often aquatic, with alternate, opposite, or whorled leaves, and small, frequently incomplete flowers. They may be regarded as an imperfect. form of Onagraceæ, from which they are distinguished by their minute calyx, and their solitary pendulous seeds. They are frequently apetalous, and the stamens are sometimes reduced to one. They are found in all quarters of the globe. Some of the plants of the order yield edible form of Onagraceæ, from which they are

seeds; others have a fragrant odour. Trapa natans, the Water-Chestnut, furnishes edible seeds. T. bicornis has a remarkable horned fruit like the head of a bull.

Nat. Ord. 92.—Loasaceæ, the Loasa or Chili-Nettle order.—Herbs with rigid or stinging hairs, opposite or al-

ternate, exstipulate leaves, and showy flowers. Calyx adherent, limb 4-5parted. Petals 5 or 10, often cucullate. Stamens on, distinct or united in bundles. Ovary 1-celled, with several parietal placentas; style single. Fruit capsular or succulent. Seeds albuminous. American plants, some of which receive the name of Chili-Nettles on account of the stinging property of their hairs.

Nat. Ord. 93.—Cucurbitaceæ, the Gourd order (Figs. 478 to 480).—Succulent climbing plants, with extra-axillary tendrils (in place of stipules), alternate, palmately-veined, scabrous leaves, and unisexual flowers. Calyx adherent, limb 5-toothed or obsolete.

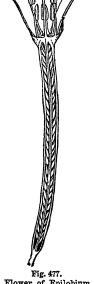


Fig. 478.

Diagram of the male flower of the Melon, showing five divisions of the callyx, five imbricate segments of the corolla, five stamens with sinuous an Ners, four of the stamens being united in pairs, and the fifth one free; in the centre is seen the abortive ovary.

Petals 4-5 usually

Botany.

Botany. united, reticulated. Stamens generally 5, distinct or combined; anthers long and sinuous. Ovary 1-celled, inferior. with 3 parietal placentas; stigmas thick, dilated or fringed. Fruit a pepo (Fig. 324). Seeds flat, exalbuminous; cotyledons leafy. Chiefly natives of hot countries; they abound in India and South America. The plants of the order may be said in general to possess a certain degree of acridity, which is sometimes so marked as to give rise to drastic purgative qualities. In many cases, however, as in the Melon, the Cucumber, the Vegetable Marrow, Gourd, Pumpkin, and Squash, the fruit is edible when cultivated. The seeds are usually harmless. Bryonia alba and B. dioica have large roots, which are powerful purgatives. Citrullus (Cucumis) Colocynthis, Coloquintida, or Bitter Apple (Fig. 480),



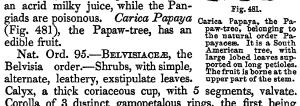


Fig. 479. Diagram of the female flower of the Melon, showing a similar arrangement of the floral envelopes, as in fig. 478, an abortive circle of stamens, and the ovary, with three parietal curved placentaries sending processes towards the centre.
480. Citrullus or Cucumis Colceynthis, the Colceynth plant, with its palmately-veined leaves, cirrhose stipules on one side of the leaf, and a pulpy fruit or Pepo.

has a round fruit, the pulp of which is the Colocynth of the shops. Cucumis sativus, yields the common Cucumber; C. Melo, the Common Melon; Cucurbita Citrullus, the Water Melon, and C. ovifera, Vegetable Marrow. Echalium purgans (Momordica Elaterium), is called Squirting Cucumber, on account of the elastic mode in which its seeds are scattered. The feculence deposited from the juice of the fruit constitutes the hydragogue cathartic called Ela-

Plate figs. 1—5. Nat. Ord. 94.—PAPAYACEÆ, the Papaw order (Fig.

481).—Trees or shrubs often having an acrid milky juice, with alternate, lobed, long-petioled leaves, and unisexual flowers. The plants are distinguished from Cucurbitaceæ by not climbing, and by having a free ovary with 5 placentas and albuminous seeds. The natural order Pangiaceæ may be included, which differs only in having a polypetalous corolla and scales attached to the throat of the female flower. Papayaceæ are chiefly found in South America; Pangiaceæ in India. Many of the Papaw-worts have an acrid milky juice, while the Pan-



Calyx, a thick coriaceous cup, with 5 segments, valvate. Corolla of 3 distinct gamopetalous rings, the first being large and conspicuous, and consisting of 5 lobes, each with 7 ribs and 7 teeth, the second being a narrow membrane cut into sharp pointed segments, the third being an inconspicuous membranous cup finely cut. Stamens 20, in an erect cup-like form, unequally united. Disk fleshy, cuplike, covering the ovary, and standing as high as the stigma.



Ovary 5-celled; ovules 2 in each cell, suspended from an axile placenta; style and stigma pentagonal. Fruit a large round berry crowned by the calyx. Seeds large and reniform. Natives of tropical Africa. The pulp of the fruit is eatable, and the rind contains so much tannin as to be used for making ink; the wood is soft, and contains numerous dotted vessels. Bentham considers the order as a section of Myrtaceæ, while Lindley considers it as allied to Rhizophoraceæ.

Nat. Ord. 96.—Passifloraceæ, the Passion-flower order.—Herbs or shrubs usually climbing by tendrils, with alternate, stipulate, sometimes glandular leaves. Calyx of 5 sepals, united below, the throat bearing 5 petals and filamentous or annular processes. Stamens 5, monadelphous, surrounding the gynophore; anthers extrorse. Ovary free from the calyx, 1-celled; styles 3, club-shaped. Fruit mostly fleshy, stalked, 1-celled, with 3 parietal polyspermous placentas. Seeds albuminous, arillate. They are common in tropical America. Astringent and narcotic qualities appear to prevail in the order. Many of the species, however, produce edible fruits. Passiflora quadrangularis produces the granadilla, a well-known West Indian

Nat. Ord. 97.—Homaliaceæ, the Homalium order.— Trees or shrubs with alternate leaves with or without stipules. Calyx infundibuliform, with 5-15 divisions. Petals equal in number to the segments of the calyx and alternate with them. Stamens arising from the base of the petals, either singly or in bundles of 3 or 6. Ovary adherent, 1-celled; ovules numerous, pendulous; placentas 3-5, parietal; styles 3-5. Fruit a capsule or berry. Seeds albuminous. Tropical plants of India, Africa, and America, having astringent properties.

Nat. Ord. 98.—TURNERACEÆ, the Turnera order.— Herbs, sometimes shrubby plants, having a Cistus-like habit, with alternate, exstipulate, pubescent leaves. Calyx 5-lobed, bearing 5 petals and 5 stamens. Ovary free, 1-celled, with 3 parietal placentas and 3 styles which are often forked or multifid at the apex. Fruit a 3-valved capsule. Seeds albuminous, strophiolate at one side. The plants have astringent, tonic, and occasionally aromatic qualities, and are natives of South America and the West Indies.

Nat. Ord. 99.—PORTULACACEÆ, the Purslane order.— Succulent herbs or shrubs, with alternate or opposite, entire, exstipulate leaves. Calyx of 2 coherent sepals. Petals 5. Stamens variable in number, sometimes opposite the petals; anthers versatile. Ovary 1-celled, formed of 3 united carpels. Fruit capsular, usually dehiscent by valves or by a lid. Seeds numerous, albuminous, attached to a central placenta; embryo peripherical. This order has the stamens sometimes hypogynous, and it has been placed near Caryophyllaceæ by some authors. The plants are found in dry places, in various parts of the world, more particularly in South America and at the Cape of Good Hope. Esculent and antiscorbutic qualities prevail in the order. Some have showy flowers which are ephemeral.

Nat. Ord. 100.—ILLEGEBRACEÆ or PARONYCHIACEÆ, the Knotwort order.-Herbaceous or suffruticose plants, with opposite or alternate, often clustered, sessile, entire, stipulate leaves, and minute flowers. Sepals 3-5, distinct or cohering. Petals small, sometimes 0. Stamens opposite the sepals, if equal to them in number. Ovary superior; styles 2-5. Fruit dry, 1-3-celled, indehiscent or opening by 3 valves. Seeds either numerous and attached to a free axile placenta, or solitary and pendulous from a cord attached to a basal placenta. Seeds albuminous; em bryo curved. This order is by some placed near Caryophyllaceæ, from which it differs in the presence of scarious stipules and in its perigynous stamens. The plants are

Botany. natives chiefly of barren places in the south of Europe and Ovary 1-celled, with parietal placentas; style single; Botany. north of Africa, and their properties are astringent.

Nat. Ord. 101.—CRASSULACEÆ, the Stonecrop order (Fig. 482 and Fig. 217).—Succulent herbs or shrubs, with exstipulate leaves and cymose, often secund flowers. Sepals 3-20, more or less combined. Petals 3-20, separate or united. Stamens equal in number to the petals, or twice as many. Carpels 1-celled, of the same number as the petals, having hypogynous scales at their base. Fruit follicular. Seeds numerous, albuminous. Natives of dry places in all parts of the world.

The many plants of the world.

The provide in many plants of Acridity prevails in many plants of



Fig. 482.

this order. Some species are refrigerant, others astringent. Bryophyllum calycinum has a gamopetalous corolla, and produces marginal buds on its leaves (Fig. 141). Sedum Telephium has been employed in diarrhoea as an astringent. S. acre, Biting Stonecrop, possesses acridity, and has emetic

and purgative properties.

Nat. Ord. 102.—Mesembryanthemaceæ or Ficoideæ, the Fig-Marigold order.-Succulent shrubs or herbs, with opposite simple leaves and often showy flowers. Sepals 4-8, more or less united. Petals and stamens ∞. Capsule usually many-celled, opening in a stellate manner; placenta central or parietal. Seeds numerous, albuminous; embryo curved or spiral. Natives of the hot sandy plains of the Cape of Good Hope; a few also are found in Europe, South America, and China. Some of the plants are esculent, others furnish alkaline matter, while a few are diuretic. Mesembryanthemum crystallinum is called the Ice-plant, on account of the watery vesicles on its surface.

Nat. Ord. 103.—Tetragoniaceæ, the Tetragonia order. -Succulent plants nearly allied to Fig-Marigolds, but differing in the want of petals and in having definite stamens. The fruit is either an indehiscent nut or a pyxidium. They are found in the South Sea Islands, the Mediterranean, and the Cape of Good Hope. Many of them are saline, others are esculent. Tetragonia expansa is used as Spinage in New Zealand.

Nat. Ord. 104.—CACTACEÆ, the Cactus order (Figs.

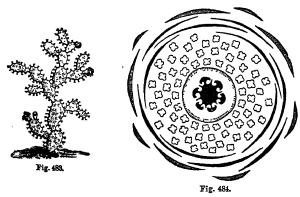


Fig. 483. Opuntia vulgaris, Prickly Pear, or Indian Fig, with its succulent jointed stem and stellate spines.

... 484. Disgram of the flower of Opuntia, showing numerous sepals and petals, which pass insensibly into each other, indefinite stamens (often 300 or 400), and a one-ciled overy formed of several carpels, with parietal piscentas.

483 and 484).—Succulent often spiny herbs, with remarkable stems, which are angular, two-edged, or leafy, and have their woody matter often arranged in a wedge-like manner. Calyx of numerous sepals combined and epigynous. Petals indefinite. Stamens co, with long filaments.

stigmas several. Fruit baccate. Seeds exalbuminous. Natives of America. The fruit of many of the Indian Figs is subacid and refreshing. In some instances, it is sweetish and insipid. The stems of some of the species are eaten by cattle. The plants of the Cactus tribe present remarkable stems; sometimes spherical (Fig. 142), sometimes articulated or jointed (Fig. 483), and sometimes assuming the form of a tall upright polygonal column. Cercus grandiflorus is a night-flowering plant, so is also C. nycti-calus and some other species. Opuntia cochinellifera, the Nopal plant, affords nourishment to the Coccus Cacti or Cochineal insect in Mexico and Peru.

Nat. Ord. 105.—Grossulariaceæ, the Gooseberry order.—Shrubs which are either spiny or prickly or unarmed, with alternate palmately-lobed leaves without true stipules. Calyx-tube adherent to the ovary, limb 4-5lobed, sometimes coloured. Petals small, 5. Stamens 5. Ovary 1-celled, with 2 parietal placentas; styles more or less united. Fruit a berry, crowned with the remains of the flower, with two parietal placentas (Fig. 323). Seeds numerous, albuminous; embryo minute. Natives of the temperate regions of Europe, Asia, and America. Wholesome plants, furnishing often edible fruits, containing malic and other organic acids. *Ribes Grossularia*, the Gooseberry; *R. nigrum*, the Black Currant; *R. rubrum*, the Red Currant, furnish valuable fruits.

Nat. Ord. 106.—ESCALLONIACEÆ, the Escallonia order -Evergreen shrubs, often odoriferous, with alternate exstipulate leaves, allied to the last order, and differing from it in their capsular bicarpellary fruit, epigynous disk, axile placentas, and oily albumen. By some they are placed among Saxifrages, from which they differ in their simple style and oily albumen. Natives chiefly of South America. Escallonias attain a high elevation on the mountains.

Nat. Ord. 107.—Saxifragaceæ, the Saxifrage order (Fig. 485).—Herbs with alternate leaves. Calyx of 4-5

more or less cohering sepals. Petals 5 or 0. Stamens 5-10. Ovary more or less completely inferior, consisting of 2 carpels which diverge at the apex. Fruit a 1 or 2-celled capsule. Seeds numerous; embryo straight in fleshy albumen. Natives of northern alpine districts. Their properties are astringent. Heuchera americana is called alum-root on ac-count of its astringency.

Nat. Ord. 108.—Hydranace.

Diagram of the flower of Saxi-fraga tridactylites, with 5 di-visions of the calyx, 5 petals, 10 stamens in 2 rows, and a

Nat. Ord. 108.—HYDRANGE-ACEÆ, the Hydrangea order.-



Fig. 485.

bicarpellary pistil with nu-merous ovules.

Shrubs with simple exstipulate leaves, often considered as a sub-order of Saxifragaceæ, but differing in their opposite leaves, their tendency to form abortive radiant flowers, and in the carpels being often more than two. Natives of the temperate regions of Asia and America. Hydrangeas from China and Japan are commonly cultivated. Some of the species are used instead of Tea.

Nat. Ord. 109.—CUNONIACEÆ, the Cunonia order.— Trees or shrubs allied to Saxifragaceæ, and differing in their shrubby growth, opposite leaves, and interpetiolar stipules. The latter character separates them from Hydrangeas, which are exstipulate. Natives of the Cape of Good Hope, South America, the East Indies, and Australia. Their properties are astringent.

Nat. Ord. 110.—BRUNIACEÆ, the Brunia order.—Heathlike shrubs, with small, rigid, entire leaves. Calyx usually superior, 5-cleft. Petals and stamens 5; anthers extrorse. Ovary 1-3-celled, with 1-2 suspended ovules in each cell; style simple or bifid. Fruit either dehiscent and 2-celled, or indehiscent and 1-celled. Seeds solitary or in pairs; Botany. embryo minute, in fleshy albumen. Natives chiefly of the feræ, from which they differ in having the ovary composed Botany.

Cape of Good Hope.

Nat. Ord. 111.—HAMAMELIDACEÆ, the Witch-Hazel order.—Trees or shrubs, with alternate, feather-veined leaves, having deciduous stipules. Calyx 4-5-divided. Petals 4, 5, or 0. Stamens 8; anthers introrse. Ovary 2-celled, inferior; ovules solitary or several; styles 2. Fruit a 2-valved loculicidal capsule. Seeds pendulous, albuminous. Natives of North America, Asia, and Africa. Rhodoleia Championi is a showy plant, with red involucral leaves, found in China. Hamamelis virginica furnishes edible oily seeds.

Nat. Ord. 112.—Umbelliferæ or Apiaceæ, the Umbelliferous order,* (Figs. 486, 487).—Herbs with solid or

*Plates CXIX., CXX., and CXXI.

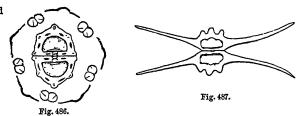


Fig. 486. Diagram of the flower of Fœniculum vulgare, common Fennel. The calyx limb is obsolete; there are 5 petals, 5 alternating stamens, and a cremocarp consisting of two achenes or mericarps united by their faces, with 5 primary ridges or jug4, and valleouize between them. There are 4 vittes on each side marked by dots between the ridges, and 2 on each side of the commissure. The albumen is solid, not furrowed or involute at the suture.

487. Transverse section of cremocarp or fruit of Angelica, showing the hemicarps or achenes forming it. There are 5 ridges on each achene, and the two lateral ones expand into long wings. The albumen is solid.

hollow stems, alternate leaves generally compound and sheathing at the base, and umbellate involucrate flowers (Fig. 163). Calyx adherent to the bicarpellary ovary, limb 5-toothed or obsolete. Petals 5, inflexed at the point (Fig. 319), often unequal, the outer ones being radiant. Stamens 5, alternate with the petals, and inserted with them on the outside of an epigynous disk or stylopod (Fig. 319). Styles 2. Fruit a cremocarp (diachænium), the 2 carpels or mericarps separating when ripe by their inner faces or commissure, and being suspended by a forked carpophore (Fig. 320); the carpels marked with ribs or ridges called juga and intervening spaces called valleculæ, and often containing vittæ. Seed solitary, pendulous; embryo mi ute, in the base of horny albumen. The Sections formed from the nature of the albumen, whether flat or curved, are not now adopted, inasmuch as they are found to be unsatisfactory. In the genera, the ridges on the fruit, the presence or absence of vittæ, and the form of the albumen, are taken into account. The umbels are sometimes reduced to a sort of head by the absence of peduncles. Natives of the northern parts of the northern hemisphere, and found high on the mountains of the tropics.

The properties of Umbelliferous plants are various. Some are harmless and esculent, such as the Carrot, Parsnip, Skirret and Parsley; others are acro-narcotic poisons, as Hemlock; a third set are antispasmodic, owing to the presence of a gum-resin containing a fetid sulphur oil, such as Assafœtida; while a fourth set are carminative from containing a volatile oil, as Caraway (Carum Carui), and Coriander (Coriandrum sativum). Conium maculatum, Hem-PI. CXX. lock,* used medicinally as an anodyne, contains a very active volatile oleaginous alkali called Conia, which causes death by paralysing the muscles of respiration. Dorema Ammoniacum, or Diserneston gummiferum, a Persian plant, yields gum Ammoniac. Narthex Assafætida, a plant found in Persia and Affghanistan, furnishes the true Assafætida. Opoponax Chironum, or Pastinaca Opoponax, produces the gum-resin called Opoponax.

Nat. Ord. 113.—Araliaceæ, or Hederaceæ, the Ivy order.—Trees, shrubs, or herbs with the habit of Umbelli-

of more than 2 carpels which do not separate in fruit, but become drupaceous or baccate, and in having fleshy in place of horny albumen. They are found in tropical and sub-tropical regions. The properties of the order are aromatic, stimulant, and tonic. Aralia papyrifera, Bokshung of China, found in the island of Formosa, is the plant which supplies the Chinese Rice paper. The black berries of *Hedera Helix*, common Ivy, are emetic and purgative. Panax Schinseng is the Asiatic Ginseng root, extravagantly prized by the Chinese as a stimulant and restorative.

Nat. Ord. 114.—Cornaceze, the Cornel order.—Chiefly trees or shrubs, with leaves almost always opposite and exstipulate; flowers in cymes or in involucrate heads. Calyx adherent, limb 4-toothed. Petals 4, valvate in æstivation. Stamens 4, alternate with the petals. Styles united into one. Ovary 2-celled; ovules solitary, pendulous. Fruit a 2-celled drupe. Embryo in fleshy albumen. Natives of the temperate regions of Europe, Asia, and America. The plants of this order have tonic and febrifugal properties. Some are astringent. The bark of various species of Cornus, as C. florida, C. sericea, and C. circinata, are used as substitutes for Cinchona in the United States.

2. Monopetalæ or Gamopetalæ.

Nat. Ord. 115 .- LORANTHACEE, the Mistleto order (Fig. 488).—Parasitic shrubs with articulated branches, opposite

exstipulate fleshy leaves, and hermaphrodite or unisexual flowers. Calvx tube adherent to the ovary, bracteated. Corolla of 4-8 united petals. Stamens 4-8, opposite the petals. Ovary 1-celled; ovule solitary, pendulous. Fruit inferior, succulent. Albumen fleshy. In place of one order, Miers makes two, Loranthaceæ and Viscaceæ. Loranthus, which is the type of the first, has showy dichlamydeous hermaphrodite flowers, lengthened stamens, and an ovary containing a solitary suspended ovule; while Viscum (Fig. 488), the type of the second, has small, monochlamydeous, diœcious flowers, with nearly



Fig. 488. Viscum album, the Mistleto, a parasitic plant, illustrating the natural order Loranthaceæ. By some it is placed in a Monochlamy-deons order called Visca-

sessile stamens, and an ovary containing 3 ovules attached to a free central placenta, one of the ovules only being perfected in the baccate fruit. The order Viscaceæ is placed near Santalaceæ. Natives chiefly of the equinoctial regions of Asia and America; a few are European and African. Astringent properties prevail in the order. The plants are truly parasitic, and they have often a peculiar woody structure with scalariform vessels. Occasionally 2 or 3 embryos are produced in the seed.

Nat. Ord. 116.—CAPRIFOLIACEE, the Honeysuckle order.-Shrubs or herbs, often twining, with opposite, exstipulate leaves (Fig. 137). Calyx adherent to the ovary, limb 4-5-cleft, usually bracteated. Corolla regular or irregular. Stamens 4-5, alternate with the corolline lobes. Ovary 3-5-celled; stigmas 3-5. Fruit usually a berry, one-celled, crowned by the calyx-lobes. Albumen fleshy. Natives chiefly of the northern parts of Europe, Asia, and America. Some of the plants are astringent, others have emetic and purgative properties. Many have showy and fragrant flowers. Lonicera Periclymenum, common Honeysuckle or Woodbine, possesses emetic and purgative qualities. The flowers of Sambucus nigra, common Elder, yield a volatile oil, and the berries are used in making a kind of wine.

Nat. Ord. 117.—CINCHONACEE, the Cinchona order

Botany.

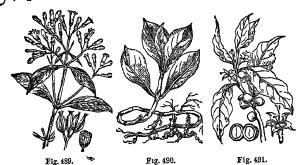


Fig. 489. Cinchona, the genus whence the order is named. It embraces the species of Peruvian or Jesuit's Bark. The plants have opposite leaves and interpetiolar stipules, with a 2-celled seed-vessel, and flowers in corymbose cymes.

490. Cephaelis Ipecacuanha, with its annulated root.

491. Coffea at abota, the Coffee tree, a native of Arabia and the confines of Abyssinia. It has a succulent reddish-brown fruit and horny albumen, which, when roasted, supplies the beverage called Coffee.

opposite leaves, interpetiolar glandular stipules and cymose inflorescence. Calyx adherent, entire, or toothed. Corolla regular. Stamens attached to the corolla. Ovary 2-celled; style 1. Fruit inferior, separating into 2 cocci, or indehiscent and dry, or succulent. Seeds definite and erect or ascending, or indefinite and attached to a central placenta; embryo small, in horny albumen. Chiefly found in tropical regions. This extensive order furnishes many important products. The plants have tonic, stimulant, febrifugal, emetic, and purgative properties. Some species are said to have intoxicating and even poisonous qualities. Many of the plants of the order have flowers remarkable for their beauty and odour. Cephaelis Ipecacuanha (Fig. 490) has an annulated root which is the Ipecacuan of the Pharmacopœias. It is emetic and diaphoretic, and contains a principle called Emetine. Cinchona (Fig. 489), is the genus which furnishes the species of Peruvian-bark trees. They contain three important alkalies, Quinine, Quinidine, and Cinchonine, combined with Kinic acid, and a peculiar variety of tannin. Coffee arabica (Fig. 491), the Coffee tree, has a succulent fruit of a reddish-brown colour when ripe. The hard albumen is used to furnish the well-known beverage. It contains a bitter principle called Caffeine, which is identical with Theine. An astringent extract called Gambeer is prepared by the Malays from the leaves of Uncaria Gambir.

Nat. Ord. 118.—Galiaceæ or Stellatæ, the Madder

order (Fig. 492).—Herbs agreeing in most points with Cinchonaceæ, and often included with them in a common order called Rubiaceæ. The chief distinguishing marks are their square stems, verticillate and exstipulate leaves. The name Stellatæ is derived from the star-like arrangement of the leaves. Some look upon the verticils as made up partly of true leaves, and partly of stipules. Natives of the northern parts of the northern hemisphere and of high mountains in South America and

Fig. 492. Diagram of the flower of Madder with the rim-like calycine limb, 5 parts of the corolla, 5 stamens, and a 2-celled and 2-seeded overy.

Australia. The plants supply important dyes. Some have tonic and diuretic properties. The horny albumen of Galium Aparine has been used for Coffee. Rubia tinctorum, Madder root, is a most important dye-stuff used in giving the colour called Turkey-red. The roots of R. cordifolia (Munjista) furnish the dye called Munjeet in India.

Nat. Ord. 119.—VALERIANACEE, the Valerian order,* (Figs. 493 to 495).—Herbs with opposite exstipulate leaves and cymose inflorescence. Calyx superior (Fig. 494), limb obsolete or forming a kind of pappus (Fig. 495). Corolla tubular, 3-6-lobed, sometimes gibbous, or spurred at the base (Fig. 494). Stamens 1-5, inserted on the corolla. Ovary

(Figs. 489 to 491).—Trees, shrubs, or herbs, with simple with one cell and 2 abortive ones; ovule solitary. Fruit Botany. dry and indehiscent, with 1 fertile cell, sometimes pappose (Fig. 495). Seed suspended, exalbuminous. Natives of temperate climates in Europe, Asia, and America. Many

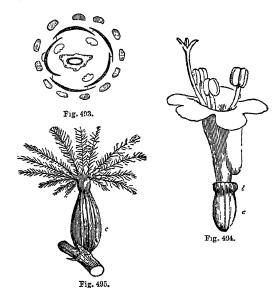


Fig. 493. Diagram of Valerian, showing calycine feathery pappus, 5 lobes of the corolla, one gibbous, 3 stamens, and one perfect ovarian cell with a single ovule.

494. Flower of Valerian, with adherent calycine tube, I, obsolete limb, c, which becomes pappose, irregular corolla gibbous at the base and with a 5-lobed limb, 3 stamens, and one style with 3 stigmas.

495. Fruit, c, of Centranthus ruber, Ited Valerian, indehiscent, containing one perfect seed (2 others being abortive), and having a feathery pappose calyx-limb at the apex, I.

of the plants in the order are strong-scented or aromatic, owing to the presence of a peculiar volatile oil. In medicine, they are employed as tonics and antispasmodics. The leaves of Centranthus ruber, Red Valerian, are used as a salad. Nardostachys Jatamansi appears to be the plant which supplied the ancient Spikenard. Valeriana officinalis* furnishes the Valerian root of the druggists. which *Plate yields Valerianic acid, and is used as an antispasmodic in CXXII.

nervous affections.

Nat. Ord. 120.—DIPSACACEE, the Teazel order.—Herbs or undershrubs, with opposite or whorled, exstipulate leaves, and flowers in capitula surrounded by an involucre. Calyx adherent, membranous, surrounded by an involucel. Corolla tubular, with an oblique 4-5-lobed limb. Stamens 4, anthers distinct. Ovary 1-celled; ovule pendulous. Fruit dry, indehiscent, crowned by the pappus-like calyx. Seed albuminous. Natives of the south of Europe, the Mediterranean, and the Cape of Good Hope. Some of the species are used in dressing cloth. Astringent qualities reside in some of the plants. The dried heads of Dipsacus Fullonum, Fuller's Teazel, with their uncinate spiny bracts, are used by fullers.

Nat. Ord. 121.—CALYCERACEÆ, the Calycera order.— A small order of herbs with alternate exstipulate leaves, and capitate flowers, intermediate between Dipsacaceæ and Compositæ, differing from the former in their united filaments and partially united anthers, and from the latter in their pendulous ovule, albuminous seed, and in their anthers. They inhabit the cooler parts of South America.

Nat. Ord. 122.—Compositze or Asteraceze, the Composite order (Figs. 496 to 499).—Herbs or shrubs with alternate or opposite, exstipulate leaves, and hermaphrodite or unisexual flowers (called florets) collected into dense capitula on a common receptacle (Figs. 496 and 174), and surrounded by a set of bracts (called phyllaries), forming an involucre (Fig. 151), the separate florets being often furnished with bractlets in the form of chaff (called squamæ or paleæ). Calyx adherent, limb entire or toothed, or mostly

*Plate CXXIL Botany. expanded into a pappus (Fig. 228). Corolla regular or irregular (Figs. 497 and 498). Stamens 5; anthers syn-

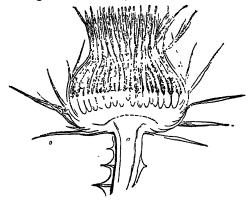


Fig. 496. Capitulum of Onopordum Acanthium, called Scotch Thistle by gardeners, showing involucre b, receptacle a, and florets f.

genesious (Fig. 252). Ovary single; style 1, bifid at the apex when fertile (Fig. 498); stigmas on the inner surface of each branch of the style (Fig. 499). Fruit an achene,



Fig. 497. Fig. 498. Fig. 499.

Fig. 497. Tubular gamopetalous corolls of Milfoil (Achillæa) with an inferior ovary, and an obsolete calyoine limb.

... 498. Ligulate flower of Milfoil (Achillæa), with the forked style projecting beyond the tube. There is no pappus. The flower is pistilliferous (femals)

(female).

(female).

499. Style of Achillæa Millefolium, Milfoil, forking so as to form 2 papillose stigmatic surfaces, which are curved outwards.

crowned with the limb of the calyx (Fig. 155). Seed solitary, erect, exalbuminous; embryo straight. The plants are found in all parts of the world. In warm countries they sometimes assume arborescent forms. There are between 9000 and 10,000 known species.

The plants of this very extensive order have been variously divided by authors. They were included by Linnæus in his class Syngenesia, the divisions of which have been already given. By Jussieu the following divisions have been established:-1. Cichoraceæ, the florets all ligulate and perfect. Ex. Cichorium. 2. Cynarocephalæ, the florets all tubular, homogamous, or those of the ray neuter; style swollen below its branches. Ex. Carduus. 3. Corymbiferæ, florets of the same head all homogamous (usually tubular); or those of the circumference filiform or tubular and pistilliferous, or ligulate; style of the perfect florets not swollen below its branches. Ex. Anthemis. De Candolle gives the following primary divisions:-1. Tubulifloræ (embracing Cynarocephalæ and Corymbiferæ of Jussieu), hermaphrodite flowers, tubular, with 5, rarely 4, equal teeth. 2. Labiatifloræ, hermaphrodite flowers, or at least the unisexual ones, two-lipped. This includes chiefly some peculiar American genera. 3. Ligulifloræ (Cichoraceæ of Jussieu), all the florets hermaphrodite and ligulate. Under these suborders De Candolle formed tribes from the form and nature of the style and stigma, attention being paid to the mode in which the branches of the style separate, the nature and extent of the papillæ, and the hairs on the stigmatic surface and on the style, &c.

The properties of Composite plants are various. Bitterness seems to prevail in the order to a greater or less degree. This is accompanied with tonic, stimulant, aromatic, or even narcotic qualities. Cichorium Intybus Chicory, or Wild Succory (Fig. 375), is much cultivated,

especially in France and Germany. Its roots are used as a substitute for Coffee, or as an addition to it. C. Endivia is the Endive or garden Succory, the leaves of which are used as a salad when etiolated. Lactuca virosa,* Wild Lettuce, *Plate gives out abundantly a white juice which, when inspissated, CXXIII. constitutes the anodyne narcotic called Lactucarium, or Lettuce-opium. L. sativa, common Lettuce, also yields a similar juice. Leontodon Taraxacum,* common Dandelion, has *Plate a milky juice which, when concrete, has been used medi-CXXIV. cinally as a diuretic, and economically as Coffee. The dried flowers of Carthamus tinctorius, Safflower, yield a pink dye. Cynara Scolymus, or the common Artichoke, has a succulent receptacle, which is used for food. Anacyclus Pyrethrum, Pellitory of Spain, is used medicinally to promote the flow of saliva. The flowers of Anthemis nobilis, Chamomile, act as an emetic and diaphoretic; the extract is bitter tonic. Arnica montana, Leopard's-bane, or Mountain Tobacco, has been given in nervous diseases as an acrid stimulant. Artemisia Absinthium, and other species of Wormwood, are bitter stomachic, and anthelmintic.

Nat. Ord. 123.—Brunoniaceæ, the Brunonia order.— Herbs with radical exstipulate leaves, and capitulate, involucrate flowers supported on scapes. Calvx free, in 5 divisions. Corolla 5-parted, inserted at the base of the calyx. Stamens inserted with the corolla. Ovary 1-celled; ovule solitary; stigma inclosed in a 2-valved cup. Fruit a utricle, inclosed in the hardened calycine tube. Seed erect, exalbuminous. Australian plants.

Nat. Ord. 124.—GOODENIACEÆ, the Goodenia order.— Herbs, rarely shrubs, not lactescent, with scattered exstipulate leaves, and distinct, not capitate flowers. Calyx usually superior, 3-5-divided. Corolla more or less superior, usually irregular, with a split tube and a 5-parted lipped limb; æstivation conduplicate. Stamens 5, separate. Ovary 1-2celled; placenta free, central; stigma surrounded by an indusium. Fruit capsular or drupaceous. Seeds albuminous. Natives chiefly of Australia, and the islands of the southern ocean. Some of the plants are used as esculent vegetables, and their pith is employed for economical purposes. Scavola Taccada furnishes Rice-paper in the Malay Archipelago.

Nat. Ord. 125.—STYLIDIACEÆ, the Stylewort order (Fig. 380).—Herbs or undershrubs, with scattered or whorled exstipulate leaves. Calyx adherent, with 2-6 divisions. Corolla usually irregular, 5-6-divided; æstivation imbricate. Stamens 2; filaments united with the style into a column; anther-lobes on the top of the column lying over the stigma. Ovary usually 2-celled, often with 1 or 2 epigynous glands in front. Fruit usually a 2-celled and 2-valved capsule. Seeds albuminous. Peculiar plants, remarkable for their gynandrous structure and for their irritable column. Natives chiefly of the swamps of Australia.

Nat. Ord. 126.—Campanulaceæ, the Hare-bell order







Fig. 501.

Fig. 500. Diagram of the flower of Campanula Rapunculus, Rampion, showing 5 divisions of the calycine limb, 5 reduplicately-valvate divisions of the corolla, 5 stamens, alternating with the corolline lobes, and a 3-celled ovary.

... 501. Vertical section of the flower of Campanula Medium; superior calyx, ovary with central placenta and numerous seeds, stamens with filaments dilated at the base, and anthers applied to the collecting hairs on the style.

(Figs. 500 and 501).—Lactescent herbs or undershrubs,

with alternate exstipulate leaves, and usually showy blue or white flowers. Calyx superior, limb commonly 5-cleft, persistent (Fig. 501). Corolla regular, campanulate, usually 5-lobed, marcescent (Fig. 501 and Fig. 219). Stamens 5, distinct. Style with collecting hairs (Fig. 384). Fruit a 2 or many-celled capsule, loculicidal, dehiscing by openings at the sides or by valves at the apex. Seeds numerous, albuminous, attached to a central placenta. Chiefly natives of the northern parts of Europe, Asia, and North America. Those with capsules opening by lateral pores appear to be natives of the northern hemisphere; those with apicilar valves, of the southern. The Belloworts have an acrid milky juice, but occasionally the young shoots and roots are cultivated as articles of food. Campanula Rapunculus, Rampion, is used as an esculent vegetable.

Nat. Ord. 127.—LOBELIACEÆ, the Lobelia order.—Lactescent herbs or shrubs, with alternate, exstipulate leaves. Calyx superior, limb often 5-lobed. Corolla irregularly 5-lobed, often deeply cleft. Stamens 5, epigynous, synantherous. Stigma fringed. Fruit capsular, 1 or more celled, dehiscing at the apex. Seeds numerous, albuminous. Natives chiefly of tropical or sub-tropical climates. The Lobeliads have usually an acro-narcotic milky juice, and hence the species are often poisonous. The milky juice is sometimes used for caoutchouc. Lobelia inflata, a North American species, is used medicinally under the name of Indian Tobacco, as an antispasmodic and sedative, as well as an

Nat. Ord. 128.—Styracaceæ or Symplocaceæ, the Storax order.—Trees or shrubs, with alternate, exstipulate leaves, usually with stellate tomentum. Calyx free, persistent, with 5 or 4 lobes, or entire. Corolla 5 or 10-divided. Stamens definite or indefinite, arising from the corolla, more or less cohering. Ovary 3-5-celled. Ovules partly erect and partly pendulous. Fruit succulent, inclosed by the calyx, often unilocular by abortion. Seeds albuminous. Miers divides this into two orders, Styracaceæ and Symplocaceæ, the former distinguished by their uniserial stamens, linear anthers, superior ovary, free central placenta, one-seeded drupe, and stellate hairs. Sparingly distributed, chiefly in tropical and subtropical regions. Some of the plants are bitter and aromatic, others yield a fragrant stimulant resin. Styrax Benzoin, a tree of the Malay Archipelago, produces the concrete balsamic exudation Benzoin, which is employed medicinally as an expectorant, and is also used for incense. S. officinale, a native of Syria, produces the resin called Storax, which is prescribed as a pectoral

Nat. Ord. 129.—COLUMELLIACEÆ, the Columellia order. -Evergreen shrubs or trees, with opposite exstipulate leaves and yellow flowers. Calyx adherent, 5-parted. Corolla rotate, 5-8-parted Stamens 2, on the corolla. Anthers sinuous. Disk epigynous. Fruit a 2-celled polyspermal capsule. Seeds albuminous. A small and doubtful order, placed by Lindley in his Cinchonal Alliance. Natives of Mexico and Peru.

Nat. Ord. 130.—VACCINIACEÆ, the Cranberry order.-Shrubs with alternate exstipulate leaves. Calyx superior. Corolla 4-6-lobed. Anthers biporose, with appendages. Fruit succulent, 4-10-celled. Seeds albuminous. The order differs from Ericaceæ chiefly in its epigynous calyx. Natives of temperate regions, and found often in sub-alpine swamps. Astringent properties prevail in the order. The berried fruit is subacid and eatable. Oxycoccus palustris (Vaccinium Oxycoccus), a marsh plant, produces the Cranberry in Britain. O. macrocarpa is the American Cranberry. Vaccinium Myrtillus is the Bilberry or Blaeberry.

Note.—In some Calycifloral Exogens the insertion of the stamens is so near the base of the calyx, that it is difficult to separate them from Thalamifloral Exogens. This may be seen in Legu-minosæ and Portulacaceæ. Occasionally the petals are abor-

tive, so that the plants become monochlamydeous. The orders Botany. in which this anomaly occurs are :- Celastraceæ, Rhamnaceæ, Amyridaces, Leguminoss, Rosaces, Lythraces, Combretaces, Myrtaces, Halorageaces, Passifloraces, Portulacaces, Illecebracez, Tetragoniacez, Saxifragacez, Cunoniacez, and Loranthaceæ.

SUB-CLASS III .- COROLLIFLORÆ. 1. Hypostamineæ.

Nat. Ord. 131.—ERICACEÆ, the Heath order* (Figs. 502, *Plate 503).—Shrubs or undershrubs with evergreen, rigid, entire, OXVIII. whorled or opposite, exstipulate leaves (Fig. 503). Calyx figs. 6-11





Fig. 502. Diagram of Erica, showing a tetramerous flower, having 4 divisions of the calyx and corolla, 8 stamens, and a 4-valved capsule.

508. Erica cinerca, fine-leaved Heath, showing its entire exstipulate leaves and ovate ventricese corolla with a 4-divided limb.

Fig. 503.

inferior, 4-5-cleft, persistent. Corolla 4-5-cleft. Stamons 8-10 or twice these numbers, hypogynous. Anthers 2celled, biporose, with appendages. Ovary surrounded by a disk or scales. Fruit capsular, rarely baccate. Seeds numerous, with an adherent testa, and cylindrical embryo in the axis of fleshy albumen. They abound at the Cape of Good Hope, and occur also in Europe, America, and Asia. Some of the Heathworts are astringent, others have edible fruit, and others, such as species of Rhododendron, Kalmia, and Ledum, are poisonous. The species of Erica have no active properties. Arbutus Unedo bears a fleshy fruit like a Strawberry, and hence it is called the Straw-Arctostaphylos Uva-Ursi, Bearberry, is an berry tree. astringent. An infusion of its leaves is prescribed in discharges from the mucous membrane of the bladder.

Nat. Ord. 132.—Pyrolaceze, the Pyrola, or Wintergreen order.—Herbs, with simple leaves, generally included as a sub-order of Ericaceæ, but distinguished by their habit, their more or less declinate styles, loose testa, and minute embryo at the base of fleshy albumen. Natives of northern countries. Chimaphila umbellata is tonic and diuretic.

Nat. Ord. 133.—MONOTROPACEÆ, the Monotropa, or Fir-Rape order.—Parasitic plants of a brown colour, allied to Pyrolaceæ, but differing in their scaly stems, in the longitudinal dehiscence of their anthers, and in their minute embryo being at the apex of the albumen. They are also considered by many as a sub-order of Ericaceæ, from which their habit, their antherine dehiscence, loose testa, and minute embryo, separate them. Chiefly found parasitic on Firs in Europe, Asia, and North America.

Nat. Ord. 134.—EPACRIDACEÆ, the Epacris order.— Shrubby plants, with usually alternate, simple, and parallelveined leaves, having overlapping bases; flowers commonly pentamerous. They represent the Heaths in Australia, and differ from Ericaceæ principally in having one-celled anthers without appendages. Natives of the Indian Archipelago and Australia.

2. Epicorollæ or Epipetalæ.

Nat. Ord. 135.—EBENACEÆ, the Ebony order.—Trees

Botany. or shrubs not lactescent, with alternate, exstipulate, coriaceous, entire leaves, and polygamous flowers. Calyx 3-7cleft, persistent. Corolla 3-7-cleft, often pubescent. Stamens usually twice or quadruple the number of the corolline segments; anthers with longitudinal dehiscence. Ovary 3 or several-celled; style with as many divisions; ovules 1 or 2 in each cell, pendulous. Fruit a round or oval berry; seeds large and bony, albuminous. Chiefly tropical plants. Many are found in India, a few in colder climates. The trees of this order are remarkable for their hard and valuable timber. The bark of some of the species is astringent, while the fruit is in many cases eatable. The heartwood of several species of Diospyros constitutes different kinds of Ebony.

Nat. Ord. 136.—AQUIFOLIACEÆ or ILICACEÆ, the Holly order.—Evergreen trees or shrubs, with coriaceous, exstipulate leaves, and small axillary flowers. Calyx of 4-6 sepals. Corolla 4-6-parted. Stamens 4-6, alternate with the corolline segments; anthers dehiscing longitudinally. Ovary 2-6-celled; a single pendulous ovule in each cell. Fruit fleshy, containing from 2 to 6 nucules. Embryo minute in fleshy albumen. Natives of various parts of the world, but sparingly distributed. Bitter, tonic, astringent, and emetic properties exist in the order. Some are used as tea. Ilex Aquifolium, the common Holly, has a tonic bark, which has been used in intermittents. I. paraguayensis is called Maté in South America, where its leaves are used for tea; they contain Theine.

Nat. Ord. 137.—Sapotace &, the Sapodilla order.—Trees or shrubs, often with milky juice, alternate, coriaceous, entire, exstipulate leaves, and hermaphrodite flowers. Calyx Corolla 4-8-cleft, sometimes with numerous 4-8-parted. segments. Stamens definite, half of them petaloid and sterile; anthers extrorse. Ovary 4-12-celled, with a single pendulous ovule in each cell; style 1. Fruit baccate. Seeds with a bony testa, usually albuminous. Natives of the tropics chiefly. The fruit of many of the plants of this order is edible. The bark is bitter and febrifugal. Some furnish caoutchouc, and others fatty matter. Achras Sapota produces the edible Sapodilla Plum. Bassia butyracea has an oily fruit which furnishes a kind of butter used in Nepal. The Shea, or Galam butter of Mungo Park, is the product of another species. Isonandra Gutta is the Taban-tree, which furnishes Gutta Percha.

Nat. Ord. 138.—MYRSINACEÆ, the Myrsine order.—Trees or shrubs, with coriaceous, exstipulate, smooth leaves, and flowers often marked with glandular dots or lines. Calyx and corolla 4-5-cleft. Stamens 4-5, opposite the corolline segments, occasionally 5 alternate sterile ones. Ovary unilocular, with a free central placenta in which the ovules are imbedded. Fruit fleshy. Seeds 1 or more, with horny albumen. The plants are said to resemble Primulaceæ in everything except their arborescent habit, fleshy fruit, and pitted placenta. They are limited in their geographical range, and abound in islands with an equable temperature, as the islands of the Indian Ocean, Mauritius, Bourbon, and Madagascar. Many of them are handsome evergreen shrubs. The seeds of Theophrasta Jussiai supply flour for bread in St Domingo, and the fruit of Myrsine africana is mixed with barley for the food of asses in Abyssinia.

Nat. Ord. 139.—Jasminaceæ, the Jasmine order.—Shrubs, often twining, with opposite or alternate, usually compound leaves. Calyx and corolla regular, with 5-8 divi-Stamens 2, included within the hypocrateriform corolla. Ovary 2-celled. Fruit a double berry or capsule. Seeds with little or no albumen and a straight embryo. Natives principally of tropical India. They are remarkable for their fragrance. The oil of Jasmine is obtained from Jusminum officinale and J. grandiflorum.

Nat. Ord. 140.—OLEACEÆ, the Olive order (Fig. 504).-

persistent, sometimes 0. Corolla 4-cleft, sometimes of 4 pe-Botany.

tals connected in pairs, sometimes 0. Stamens usually 2. Ovary 2-celled; ovules 2, pendulous in each cell. Fruit fleshy or dry, often 1seeded by abortion. Seeds albuminous; embryo straight. Natives of temperate climates. Some of the plants of the order have emollient and laxative properties; others are bitter, tonic, and febrifugal. Some supply oil, others manna. Fraxinus excelsior, the Ash, is distinguished by its samaroid fruit. Olea europæa (Fig. 504), the Olive, has a drupaceous fruit which yields, on expression, Olive Oil.

small seed which grows into a tree.



Fig. 504. Branch of Olea europæa, Olive, with drupes.

Nat. Ord. 141.—SALVADORACEÆ, the Salvadora order. -Small trees or shrubs, with opposite leaves and minute panicled flowers. Calyx of 4 minute sepals. Corolla 4partite. Stamens 4. Ovary superior. Fruit baccate, 1celled. Seed solitary, exalbuminous. The order is considered by Planchon as allied to Oleaceæ. Natives of Syria and India. The plants are acrid and stimulant, and some of them have properties like Mustard. Salvadora persica appears to be the Mustard-plant of Scripture. It has a

Nat. Ord. 142.—Asclepladaceæ, the Milkweed order. -Lactescent, often twining shrubs or herbs, having entire, usually opposite leaves, with interpetiolar stipulary cilia, Calyx 5-divided. Corolla 5-lobed, æstivation imbricate, rarely valvate. Stamens 5; filaments usually connate; pollen in wax-like masses (Fig. 382), cohering in pairs and attached to glands at the five angles of the stigma, which is common to the two styles. Fruit consisting of two follicles, containing numerous comose seeds (Fig. 329), with thin albumen. Chiefly tropical plants, found in Africa, India, and America. The Asclepiads have acrid, stimulating, purgative, diaphoretic, and emetic properties. Most of the species have milky juice containing caoutchouc. Asclepias tuberosa, the Butterfly-weed or Pleurisy-root, is employed medicinally in North America as a laxative and diaphoretic. Calotropis gigantea is the Mudar plant of Bengal. The bark is employed medicinally as an emetic and diaphoretic. Cynanchum monspeliacum has a purgative juice which is used at Montpellier to adulterate Scammony. Hemidesmus indicus is called Indian Sarsaparilla. because its roots are used in India as a substitute for that drug.

Nat. Ord. 143.—Apocynaceæ, the Dogbane order-(Fig. 505).—Trees or shrubs, usually milky, allied to the Asclepiadaceæ, and differing from them in the contorted æstivation of the corolla, distinct filaments, granular pollen, and a peculiar hourglass-like stigma (Fig. 506). Natives of the tropics of Asia, America, and Africa. Many of the plants are poisonous, some are drastic purgatives. The bark is sometimes tonic and febrifugal. The milky juice of several species supplies caoutchouc. Vinca, the Periwinkle, is the only British genus in the order. Apocynum cannabinum has emetic roots. Aspidosperma excelsum supplies the fluted Yarroura-wood used for paddles. Roupellia grata produces what is called Cream-fruit in Sierra Leone. Tabernæmontana utilis is the Cow-tree of Demerara. ghinia venenata yields the famous ordeal poison of Madagascar, called Tanghin.

Nat. Ord. 144.—LOGANIACEÆ or SPIGELIACEÆ, the Trees or shrubs with opposite, simple, or pinnate leaves. Calyx Strychnia order.—Shrubs, herbs, or trees, with opposite,

Botany. mens varying in number, not always isomerous with the corolla. Fruit a 2-celled capsule, with loose placentas, or a berry, or succulent, with 1 or 2 nucules. Seeds usually peltate, albuminous. Chiefly tropical. The plants of this

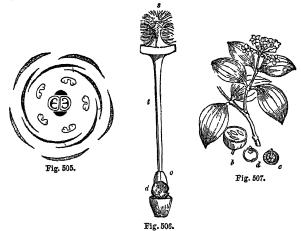


Fig. 505. Diagram of the flower of Vinca, Periwinkle, showing 5 divisions of the calyx, alternating with five of the twisted corolla, 5 stamens alternating with the corolline segments, and 2 carpels forming the nistil.

pistil.

508. Pistil of Vinca separated, showing the remarkable stigma, s, covered with hairs, and having an hour-glass contraction in the middle. Ovary, o, with disk, d, style, t.

507. Strychnos Nux-Vomica, the Poison-Nut, a tree abounding on the Malabar and Coromandel coasts. It has opposite ribbed leaves, a round fruit, b, of a reddish colour, about the size of a small orange. The seeds c, are circular, flat, and umblicated on one surface. They contain abundant albumen, d, and a small embryo.

order are highly poisonous. They produce tetanic convulsions and narcotism. Some of them are used medicinally as active remedies in certain kinds of palsy. Intense bitterness is met with in some of the species, and in very moderate doses they act as tonics. Ignatia amara, St Ignatius's Bean, produces convulsions and death. The peltate seeds of Strychnos Nux-Vomica (Fig. 507), produce powerful effects on the spinal marrow, and cause death by tetanus. They contain the alkaloid called Strychnia. The bark constitutes false Angustura.

Nat. Ord. 145.—GENTIANACEÆ, the Gentian order (Fig.

508, and Fig. 159).—Herbs, rarely shrubs, with opposite, entire, exstipulate, usually ribbed leaves, and showy variously-coloured flowers. Calyx divided, persistent. Corolla persistent, imbricate, induplicate, often twisted in æstivation, sometimes with a fringed limb. Stamens alternate with the coralline segments. Ovary of 2 carpels, placed to the right and left of the axis, one-celled, with 2 parietal, often intro-flexed, placentas; style 1; stigmas 2. Fruit a capsule or berry. Seeds



Fig. 508.

numerous, with fleshy albumen and a minute embryo. Natives of almost all parts of the world. Some are found at an elevation of 16,000 feet, others in hot tropical plains. Bitterness is the property which prevails generally in this order. Occasionally the species have emetic and narcotic qualities. Gentiana lutea, the yellow Gentian of the Alps, is a medicinal plant. Its root is used as a bitter tonic.

Nat. Ord. 146.—BIGNONACEÆ, the Trumpet-flower order.-Trees or twining or climbing shrubby plants, with ex stipulate usually opposite and compound leaves, and showy, often trumpet-shaped flowers. Their woody stem is sometimes divided in a cruciform manner. Calyx entire or di-

entire, stipulate leaves. Calyx inferior, 4-5-parted. Co- vided, often spathaceous. Corolla with a swollen throat, and Botany. rolla 4, 5 or 10-cleft; estivation convolute or valvate. Sta- a more or less irregular 4-5-lobed limb. Stamens 5, unequal, one generally abortive; sometimes didynamous. Ovary surrounded by a disk, 2-celled; carpels anterior and posterior; placentas in the axis. Fruit a 2-valved, often pod-like capsule, divided by a spurious placental dissepiment. Seeds winged, exalbuminous; embryo with broad leafy cotyledons. Natives of America. The bark of Jacaranda bahamensis, Palo de Buba, is used in the isthmus of Panama as an anthelmintic. Bignonia Chica supplies a red

> Nat. Ord. 147.—Gesneraceæ, the Gesnera orders (including Cyrtandraceæ).-Herbs or shrubs, often growing from scaly tubers, with rugose, usually opposite and whorled exstipulate leaves, and showy flowers. Calyx half-adherent, 5-parted. Corolla more or less irregular, 5-lobed. Stamens 2, or 4, didynamous, with the rudiment of a fifth; anthers often combined. Ovary 1-celled, surrounded by a disk in the form of glands or a ring. Fruit capsular or suc-culent, 1-celled, with 2 lobed parietal placentas to the right and left of the axis. Seeds numerous, albuminous. They are natives of various parts of the world, chiefly the warmer regions of America. The succulent fruits are occasionally eatable, and some of the species yield a dye.

> Nat. Ord. 148.—Crescentiaceæ, the Calabash-tree order.-Small trees, with exstipulate leaves, and flowers growing out of the old stems and branches. The plants are allied to Bignoniaceæ, from which they differ in their parietal placentas, their wingless seeds, fleshy cotyledons, and in the pulpy contents of their woody indehiscent fruit. Natives of tropical regions. Crescentia Cujete, the Calabash-tree, has a gourd-like fruit with a hard shell which is used for

> Nat. Ord. 149.—PEDALIACEÆ, the Pedalium order.— Glandular herbs, with exstipulate leaves and large bracteated flowers. They are allied also to Bignoniaceæ, from which they differ in their parietal placentation, their wingless seeds with a papery episperm. From Crescentiaceæ they are distinguished by the want of pulp in the fruit. The ovary, at first 1-celled, sometimes becomes divided by placental septa into 4 or 6 cells. Natives of tropical countries, especially Africa. The plants of the order have generally a heavy odour. Their seeds yield oil as well as starchy matter.

Nat. Ord. 150.—Polemoniaceæ, the Phlox order (Fig.

509).—Herbs, with opposite or alternate leaves. Calyx 5-cleft. Corolla regular, 5-lobed, convolute. Stamens 5, alternate with the corolline lobes; pollen blue. Ovary superior, 3-celled; style 1; stigma trifid. Capsule 3celled, 3-valved, valves separating from the axis. Seeds albuminous, often with a mucous covering containing spiral threads, which spread out in coils when water is applied. Natives chiefly of the temperate parts of America. Polemonium cæruleum is commonly cultivated under the name of Greek Valerian.

Diagram of the flower of Polemonium cæruleum, shown for five sixted to the callyx, five convolute lobes of the corolla, five alternating stamens, and a tricar pellary ovary.



Fig. 509.

Nat. Ord. 151.—Hydrophyllaceæ, the Hydrophyllum order.—Herbs or small trees, usually with alternate and lobed hispid leaves. Calyx 5-cleft, often with appendages, persistent. Corolla regular, somewhat bell-shaped. Stamens 5, alternating with the corolline lobes. Ovary superior, with 2 parietal placentas, which often line the ovary; styles 2. Fruit a 2-valved, 1-celled, or spuriously 2-celled capsule, filled with a large placenta. Seeds reticulated; embryo small in hard albumen. Natives chiefly of the temperate parts of America. Some species are tropical.

Nat. Ord. 152.—DIAPENSIACEÆ, the Diapensia order. Prostrate shrubby plants, with crowded heath-like exstipu-

Botany. late leaves and solitary terminal flowers. They are in many respects allied to Polemoniaceæ, from which they differ chiefly in their imbricated bracts, transversely 2-celled anthers, and peltate seeds. These characters with the 3-celled ovary also separate them from Hydrophyllaceæ. Natives of northern Europe and North America.

Nat. Ord. 153.—Convolvulaceæ, the Convolvulus order (Figs. 510 to 512).—Herbs or shrubs, usually twining

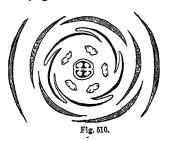




Fig. 511.

Fig. 510. Diagram of the flower of Calystegia (Convolvulus) sepium, Great
Bindweed, showing two bracts, five divisions of the calyx, five lobes
of the platted campanulate corolla, five stamens, and a two-celled
overly, with two ovules in each cell.

511. Convolvulus Scammonia, the Scammony plant, found in Greece and
the Levant. The concrete miky juice of the large root constitutes
Scammony, which is imported from Smyrns.

(Fig. 511), and lactescent, with alternate, exstipulate leaves

and regular flowers, having a unifloral or multifloral cymose inflorescence. Calyx 5divided, imbricated, persistent. Corolla plaited. Stamens 5, alternate with the corolline lobes. Ovary free, 2-4-celled; ovules 1-2 in each cell, erect; styles united, often divided at the apex. Capsule 2-4-celled, sometimes by absorption 1-celled, septifragal. Seeds large, with mucilaginous albumen; embryo curved (Fig. 512), with he curved embryo and planting of the curved embryo. 1-2 in each cell, erect; styles united, often crumpled cotyledons. Chiefly natives of the



tropics. The order is characterized by purgative properties, and it contains some important medicinal plants. Convolvulus Scammonia (Fig. 511), is the source of the purgative gum-resin, Scammony. Exogonium (Ipomæa) Purga is the plant which yields Jalap.

Nat. Ord. 154.—Cuscutaceæ, the Dodder order* (Fig. 426).—Leafless parasitic twining herbs, generally reckoned a sub-order of Convolvulaceæ. They are marked by scales alternating with the corolline lobes, and a filiform spiral acotyledonous embryo. The seeds germinate in the usual way, and afterwards the plants become true parasites. Some of them destroy Flax, Clover, and other crops. Natives of temperate regions.

Nat. Ord. 155.—CORDIACEE, the Sebesten order.—Trees with alternate, exstipulate, rough leaves. Calyx 4-5-toothed. Corolla 4-5-cleft, regular. Stamens alternate with the corolline segments; anthers versatile. Ovary superior, 4-8celled; stigma 4-8-cleft. Fruit drupaceous, 4-8-celled, with a single exalbuminous seed in each cell, pendulous by a long cord. Embryo with plaited cotyledons. The plants of this order are natives of the tropics. The drupes of Cordia Myxa and C. latifolia are called Sebesten plums, and are used as food. The bark is tonic.

Nat. Ord. 156.—Boraginaceæ, the Borage order (Figs. 513 and 514).—Herbs or shrubs with round stems, alternate, rough leaves, and flowers in scorpioidal cymes (Fig. 170). Calyx 4-5-divided, persistent. Corolla usually regular and 5-cleft (Fig. 513 and 225), imbricate, often with faucial scales (Fig. 236). Stamens alternate with the corolline segments. Ovary 4-lobed; style basilar (Fig. 514). Fruit 2 or 4 distinct achenes. Seed exalbuminous. The plants were called Asperifoliæ from their rough leaves. Natives of the northern temperate regions principally. Demulcent mucilaginous qualities pervade the order. Some of the

plants yield a dye, others are used as pot-herbs. Anchusa tinc- Botany.

toria, Alkanet, yields a reddish brown dye. Boragoofficinalis, Borage, when steeped in water, imparts coolness to it. Mertensia maritima, a sea-shore plant, has leaves which taste like oysters.

Nat. Ord. 157.—En-RETIACEÆ, the Ehretia

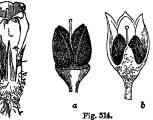


Fig. 513. RETIACEÆ, the Ehretia order.—The plants of this order are often reckoned a sub-division of the Borage order, from which they

differ in their terminal style, proceeding from a concrete 4-celled ovary, and their drupaceous fruit. Some of them, as the Peruvian Heliotrope, have a fragrant odour. They are generally tropical trees or shrubs.

Nat. Ord. 158.—Nolanaceæ, the Nolana order.—Herbaceous or shrubby plants with alternate exstipulate leaves, having characters in common both with Convolvulaceæ and Boraginaceæ. Their distinguishing characters are their straight inflorescence, valvate calyx, plaited corolla, ovary composed of 5 or more separate carpels, variously combined, united styles, somewhat capitate stigma, and embryo curved in a small quantity of albumen. South American plants.

Nat. Ord. 159.—Solanaceæ, the Potato order.*—Herbs *Plate or shrubs with alternate, often geminate leaves, cymose, CXXVI generally extra-axillary inflorescence, and isomerous flowers. Calyx and corolla, with 5, rarely 4, partitions. Corolline lobes nearly equal, æstivation valvate or induplicato-valvate. Stamens 5, very rarely 1 sterile; anthers opening by slits or pores (Fig. 260). Ovary generally bilocular; style simple; stigma 2-lobed or clavate. Fruit capsular or baccate (Fig. 207), with two cells, rarely more, from placental septa. Seeds albuminous; embryo curved (Curvembryeæ) or straight (Rectembryeæ). Natives of various parts of the world, and abundant within the tropics. The plants of this order do not display the marked narcotic properties of the next order, and their juice, according to Dr T. Anderson, does not cause dilatation of the pupil. Some of them yield edible tubers and fruit, others are tonic, pungent, and stimulant. The species of Capsicum yield Cayenne-pepper and Chillies, which are acrid and irritant. Lycopersicum esculentum produces the Tomato. Physalis peruviana yields an edible berried fruit called Peruvian Winter Cherry. Solanum tuberosum, the Potato, has starchy tubers. S. Dulca-

mara,* Bitter-sweet, or woody Nightshade, is used as a dia-*Plate phoretic in cutaneous diseases. S. Melongena and S. ovigerum, produce edible fruits known by the name of Egg-apples.

Nat. Ord. 160.-ATROPACEÆ, the Deadly Nightshade order* (Figs. 515 and 516).—This orit a separate order,

*Plate CXXVII. & CXXVIII.

Fig. 515. Fig. 516. der agrees in most Fig. 515. Diagram of the flower of Nicotiana Tabacum, Tobacco, showing five divisions of the cally a, five imbricate corolline lobes, five stamens, alternating with these lobes, and a dimerous ovary.

516. Flower of Atropa Belladonna, Deadly Nightshade, showing a five-divided cally and a five-lobed campanulate corolla.

distinguished from Solanaceæ by its corolline æstivation heing more or less imbricate, never valvate. The lobes of the corolla are somewhat unequal. Stamens 5, of which

CXXVI. fig. 2.

VOL. V.

*Plate

* Plate

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longitudinally. The geographical distribution is similar to that of Solanaceæ. The plants of this order are in general narcotic poisons. Their juice has the property of causing dilatation of the pupil. Atropa Belladonna, Deadly Nightshade,* has shining brownish-black berries. It contains an alkaloid, Atropia, to which its narcotic properties are due. CXXVII. Datura Stramonium, Thorn-apple, is so called from its spiny capsule, which is spuriously four-celled. The leaves and seeds contain a narcotic alkaloid Daturia. Hyoscyamus niger, Henbane,* is a narcotic plant, the juice of which dilates the pupil. Its seed-vessel is a pyxidium. Mandra-CXXVIII. gora officinalis, the Mandrake, stimulates the nervous

system. Nicotiana Tabacum (Fig. 224) supplies American Tobacco. Nat. Ord. 161.—Orobanchaceæ, the Broom-rape order. -Leafless, scaly herbs, parasitic on the roots of other plants. Calyx 4-5-toothed, persistent. Corolla with an irregular or bilabiate limb, imbricate. Stamens 4, didynamous. Ovary 1-celled, with 2 or more parietal placentas; the 2 carpels forming the ovary placed to the right and left of the axis. Fruit a capsule, covered by the withered corolla, 1-celled, 2-valved. Seeds albuminous, minute. Natives of Europe, middle and northern Asia, North America, and the Cape of Good Hope. The properties of the order are bitter, astringent, and escharotic.

Nat. Ord. 162.—SCROPHULARIACEÆ, the Figwort order (Figs. 517 to 519).—Herbs or undershrubs, with opposite,

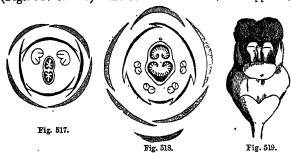


Fig. 517. Diagram of the unsymmetrical, slightly irregular, flower of Veronica, with four divisions of the calyx, four of the corolla, imbricate, two stamens, and a bilocular ovary.

518. Diagram of the flower of Antirrhinum majus, Frogsmouth, showing single bract below, five divisions of the irregular calyx, five segments of the irregular corolla, four perfect stamens, and a rudiment of a fifth above the ovary, a two-celled ovary composed of two carpels placed posteriorly and anteriorly as regards the axis.

519. Irregular lipped flower of Scrophularia, Figwort, with a transverse stammodium or abortive fifth stamen.

whorled, or alternate leaves, and anisomerous flowers. Calyx of 5 or 4 parts. Corolla irregular (Figs. 227, 229, and 230), lobes unequal, imbricate in æstivation. Stamens 2 (Fig. 230) or 4, didynamous, rarely 5, or with a rudimentary fifth (Fig. 519). Ovary bilocular, carpels anterior and posterior. Fruit capsular, rarely baccate, usually 2-celled. Seeds albuminous, with a straight or slightly curved embryo. Natives of all parts of the world, cold as well as hot. Some are root-parasites, as Eyebright, Cow-wheat, and Yellow-rattle. The Figworts are more or less suspicious in their properties. Some are acrid, others sedative. There are many showy garden plants in this order. Digitalis purpurea, Foxglove,* is used medicinally as a diuretic and sedative of the heart's action.

Nat. Ord. 163.—Labiatæ or Lamiaceæ, the Labiate or Dead-nettle order (Figs. 520 to 522).—Herbs or undershrubs, with tetragonal stems, opposite, exstipulate, often aromatic leaves, and flowers in verticillasters (Fig. 173). Calyx tubular, persistent, 5 or 10-toothed (Fig. 204), or bilabiate. Corolla bilabiate (Fig. 521). Stamens 4, didynamous (Fig. 253), or by abortion 2; anthers 2-celled, or 1celled by abortion (Fig. 245). Ovary deeply 4-lobed, on a disk, style basilar (Fig. 522); stigma bifid. Fruit 1-4 achenes, inclosed by the calyx. Seeds erect, with little or no albumen. Natives of temperate climates. Labiate plants have no de-

sometimes 1, very rarely 3, are sterile; anthers dehisce leterious qualities. They are generally aromatic and fragrant. Botany. Some are tonics. Many of them, such as Lavender, Mint,







Fig. 523.

Fig 522. Fig. 521.

Fig. 521. Fig. 522. Fig. 522.

Fig. 520. Diagram of the flower of Lamium album, White Dead-nettle, showing five segments of the calyx, five segments of the bulabiate corolla, two of which form the upper lip and three the lower, four stamens, didynamous, and a four-parted overy.

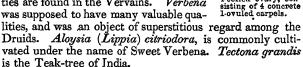
... 521. Firegular bulabiate corolla of Lamium, showing upper and under lip and didynamous stamens.

... 522. Vertical section of flower of Salvia, showing two of the achenes, a, with the single style, st, the corolla, co, the calyx, c, and the discoid receptacle, r.

Thyme, Sage, Rosemary, Marjoram, Basil, Savoury, and Hyssop, are used as carminatives and antispasmodics, and are cultivated in gardens for culinary purposes. Many contain a kind of stearoptine like camphor. Oils are procured from the leaves of most of the species, and to these their fragrance is due.

Nat. Ord. 164.—VERBENACEÆ, the Vervain order (Fig. 523).—Herbs, shrubs, or trees, with exstipulate, usually op-

posite leaves, resembling much the Labiatæ in their characters, and differing in their achenes being concrete, their style terminal, and their leaves usually not containing receptacles of oil. Corolla generally irregular. Stamens 4, didynamous, or 2; anthers 2-celled. Seeds erect or ascending; radicle inferior. Natives both of tropical and of temperate regions. In the order are included the *Myoporaceæ*, which differ only in their seeds being pendulous and in the radicle of the embryo being superior. Bitter, tonic, as well as aromatic properties are found in the Vervains. Verbena ties are found in the Vervains. Verbena was supposed to have many valuable qua-



Nat. Ord. 165.—Selaginaceæ or Globulariaceæ, the Globularia order.—A small group of herbaceous or shrubby plants, with alternate exstipulate leaves and bracteated flowers resembling Verbenaceæ, from which they differ in their 1-celled anthers, pendulous ovules, and superior radicle. Globularia has a solitary carpel. Allied to this order and Vervains is a small group, Stilbaceae, of which the Cape genus Stilbe is the type; they have slightly irregular flowers, with 4 or 5 stamens, one often abortive, anthers 2-celled, ovary 2-celled, style terminal, fruit 1-seeded, seed erect, embryo inferior. Some of the species of Selaginaceæ are fragrant. They are natives of the Cape of Good Hope chiefly; some are European.

Nat. Ord. 166.—Acanthaceæ, the Acanthus order.— Herbs or shrubs, with simple, opposite, exstipulate leaves and bracteated showy flowers. Calyx of 5 sepals, distinct or combined, persistent. Corolla usually irregular, lipped. Stamens 4, didynamous, often 2 by abortion. Ovary of 2 carpels, placed anterior and posterior; placentas parietal, but extending to the axis; style 1. Fruit a 2-celled capsule, opening by elastic valves. Seeds 1, 2, or many in each cell, attached to hooked placental processes, exalbumi-

*Plate CXXIX.

Botany.

Botany. nous. Chiefly tropical plants, some of them, as Justicia Ruellia, Aphelandra, and Hexacentris, remarkable for the beauty of their flowers. The lobed and sinuated leaves of Acanthus furnished the ornaments of the Corinthian

Nat. Ord. 167.—LENTIBULARIACEÆ, the Bladderwort order.—Herbs growing in water or in wet places, with radical leaves which are either undivided or cut into filiform root-like segments bearing little bladders, and irregular showy flowers. Calyx divided, persistent. Corolla bilabiate, irregular. Stamens 2, included; anthers 1-celled. Ovary superior, 1-celled; placenta free, central; ovules ∞. Fruit a 1-celled capsule. Seeds exalbuminous. Found in various parts of the world, most abundant in the tropics. The name Butterwort, applied to Pinguicula, is said to indicate its property of giving consistence to milk.

Nat. Ord. 168.—Primulaceæ, the Primrose order (Figs. 524 and 525).—Herbs with opposite, or alternate, or whorled, exstipulate leaves, and flowers often on scapes. Calyx 5-cleft, rarely 4-cleft, regular, persistent. Corolla regular, 5 or 4-cleft, very rarely 0 (as in Glaux). Stamens opposite the corolline segments (Fig. 525). Ovary superior, 1-celled, with a free central placenta; style 1; stigma capitate (Fig. 274); ovules mostly indefinite, and amphitropal. Fruit a capsule opening by valves or a lid. Seeds peltate, albuminous; embryo straight, transverse. plants abound in cold and in northern regions. Sedative, diaphoretic, and even drastic purgative plants are found in this order. Under the genus Primula are included the various species of Primrose, Cowslip, Oxlip, and Auricula.

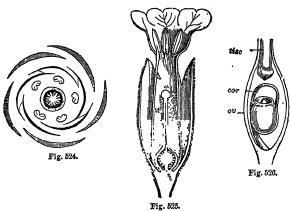


Fig. 524. Diagram of the flower of Cyclamen curopæum, Sowbread, showing 5 imbricate divisions of the calyx, 5 contorted divisions of the corolla, 5 stamens opposite the corolline segments, and a 1-celled pisth, with a free central placents, and numerous ovules.

525. Vertical section of the flower of Frimula, showing calyx, corolla, epicorolline stamens, pisth with unlocular ovary, single style and capatite stame.

capitate stigma.

... 526. Ovary of Armona mantama. Sea-pink, cut vertically; showing the ovule, ou, with its coverings, suspended by a cord or funiculus, cor, which rises from the bottom of the cell. The conducting tissue of the style, tisc, passes for a certain extent into the ovary.

Nat. Ord. 169.—Plumbaginaceæ, the Leadwort order (Fig. 526).—Herbs or undershrubs, with alternate or clustered, entire, exstipulate leaves, which are somewhat sheathing, and flowers in panicles or in heads. Calyx tubular, plaited, persistent. Corolla salver-shaped, with a 5-parted limb, or composed of 5 unguiculate petals. Stamens opposite the lobes of the gamopetalous corolla, and hypogynous or attached to the claws of the polypetalous corolla. Ovary superior, 1-celled, with a single ovule pendulous from a long funiculus which arises from the base of the cell (Fig. 526); styles 5, separate or partially united. Fruit a utricle, or opening by 5 valves. Seed inverted, albuminous. Found in salt marshes and on the sea-coasts of temperate regions; some are tropical. The species have tonic, astringent, and acrid properties; some cause blistering. Plumbago europæa, Toothwort, is used for toothache.

Nat. Ord. 170.—Plantaginaceæ, the Ribgrass order. (Fig. 164).—Herbs having usually ribbed and radical leaves, with spiked, occasionally unisexual flowers. Calyx 4parted, persistent. Corolla scarious and persistent, 4-parted. Stamens 4, alternate with the corolline segments; filaments long and slender. Ovary of one carpel, 2 rarely 4-celled by placental prolongations; style 1. Fruit a membranous pyxis with a free placenta. Seeds 1, 2, or many, albuminous. The plants are generally distributed, but are chiefly natives of temperate climates. They have bitter and astringent properties. The seeds of some are demulcent.

Note.—In the natural orders Oleaceæ and Primulaceæ, apetalous and even achlamydeous species are met with, which therefore belong properly to the sub-class Monochlamydee. Among Ericaceæ, Pyrolaceæ, Monotropaceæ, Epacridaceæ, Primulaceæ, and Plumbaginaceæ, there occur polypetalous species with hypogynous stamens, which consequently belong properly to the sub-class Thalamifloræ.

SUB-CLASS IV. MONOCHLAMYDEÆ OR APETALÆ.

1. Angiospermæ.

a. Spermogenæ.—Having true Seeds with a Dicotyledonous Embryo.

Nat. Ord. 171.—NYCTAGINACEÆ, the Marvel of Peru order.—Herbs or shrubs, with opposite leaves, and involucrate, often showy flowers. Perianth tubular and funnelshaped, the limb plaited, coloured, and separating from the hardened base, which incloses the one-celled utricular fruit, and appears to be incorporated with it. Stamens hypogynous, 1-20. Embryo coiled round mealy albumen. Natives of warm regions. Their roots are purgative, as seen in the case of Mirabilis Jalapo.

Nat. Ord. 172.—AMARANTHACEÆ, the Amaranth order. -Herbs or shrubs, with opposite or alternate, exstipulate leaves, and capitate or spiked, bracteated coloured flowers, which are occasionally unisexual. Perianth of 3-5 scarious sepals. Stamens 5, hypogynous, distinct or monadelphous; anthers often 1-celled. In other respects resembling Chenopodiaceæ. Most common within the tropics. They have mucilaginous properties. Some are used as pot-herbs, and many of them are cultivated on account of their dry, persistent, and finely coloured bracts and perianth. Amaranths are known in gardens by the name of Princes Feather (Amaranthus hypochondriacus) and Love-lies-bleeding (A. caudatus). Celosia cristata, the Cockscomb, has astringent

Nat. Ord. 173.—CHENOPODIACEÆ, the Goosefoot order (Fig. 178).—Herbs or undershrubs, with exstipulate, alternate, and occasionally opposite leaves, and small herbaceous, often unisexual flowers. Perianth divided deeply, sometimes tubular at the base, persistent. Stamens inserted into the base of the perianth, and opposite to its divisions. Ovary free, 1-celled, with a single ovule attached to its base. Fruit a utricle or achene, sometimes succulent. Embryo coiled round mealy albumen, or spiral without albumen. Inconspicuous plants, found in waste places in various parts of the world, chiefly in extra-tropical regions. Many of the plants of this order are used as pot-herbs, for instance, Spinage, Garden Orach, and Beet. Soda is supplied by some of the species of Salicornia and Salsola growing on the sea-shore. Anthelmintic and antispasmodic properties are also met with in the order.

Nat. Ord. 174.—Basellaceæ, the Basella order.—A small order of climbing, herbaceous, and shrubby tropical plants, closely allied to Chenopodiaceæ, and differing chiefly in their coloured double perianth, and in their stamens being attached to its sides. Some species of Basella are used as

used in Peru as a substitute for the Potato.

Nat. Ord. 175.—Scleranthaceæ, the Scleranthus or Knawel order.—Inconspicuous weeds, often included among the Illecebraceæ, but differing from that order in their apetalous flowers, exstipulate leaves, hardened tube of the perianth inclosing the 1-celled fruit, and perigynous stamens. They seem to be more nearly allied to Chenopodiaceæ. They occur in barren places in various parts of the world.

Nat Ord. 176.—PHYTOLACCACEÆ, the Poke-weed order. -Herbs or undershrubs, with alternate, exstipulate, often dotted leaves, and racemose flowers. Perianth of 4-5 leaves, often petaloid. Stamens hypogynous or nearly so, indefinite, or 4-5 and then alternate with the divisions of the perianth. Ovary of 1 or many united one-seeded carpels; styles and stigmas distinct. Fruit either succulent or dry. Embryo curved round mealy albumen. Many of the plants are American. They have acrid, emetic, and purgative qualities. The berries of *Phytolacca decandra*, Poke or Pocan, yield a deep purple juice. Its root is emetic, and is used in rheumatic and syphilitic pains. The young shoots are eaten as Asparagus. Gyrostemon, a genus with unisexual flowers, is considered as a type of an allied order, Gyrostemonace a.

Nat. Ord. 177.—Petiverlaceæ, the Petiveria order. —A small order of plants separated from Phytolaccaceæ on account of their stipulate leaves, exalbuminous seeds, straight embryo, and convolute cotyledons. Tropical American plants. They have acrid properties and an alliaceous odour.

Nat. Ord. 178.—Polygonaceæ, the Buckwheat order* (Figs. 527, 528).—Herbs, rarely shrubs, with alternate





Fig. 527. Diagram of the flower of Rumex, Dock, showing a six-partite perianth, in two alternating rows, six stamens in pairs, and a one-celled ovary formed of 3 carpels.

528. Fruit of Rumex out vertically, showing the triquetrous achene closely invested by the inner segments of the perianth, two out of the three styles, and the arcuate embryo on one side of failnaceous albumen.

leaves, ochreate stipules, and occasionally unisexual flowers. Perianth often coloured. Stamens definite, and inserted into the base of the Perianth. Ovary formed of 3 carpels, 1-celled, containing a single orthotropal ovule. Fruit a triangular nut, often covered by the perianth (Fig. 528). Embryo usually on one side of mealy albumen. Generally distributed both in cold and warm climates. Acid, astringent, and purgative qualities are met with in the plants of this order. Fagopyrum esculentum, and other species, are cultivated as Buckwheat. Polygonum Bistoria* has a twisted rhizome, which is used as an astringent. Various species of Rheum yield the different kinds of Rhubarb. R. palmatum is generally said to be the plant which supplies Russian or Turkey Rhubarb.

Nat. Ord. 179.—Begoniaceæ, the Begonia order.— Herbs or succulent undershrubs, with alternate oblique stipulate leaves, and cymose, pink, unisexual flowers. Perianth superior, coloured, with 4 divisions in the male flower, and 5-8 in the female. Stamens ∞, distinct or united; anthers collected into a head. Ovary winged, 3-celled, with 3 placentas meeting in the axis. Fruit capsular, winged, 3celled. Seeds co, exalbuminous, reticulated. Found in the East and West Indies, and in South America. They are said, to have bitter and astringent qualities. Begonias

Botany. Spinage. Melloca tuberosa has a tuberous root, which is their oblique leaves. Their succulent stalks are sometimes Botany. used like Rhubarb.

Nat. Ord. 180.—LAURACEÆ, the Laurel order (Figs. 529, 530).—Trees with exstipulate, usually alternate, dotted

Perianth leaves. 4-cleft, or 6-cleft in 2 rows. Stamens often 8-12, the 3 or 4 innermost being abortive staminodia, and the outer fertile; filaments sometimes bearing glands, anthers 2-4-celled, opening by revalves. curved Ovary superior, 1celled, with 1 or 2 pendulous ovules. Fruit a berry or

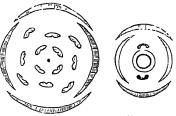


Fig. 529. Fig. 530. Fig. 529. Fig. 530.

Fig. 529. Diagram of the male or stammiferous flower of Laurus nobils, Sweet Bay, showing four divisions of the perianth, twelve stamens in three rows, some fettile, some abortive, and the abortive pital as a point in the centre.

... 530. Diagram of the female or pistiliferous flower of Laurus nobilis, showing a four-divided perianth, and a one-celled ovary in the centre, with two abortive stamens.

stamens.

drupe; pedicel often thickened; seed solitary, exalbuminous; embryo with large cotyledons. Tropical aromatic and fragrant plants, yielding fixed as well as volatile oils and camphor. Some have tonic and febrifugal barks; others supply edible fruits. The timber of some of the plants is valuable. Camphora officinarum, a tree found in China and Japan, supplies camphor. Cinnamomum zeylanicum, is the Cinnamon-tree, the bark of which constitutes the Cinnamon of commerce. Laurus nobilis, Sweet-bay, yields a concrete green oil, called Oil of Bays. Its branches were used to crown the victors in the ancient games. Nectandra Rodiæi (N. leucantha, var. N. ab. E.), yields the Bebeerubark, which contains an antiperiodic alkaloid Bebeerine. Its wood is called Green-heart, and is used in ship-building.

Nat. Ord. 181.—ATHEROSPERMACEÆ, the Plume-Nutmeg order.—Trees, with opposite exstipulate leaves, and bracteated unisexual flowers. Perianth tubular, divided at the top into segments, in 2 rows, the inner partly petaloid. Stamens numerous, inserted in the bottom of the perianth; filaments with scales at their base; anthers with valvular dehiscence. In the female flowers, there are often abortive stamens in the form of scales. Carpels numerous, each having a single erect ovule. Fruit achenes, inclosed in the tube of the perianth, having persistent feathery styles. Seed solitary, erect; embryo minute in the base of fleshy albu-

men. Fragrant plants from Australia and Chili. Nat. Ord. 182.—MYRISTICACEÆ, the Nutmeg order.*—*Plate. Tropical trees, with alternate, exstipulate leaves, and uni-CXXXL sexual flowers. Perianth 3-4-cleft, valvate. Stamens 3-12, distinct or monadelphous; anthers extrorse, often united. In the female flowers, the perianth is deciduous. Carpels 1 or many, each with a single erect anatropal ovule. Fruit succulent, 2-valved. Albumen ruminate. Some regard this order as an apetalous unisexual form of Anonaceæ. Natives of the tropical parts of India and America. The plants of this order are acrid and aromatic. Their bark yields a red juice. Myristica moschata* is the Nutmeg-*Plate tree of the Moluccas. The fruit is drupaceous and dehisces, CXXXL so as to display the scarlet mace, which consists of a reticulated arillode covering the shell in which the seed or

Nutmeg is inclosed. Nat. Ord. 183.—MONIMIAGEÆ, the Monimia order.— Trees or shrubs, with opposite, exstipulate leaves, and unisexual flowers, resembling Atherospermaceæ, from which they differ chiefly in the anthers dehiscing longitudinally, in the ovule being pendulous, and in the want of feathery styles to the fruit. The plants are chiefly South American, and possess aromatic qualities.

Nat. Ord. 184.—PROTEACEÆ, the Protea order.—Shrubs receive the name of Elephant's-ear from the appearance of or small trees, with hard, dry, exstipulate leaves. Perianth

*Plate CXXX.

*Plate

CXXX

Botany.

Botany. divided into 4, valvate. Stamens 4, placed on the segments of the perianth. Ovary of one superior carpel, containing 1 or more ovules; fruit dehiscent or closed. Seed exalbuminous; embryo straight. Natives of Australia and the Cape of Good Hope chiefly. Leucadendron argenteum is the Witteboom or Silver-tree of the Cape. Protea grandiflora is called Wagenboom.

> Nat. Ord. 185.—ELEAGNACEE, the Oleaster order.— Trees or shrubs, usually lepidote, with exstipulate leaves, and unisexual, rarely hermaphrodite, flowers. Male flowers in the axil of scales; perianth of 2-4 leaves, sometimes united; stamens 3, 4, or 8. In the Ω and Ω flowers, perianth tubular, with a fleshy disk. Ovary free, 1-celled, with a single ascending ovule. Fruit a crustaceous achene, inclosed in the succulent perianth. Found chiefly in the northern hemisphere. Many are cultivated for their silvery scaly foliage. The scales are beautiful microscopic objects (Fig. 53). Hippophaë rhamnoides, Sea Buckthorn, is a spiny plant which thrives on the sea-shore. Elæagnus parvifolia, small-leaved Oleaster, bears clusters of red edible berries, mottled with scales.

> Nat. Ord. 186.—Penæaceæ, the Penæa order.—Shrubs. with opposite exstipulate leaves. Perianth inferior, bracteated, salver-shaped, limb 4-lobed. Stamens 4 or 8, inserted on the perianth. Ovary 4-celled, with 4 appendaged stigmas. Fruit a 4-celled capsule. Seed exalbuminous; embryo with minute cotyledons. Evergreens, found at the Cape of Good Hope. Some yield a gum-resin called Sarcocol.

> Nat. Ord. 187.—THYMELEACEE, the Mezereon order. —Shrubby plants, with stipulate leaves, and ♥ rarely ₺♀ flowers: Perianth coloured, tubular, with a 4-5-lobed imbricate limb. Stamens often twice as many as the lobes of the perianth, and inserted on its tube. Carpel solitary, superior, with a single pendulous ovule. Fruit nut-like or drupaceous. Seed with or without albumen; embryo straight. Natives both of cold and of warm climates in various parts of the world. The plants of this order possess acrid, irritant, and occasionally narcotic qualities. The bark of many of them is tough and tenacious, so as to be used for cordage. Daphne cannabina has a fibrous inner bark, which is used for ropes and for the manufacture of paper. Lagetta lintearia is called Lace-bark tree, on account of the beautiful meshes of its inner bark.

> Nat. Ord. 188.—AQUILARIACEÆ, the Aquilaria order.— Trees, with exstipulate leaves. Perianth tubular, with a 4-5-lobed imbricate limb. Stamens usually 8-10, inserted into the throat of the perianth. Ovary superior, 2-celled, with 2 suspended ovules. Fruit a 2-valved capsule, or succulent. Seeds exalbuminous. Natives of the tropical parts of Asia. Some of the plants yield resinous matter, which is used as a stimulant.

> Nat. Ord. 189.—Samydaceæ, the Samyda order.— Trees or shrubs, with alternate, stipulate, usually dotted leaves. Perianth 4-5-parted; æstivation imbricate. Stamens inserted into the tube of the perianth, 2, 3, or 4 times as many as its divisions, some of them occasionally sterile; filaments united. Ovary superior, 1-celled, with numerous ovules. Fruit, a leathery, 1-celled, 3-5-valved capsule. Seeds albuminous, arillate, attached to parietal placentas. Tropical, chiefly American plants, with astringent bark and leaves.

Nat. Ord. 190.—Santalaceæ, the Sandal-wood order. -Trees, shrubs, or herbs, with alternate, entire, exstipulate leaves, and small flowers, sometimes & Q. Perianth adherent, 4-5-cleft, valvate. Stamens 4-5, inserted into the throat of the perianth opposite its segments. Ovary 1celled; ovules 1-4; placenta central. Fruit monospermal, dry, or succulent. Seed albuminous. Found in Europe, Asia, America, and Australia. Some of the species are astringent, others yield edible fruit. The wood is in some

instances fragrant, and the bark is tough and tenacious. Santalum album, a Malabar tree, from 25 to 30 feet high, produces Sandal-wood, which is used as a perfume in China, and in India as an astringent.

Nat. Ord. 191.—Aristolochiaceæ, the Birthwort order (Fig. 531).—Herbs or climbing shrubby plants, with alternate leaves, solitary or clustered brown or greenish coloured \$ flowers, and wood arranged in separable wedges. Perianth tubular (Fig. 383), adherent, valvate. Stamens 6-12, epigynous, distinct or adherent to the style and stigmas (Fig. 248). Ovary 3-6-celled; ovules ∞ ; stigmas radiating. Fruit a 3-6-celled polyspermal capsule or berry. Seeds albuminous; embryo minute. Found in various parts of the world, but abundant in the tropical parts of South America. Birthworts have pungent, aromatic, stimulant, and tonic properties. Some have been celebrated for their effects on the uterus, others as antidotes for snakebites. The root of various species of Aristolochia have been used as emmenagogues. The root of A. serpentaria, Virginian Snake-root, formerly of repute in typhus fever, and also in cases of snake-bite, is a valuable stomachic.

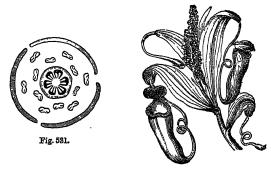


Fig. 532.

Fig. 531. Diagram of the flower of Asarum europæum, Asarabacca, showing three divisions of the perianth, nine stamens in three rows, and a three-celled ovary.

... 552. Flowering branch of Nepenthes distillatoria, the Pitcher-plant. The racemose flowers are seen with the operculate ascidia at the end of the leaves.

Nat. Ord. 192.—NEPENTHACEÆ, the Pitcher-plant order (Fig. 532).—Herbaceous or suffruticose plants, with alternate leaves, having calyptrimorphous ascidia at their extremities (Fig. 140), wood in separable wedges, and racemose diœcious flowers. Perianth inferior, 4-leaved, imbricate. Stamens columnar, with anthers collected into a Ovary superior, tetragonal, 4-celled; ovules ∞ ; ascending. Fruit a 4-celled, 4-valved capsule, loculicidal. Seeds with a loose testa, albuminous. Found in marshy ground in the East Indies and China.

Nat. Ord. 193.—Datiscaceæ, the Datisca order.-Herbs or trees, with alternate exstipulate leaves, and 5 2 flowers. Perianth, 3-4 divided, adherent to the ovary. Stamens 3-7, ovary unilocular, with 3-4 polyspermous parietal placentas. Fruit a 1-celled capsule opening at the apex. Seeds strophiolate, exalbuminous. The plants are scattered over various parts of the world, chiefly in the northern hemisphere. Bitter and purgative properties are met with in the order. Some yield fibres.

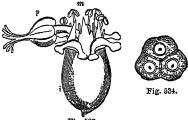
Nat. Ord. 194.—EMPETRACEÆ, the Crowberry order.— Shrubs, with heath-like, evergreen, exstipulate leaves, and small axillary unisexual flowers. Perianth of 4-6 hypogynous persistent scales, the innermost sometimes petaloid and united. Stamens 2-3, alternate with the inner row of scales. Ovary free, on a fleshy disk, 2-9-celled; ovules solitary. Fruit fleshy, with 2-9 nucules. Seed solitary, ascending; embryo with an inferior radicle. A small group, allied to Euphorbiaceæ, and distinguished chiefly by its ascending seeds and inferior radicle. Natives chiefly of the northern parts of Europe and America. Their leaves

Botany. *Plate CXXXII.

and fruit are often subacid. Empetrum nigrum, Crowberry, has black watery fruit.

Nat. Ord. 195.—EUPHORBIACEÆ, the Spurgewort order*

(Figs. 533, 534).--Trees, shrubs, or herbs, with opposite or alternate, often stipulate leaves, and involucrate (Fig. 533), unisexual, sometimes, achlamydeous flowers (Fig. 209). Peri-



(Fig. 209). Perianth, when present, fig. 533. Involuce, 4, of Enphorbia, containing inferior, lobed, with glandular, scaly, or petaloid appendaments. Saly, or petaloid appendaments. Saly, Section of tricoccons fruit of Euphorbia.

ages. Stamens definite or ∞, separate (Fig. 246), or united in one or more bundles (Fig. 251). Ovary 1, 2, or 3 or more celled; ovules 1 or 2, suspended. Fruit usually tricoccous (Fig. 534), the carpels separating with elasticity, sometimes fleshy and indehiscent. Seeds albuminous, often arillate. Embryo with a superior radicle. Lindley considers this a dichlamydeous order, and as becoming monochlamydeous or achlamydeous by abortion. The plants abound in equinoctial America. Some are found in North America, Africa, India, and Europe. The plants of the order are generally acrid and poisonous, abounding in a milky juice. Starchy matter is procured from many of the species, as well as oils and caoutchouc. Croton Eleuteria produces a tonic bark known by the name of Cascarilla. The seeds of C. Tiglium yield, by expression, Croton-oil, which is a drastic purgative in doses of one or two drops. Euphorbia Lathyris, Caper-spurge, has been used as a purgative. E. officinarum is the source of the purgative resin *Pl. CXIII. called Euphorbium. Janipha Manihot* is the Cassava or Manioc plant. Oldfieldia africana is the tree which supplies the African Teak. The seeds of Ricinus communis yield Castor-oil by expression.

Nat. Ord. 196.—Scepaceæ, the Scepa order.—Trees, with alternate stipulate leaves and unisexual flowers, resembling Euphorbiaceæ, and differing chiefly in being amentiferous. The perianth is 4, 5, or 6-leaved; stamens 2-5; ovary 2-celled, ovules in pairs; seeds arillate, often buried in hairs. Natives of India.

Nat. Ord. 197.—CALLITRICHACEÆ, the Starwort order. -Aquatic herbs, with opposite leaves, and minute axillary unisexual achlamydeous flowers. Stamen 1, rarely 2; anther reniform, 1-celled. Ovary solitary, tetragonal, 4-celled; ovules solitary in each cell; styles 2. Fruit 4-celled, 4seeded, indehiscent. Seeds peltate, albuminous; embryo

with a superior radicle. Natives of still waters in Europe and North America.

Nat. Ord. 198.— CERA-TOPHYLLACEÆ, the Hornwort order.-Aquatic herbs, with verticillate leaves and monœcious flowers. Perianth inferior, 10-12-cleft; anthers sessile, 12-20; ovary 1-celled, sessile, 12-20; ovary 1-celled, with 1 pendulous ovule. Fruit an achene; seed exalbuminous; embryo with an inferior radicle. Found in ditches in various parts of the world.

Nat. Ord. 199.—URTICA-CEE, the Nettle and Hemporder (Figs. 535, 536).—
Trees, shrubs, or herbs, with

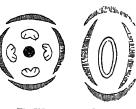


Fig. 535. Fig. 536.

watery juice and alternate stipulate leaves, often covered

with asperities or stinging hairs (Fig. 48). Flowers uni- Botany. sexual, rarely \$\varphi\$, scattered or collected into heads or catkins. Perianth divided; stamens definite, opposite the lobes of the perianth, and inserted into its base; filaments sometimes curved and elastic (Fig. 378); ovary superior, 1-celled, with a solitary ovule; fruit indehiscent, with a single seed. Embryo straight, hooked, or spiral, with or without albumen; radicle superior. Natives chiefly of temperate regions. Some of the plants have caustic juice connected with stinging hairs; others yield valuable fibres. Occasionally narcotic qualities are present. Böhmeria nivea supplies the fibres whence Chinese grass-cloth is made. Cannabis sativa, is the common Hemp plant. An Indian variety, C. indica, possesses powerful narcotic qualities. Humulus Lupulus, the Hop, is cultivated on account of its bitter principle, Lupulin, which exists in the resinous scales (Fig. 54) surrounding the fruit.

Nat. Ord. 200.—Artocarpaceæ, the Bread-fruit* and *Plate CXXXIII.



Fig. 537. Male flower of Morus nigra, Black Mulberry, showing four stamens opposite the four segments of the perianth, and the rudimentary, pistil in the centre.

... 538. Fruit of the Mulberry, consisting of numerous female flowers united into a succulent mass. It is a polygynæcial or anthocarpous fruit.

Mulberry order (Figs. 537, 538).—Trees or shrubs, with a milky juice, and alternate lobed leaves, having large stipules. The flowers are 5 2, and are collected into dense heads or catkins. The plants are considered by many as a section of Urticaceæ, from which they differ chiefly in being lactescent, in their fruit being a sorosis (Fig. 326), or syconus (Fig. 157). Perianth divided (Fig. 537), often wanting; ovary 1-celled; ovules erect or pendulous. Fruit polygynœcial or anthocarpous, consisting of achenes immersed in the persistent fleshy perianths (Fig. 538), or situated upon (Fig. 156) or within large fleshy receptacles (Fig. 157). Seeds albuminous or exalbuminous; embryo straight or hooked. The plants of this order supply, in many instances, edible fruits; their milky juice often abounds in caoutchouc, and, in some instances, is bland and nutritious, while their inner bark supplies fibres. Bitter, tonic, as well as acrid and poisonous properties, are found in the order. Antiaris toxicaria is a large tree, whence the Javanese poison called Upas-Antiar is obtained, and which owes its activity to a peculiar principle Antiarin. Artocarpus incisa,* the *Plate Bread-fruit tree (Fig. 326), has large pinnatifid leaves, CXXXIII.

while A. integrifolia, the Jack-fruit, has undivided leaves. Galactodendron utile, the Cow-tree of South America, has a nutritive milky juice. Dorstenia Contrayerva, and other species (Fig. 156), have a stimulant, tonic, and diaphoretic rhizome. Ficus Carica, the common Fig (Fig. 157), is used as a laxative and as a cataplasm. Urostigma (Ficus) elasticum, and other species, supply caoutchouc abundantly. U. indicum (benghalense) is the Banyan-tree of India (Fig. 65).

Nat. Ord. 201.—Ulmaceæ, the Elm order.—Trees or shrubs, with scabrous, alternate, stipuled leaves, and g or ₹ ? flowers in loose clusters. Perianth inferior, membranous, campanulate, irregular. Stamens definite, attached to the base of the perianth. Ovary 1-2-celled; ovules solitary, pendulous; stigmas 2. Fruit 1 or 2-celled, indehiscent. dry, or drupaceous. Seed solitary, without or with little albumen. Bitter and astringent properties exist in the bark and fruit of some of the plants of this order. Many are valuable timber-trees.

Nat. Ord. 202.—Stillagnaceæ, the Stilagoorder.—Trees or shrubs, with alternate, stipuled leaves, and minute 5 ? flowers in scaly spikes. They are allied to Urticaceæ, and are chiefly distinguished by their large disk and vertical antherine cells, opening transversely, and having a fleshy connective. Their fruit is drupaceous, and seed suspended and albuminous. Natives of the East Indies and of Mada-

Nat. Ord. 203.—LACISTEMACEÆ, the Lacistema order.— Shrubs, with alternate, simple stipuled leaves, and 덫 or ᄎ오 flowers in axillary catkins. Perianth free, divided, with a large bract. Stamen 1, hypogynous; connective separating antherine cells, which open transversely. Disk often fleshy. Ovary 1-celled; placentas parietal. Fruit a 1-celled 2-3-valved capsule, loculicidal. Seeds suspended, arillate, albuminous. Natives of the tropical woods of America.

Nat. Ord. 204.—Podostemonaceæ, the River-weed order.—Submersed aquatic herbs, with capillary or minute leaves, which are often densely imbricated. They have the aspect of Mosses or Liverworts. Flowers usually &. Perianth imperfect or 0, sometimes of 3 parts. with a spathe. Stamens 1, or many, hypogynous. Ovary 2-3-celled; placenta parietal or axile. Fruit a 2-3-valved capsule. Seeds numerous, exalbuminous; embryo orthotropal. Chiefly natives of South America. Some of the species are used for food.

Nat. Ord. 205.—CHLORANTHACEÆ, the Chloranthus order.—Herbs or undershrubs, with jointed stems, opposite simple leaves, sheathing petioles, interpetiolar stipules, and spiked of or \$2 flowers. Scaly bract, no perianth. Stamens definite, lateral, 1 or more; anthers 1-2-celled, with a fleshy connective. Ovary 1-celled; ovule orthotropal. Fruit drupaceous. Seed pendulous; embryo minute, at the apex of fleshy albumen; no vitellus. Natives of the warm regions of India and America chiefly. They have aromatic and stimulant properties. The leaves of *Chloranthus in*conspicuus are sometimes used to perfume tea.

Nat. Ord. 206.—SAURURACEÆ, the Lizard's-tail order.-Marshy herbs, with alternate, stipuled leaves, ♂ spiked flowers, each supported on a scale. Perianth 0. Stamens 3-6, hypogynous, club-shaped, persistent. Ovaries 3-4, distinct or united. Ovules few, orthotropal. Fruit of 4 achenes, or a 3-4-celled capsule. Embryo in a vitellus, outside mealy albumen, at the apex of the seed. Natives of North America, China, and Northern India.

Nat. Ord. 207.—PIPERACEÆ, the Pepper order (Figs. 539 and 540).—Shrubs or herbs with jointed stems, usually





Fig. 540.

Fig. 539. Branch of Piper longum, a species of Charica, perhaps C. Roxburghii, showing its spiked female flowers, which, when dried, constitute Long Pepper. The leaves are cordate acute. Charica perpuloides and C. officinarum, also supply the officinal Long Pepper, according to Miquel.

... 540. Piper nigrum, the plant which yields Black and White Pepper, with its spiked flowers and cordate acuminate leaves.

opposite or verticillate leaves, stipules sometimes present, flowers & in spikes, each supported on a bract, no perianth. Stamens 2 or more; ovary free, 1-celled; ovule 1, erect, orthotropal. Fruit somewhat fleshy, indehiscent, 1-celled,

1-seeded. Seed erect; embryo in a vitellus or fleshy sac outside the albumen, and at the apex of the seed. The stems of Pepper have a peculiar arrangement of the woody matter in wedges and not in concentric zones. Natives of tropical regions, especially in America and Asia. The plants of this order are pungent and aromatic, owing to the presence of an acrid resin, an oil, and a crystalline matter called Piperin. Some possess narcotic qualities, others are astringent. Chavica Roxburghii, and other species (Fig. 539), produce Long-pepper, which is the dried female spikes. Cubeba officinalis, and other species, produce the aromatic pungent fruit called Cubebs. Piper nigrum (Fig. 540) is a climbing East Indian plant, the dried unripe fruit of which constitutes Black Pepper.

Nat. Ord. 208.—MYRICACEÆ, the Gale order (Fig. 541). -Amentiferous shrubs or small trees, with resinous glands, alternate leaves, and unisexual flowers. Perianth O. Stamens 2-8, usually in the axil of a bract; anthers 2-4-celled. Ovary 1-celled, with hypogynous scales; ovule solitary, orthotropal; stigmas 2. Fruit drupaceous, often covered with wax, and with adherent fleshy scales. Seed solitary, erect, exalbuminous; embryo with superior radicle. Found both in temperate and in tropical countries. plants have aromatic, tonic, and astringent properties. Tannic and benzoic acids, as well as wax, resin, and oil, are procured from different species. The berries of Myrica cerifera, Wax Myrtle or Candleberry (Fig. 541), furnish a greenish-coloured wax when put into hot water.

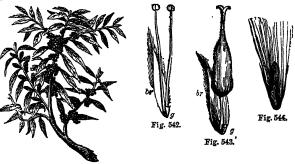


Fig. 541.

Fig. 541. Myrica cerifera, Wax Myrtle, or Candleberry bush. Its succulent fruit is covered with a waxy secretion.

... 542. Single male flower of a Willow, showing the single bract, br, bearing 2 stamens, with a gland, g, at the base. The flower is called naked or achiamydeous.

... 543. Single female flower of a Willow, with bract, br, bearing a stipitate or stalked ovary, with 2 stigmas, st, at the aummit, and a gland, g, at the base. The flower is also naked.

... 544. Comose seed of the Willow, showing the hairs proceeding from its base.

Nat. Ord. 209.—Salicaceæ, the Willow order (Figs. 542 to 544).—Amentiferous trees or shrubs (Fig. 167), with alternate, simple, stipuled leaves, sometimes with petiolary glands, and 52 flowers. Perianth 0, or cup-like. Stamens 2-30. Ovary superior, 1-celled; ovules numerous, erect, attached to the bottom of the cell, or to the base of 2 parietal placentas; stigmas 2. Fruit leathery, 1-celled, 2-valved, polyspermal. Seeds covered with basal silky hairs, exalbuminous; embryo erect, with an inferior radicle. Chiefly found in northern regions; some grow on the high mountains of South America, others in antarctic regions. The plants of this order are useful timber trees, and they are employed for various economical purposes. Their bark is tonic and astringent. The downy matter surrounding the seeds is used for stuffing cushions, and for making paper. The bark of Salix alba, S. Helix, S. purpurea, S. fragilis, S. caprea, S. pentandra, and many other species, contains a bitter tonic principle called Salicin.

Nat. Ord. 210.—Altingiaceæ or Balsamifluæ, the Liquidambar order:—Amentiferous unisexual trees, with alternate, stipuled leaves, and involucrate catkins. Anthers on, nearly sessile, with a few minute scales. Ovaries 2-

Botany. celled, collected into a round mass, each with a few scales; styles 2; ovules ∞ , amphitropal. Fruit, consisting of 2celled capsules, inclosed in scales, and forming a sort of cone. Seeds winged, peltate, albuminous; embryo inverted, radicle superior. Natives of the warmer parts of India and America; also found in the Levant. Fragrant and balsamic properties are met with in this order. The bark of some of the plants is bitter.

Nat. Ord. 211.—Betulacese, the Birch order (Fig. 545). -Amentiferous trees or shrubs, with alternate, simple, stipuled, often feather-veined leaves, and unisexual flowers, which have small scales in place of a perianth. Stamens opposite the scales. Ovary 2-celled; ovules 1 in each cell, pendulous, anatropal; stigmas 2. Fruit dry, indehiscent, 1celled, 1-seeded. Seed exalbuminous; radicle superior. In Alnus there is a 4-leaved membranous perianth. The plants of this order are usually timber trees, such as the Birch and Alder, with deciduous leaves, chiefly found in northern and cold regions. Their bark is tonic and astrin-

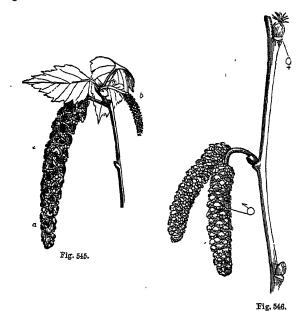


Fig. 545. Betula alba, the common Birch. Its male flowers, a, are produced in scaly catkins, and they have no proper perianth; its female flowers, b, are in scaly spikes or catkins, and are also naked.

546. Flowering branch of Corylus Avellana, the Hazel or Hasel, bearing male flowers t in catkins (amentiferous), and female flowers Q in rounded clusters.

Nat. Ord. 212.—Corylace or Cupulifere, the Hazel and Oak order (Fig 546).—Amentiferous trees or shrubs, with simple, alternate, stipulate, often feather-veined leaves, and monœcious flowers (Fig. 546). Barren flowers in catkins. Stamens 5-20, inserted in the base of scales, or of a membranous valvate perianth. Fertile flowers aggregate (Fig. 546, ♀), or on a spike. Ovary, with several cells, crowned by the remains of an adherent perianth inclosed in an involucre or cupula (Fig. 299). Ovules in pairs or solitary, pendulous or peltate; stigmas several. Fruit a glans (Fig. 300); seed solitary, exalbuminous. The plants abound in the forests of temperate regions in the form of Oaks, Hazels, Beeches, and Chestnuts. The plants of this order afford valuable timber and edible seeds. Astringency also prevails in a marked degree in the bark.

Nat. Ord. 213.—Casuarinaceæ, the Beefwood order.— Leafless trees, with pendulous, jointed, striated, sheathed branches, and spikes or heads of unisexual flowers proceeding from bracts. Barren flowers in spikes, and whorled round a jointed rachis. Perianth 2-leaved, with 2 alternating bracts. Stamen 1, carrying up the united 2 leaves of

the perianth in the form of a lid. Fertile flowers, capitate, Botany. without a jointed rachis, and naked. Ovary 1-celled; ovules 1 or 2, orthotropal; styles 2. Fruit, winged achenes, combined into a bracteated cone. Seed exalbuminous; epi-sperm with spiral cells; radicle superior. Tropical or subtropical plants, having the aspect of Equisetums. They abound in Australia. Their wood is hard and heavy, and on account of its colour is called Beefwood. The bark of some of the species of Casuarina is tonic and astringent.

Nat. Ord. 214.—PLATANACEE, the Plane order (Fig.

547).—Amentiferous trees or shrubs, with alternate, deciduous, palmate, or toothed, stipulate leaves, and unisexual naked flowers in globose catkins (Fig. 547). Barren flowers. single, Stamens mixed with scales. Fertile flowers. Ovary 1-celled; style thick and subulate. Ovules 1-2, orthotropal, suspended. Nuts cla-



vate, with a per-Branch of Platanus orientalis, showing the globose sistent style. Seeds clusters or catkins of female flowers.

usually solitary and albuminous: radicle inferior. Natives of the Levant and North America chiefly. The species of Platanus are fine trees, but their timber is not durable.

Nat. Ord. 215.—JUGLANDACEÆ, the Walnut order (Fig.

548).—Trees, with alternate, pinnate, stipuled leaves, and unisexual flowers. 5: Amentiferous. Perianth 2-3-6parted, with a scaly bract. Stamens 3 or more. 2: In terminal clusters or in loose racemes, with distinct or united bracts. Perianth adherent, 3-5-divided. Ovary 2-4-celled at the base, unilocular at the apex. Ovule solitary, orthotropal, and erect; style 1 or 2. Fruit solitary, a tryma, endocarp stony and often 2-valved. Seed exalbuminous, 2-4-lobed at the base, and partly divided by partial dissepiments. Natives chiefly of North America. Some are found in the East Indies, Persia, and the Caucasus. The plants are fine trees with edible oily seeds and an acrid bark. Purgative

Branch of Juglans regia, the Walnuttree, with an impari-pinnate leaf and a cluster of drupaceous fruit.



Fig. 548.

qualities are found in some of the species. , Carya alba, the common Hickory-tree, produces an eatable nut. Juglans regia is the Walnut-tree (Fig. 548).

Nat. Ord. 216.—GARRYACEÆ, the Garrya order.— Shrubs with opposite, exstipulate leaves, and amentiferous unisexual flowers, surrounded by united bracts. 5: Perianth of 4 leaves, alternating with 4 stamens. Q: Perianth adherent, bidentate. Ovary 1-celled styles 2; ovules 2, pendulous with long cords. Fruit a 2-seeded berry. Embryo minute in the base of fleshy albumen. The wood is not arranged in circles, and there is an absence of dotted vessels. Natives chiefly of the temperate parts of America. b. Sporogenæ or Rhizanthæ.—Having Spore-like Seeds with an Acotyledonous Embryo.

Nat. Ord. 217.—RAFFLESIACEÆ, the Rafflesia order (Fig.

549).—Stemless and leafless parasites, consisting only of ♥ or ★:♀ flowers growing on the branches of trees. Perianth superior, with a 5-parted limb, thickened processes or calli, either distinct or united



into a ring, being attached to the throat of the tube.

The essential or-

gans are combined in a column (synema) which adheres to the tube of the perianth. Anthers 2-celled, either distinct and opening by vertical apertures, or combined together, so as to become a multicellular mass opening by a common pore. Ovary 1-celled, placentas parietal. Fruit indehiscent. Seeds &; embryo cellular, undivided. East Indian and South American plants, parasitic on species of Cissus and on some Leguminosæ.

Nat. Ord. 218.—CYTINACEÆ, the Cistus-rape order.— Root-parasites, having ♥ or ਰ ♀ flowers, which are either solitary and stemless, or proceed from bracts arising from a scaly stalk. Perianth has a tubular form, and a 3-6-lobed limb. Anthers sessile, 2-celled, opening longitudinally. Ovary inferior, 1-celled; placentas parietal. Fruit containing pulp. Seeds ∞, immersed in pulp, and with a leathery covering; embryo undivided. Natives of the south of Europe and the Cape of Good Hope. Parasitical on the roots of Cistus, and on those of some succulent plants.

Nat. Ord. 219.—BALANOPHORACEÆ, the Balanophora order.—Leafless root-parasites, with tubers or rhizomes. whence proceed naked or scaly peduncles, bearing heads of unisexual bracteated flowers, mixed with filaments. 5: Flowers generally white. Perianth tubular, 3-5-lobed or entire. Stamens 3-5, rarely 1; anthers free or united into a multicellular mass. Q: Perianth having its tube closely investing the ovary, and its limb 0 or bilabiate; rarely 6leaved. Ovary 1-celled; ovule a pendulous, cellular nucleus; styles 1-2. Fruit somewhat drupaceous. Seed solitary, albuminous; embryo undivided. Parasitic on the roots of various Dicotyledons, and abounding on the mountains of tropical countries, especially the Andes and Himalava.

2. Gymnospermæ or Gymnogenæ.

Nat. Ord. 220.—Conferæ or Pinaceæ, the Conferous or Pine order (Figs. 550 to 553).—Resinous trees or shrubs. with disk-bearing woody tissue (Fig. 550), linear, accrose or 'anceolate, parallel-veined leaves, sometimes clustered and having a membranous sheath at the base (Fig. 551); flowers unisexual and achlamydeous. Male flowers in deciduous catkins, each consisting of 1 stamen or of several united; anthers 2 or many-celled, dehiscing longitudinally, often crested above (Fig. 552). Female flowers in cones; scales arising from the axil of membranous bracts supplying the place of ovaries; no style nor stigma; ovules naked, 1, 2, or several, at the base of each scale, with a large micropyle at the apex (Fig. 296). Fruit a cone formed of hardened scales, sometimes with the addition of bracts also, which either disappear, or become enlarged and lobed. Seed with a hard crustaceous spermoderm, sometimes winged (Figs. 553 and 328); embryo in fleshy oily albumen, sometimes poly-VOL V.

cotyledonous (Fig. 341); radicle having no definite boun- Botany. dary, but losing itself among the lax cells of the albumen near the apex of the seed. Conifers are found in various parts of the world, both in cold and in warm climates. They are most abundant in temperate regions, both in the northern and southern hemispheres. In the former they occur in

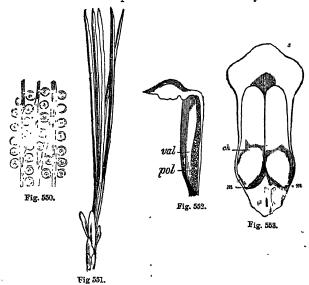


Fig. 550. Punctated or disk-bearing woody tissue of a Conifer.

... 551. Linear leaves of Pinus Strobus in a cluster of five, with a scaly sheath at the base.

... 552. Stamen of a Conifer, with longitudinal dehiscence, val, containing pollen, pol, and terminated by a crest at the apex.

... 558. Scale of a mature cone, with two winged seeds at the base, the micropyle, m, and the chalaza, ch.

the form of Pines, Spruces, Larches, Cedars, and Junipers, while in the latter we meet with species of Araucaria, Eutassa, and Dammara. The two following divisions have been adopted:—Sub-order 1. Abietineæ, the Fir tribe; ovules inverted, pollen oval, or curved (Fig. 267). Suborder 2. Cupressineæ, the Cypress tribe; ovules erect, pollen spheroidal, cone occasionally succulent, forming a galbulus. Conifers supply valuable timber, and yield resin, oil, pitch, and turpentine of various kinds. Abies balsamea, the Balm of Gilead Fir, and A. canadensis, Hemlock Spruce, yield Canada Balsam. Cedrus Libani, is the Cedar of Lebanon; C. Deodara, the Deodar, is a noble Himalayan Cedar, which some have thought to be a variety of the Cedar of Lebanon. Dammara australis, is the Kaurie or Cowdie Pine of New Zealand, which attains a height of 200 feet, and supplies valuable timber for masts, as well as a hard useful resin; D. orientalis yields the Dammar resin of India. Eutassa excelsa is the famous Norfolk Island Pine, which grows to

the height of 181-224 feet, and the wood of which is very valuable. The species of Juniperus have a succulent cone called galbulus.

Nat. Ord. 221.—TAXACEÆ, the Yew order (Figs. 554 and 555). Trees or shrubs, having narrow, evergreen, alternate, or distichous leaves which are either veinless or Fig. 554. Staminiferous flower of the Yew, with bracts at the base and nullied to Coniferse, and generally inlied to Coniferæ, and generally included as a section of the order, but differing in not producing true cones. They have monadelphous stamens (Fig. 554); solitary, naked ovules, and their seed is supported on, or inclosed by, a succulent





Fig. 554. at the base and numerous monadelphous stamens. Some
consider this as one
stamen divided into
numerous antherine
cells by the connective.
... 555. Fruit of the Yew, a
naked seed partially
inclosed in a succulent receptacle.

cup-shaped receptacle (Fig. 555). They are natives of temperate regions, and abound in Asiatic countries.

Botany. are found also in Europe, New Zealand, and the Cape of Good Hope. Like the Conifers they yield valuable and durable timber, along with resinous and astringent matter. Some are poisonous. The seeds of Taxus baccata, the

common Yew, are narcotico-acrid.

Nat. Ord. 222.—GNETACEÆ, the Jointed-Fir order.— Small trees or creeping shrubs, not resinous, with jointed stems and branches, and opposite, reticulated, sometimes scaly leaves. They are closely allied to Coniferæ and Taxaceæ and are chiefly distinguished by the want of true cones, by the male flowers having a 1-leaved perianth, by the anthers being 1-celled and porose, by a third ovular covering next the nucleus being protruded through the foramen in a style-like manner, and by their long, twisted embryonic suspensor. The episperm is succulent. Natives of temperate as well as warm regions in Europe, Asia, and South America. The seeds of several of the species are eaten. Within the succulent episperm of Gnetum urens, stinging needle-like cells exist.
Nat. Ord. 223.—CYCADACEÆ, the Cycas order (Fig.

556).-Small palm-like trees or shrubs, with unbranched stems, occasionally dichotomous, marked with leaf-scars, and having large medullary rays, along with pitted tissue. Leaves pinnate, and usually circinate in vernation. Flowers 5 2 and achlamydeous. Males in cones, the scales bearing clusters of 1-celled anthers on their lower surface. Females consisting of ovules on the edge of altered leaves, or placed below or at the base of scales. Seeds either hard, or having a soft, spongy spermoderm, sometimes polyemCycas revoluta, one of the false Sago
plants found in Japan.



by a long suspensor in a cavity of fleshy or mealy albumen: cotyledons unequal. Natives chiefly of the tropical and temperate regions of America and Asia. Cycads have a mucilaginous juice, in which there is often much starch, which is used for food. Cycas revoluta (Fig. 556), a Japan species, has starchy matter in its stem, which is collected and eaten like Sago. C. circinalis,* in the Moluccas, yields a similar CXXXIV. kind of false Sago. Species of Encephalartos supply what is called Caffre-bread.

Note. - Among Thalamifloral Exogens, the following orders contain Monochlamydeous or Achlamydeous species:—Ranunculaceæ 1, Menispermaceæ 6, Papaveraceæ 13, Flacourtiaceæ 18, Caryophyllaceæ 28, Sterculiaceæ 31, Byttneriaceæ 32, Tiliaceæ 33, Malpighiaceæ 45, Geraniaceæ 54, Rutaceæ 63, Xanthoxylaces 64. Among Calycifloral Exogens, the following orders contain Monochlamydeous or Achlamydeous species:
—Celastraces 68, Rhamnaces 71, Amyridaces 73, Leguminoss 75, Rosaceæ sect. Sanguisorbeæ 77, Lythraceæ 79, Combretaceæ 82, Myrtaceæ 86, Halorageaceæ 91, Cucurbitaceæ 93, Passifloraceæ 96, Portulacaceæ 99, Illecebraceæ 100, Tetragoniaceæ 103, Saxifragaceæ 107, Cunoniaceæ 109, Loranthaceæ 115. Among Corollifloral Exogens, the following orders contain Monochlamydeous or Achlamydeous species:-Oleaceæ 140, Primulaceæ 168.

CLASS II.-MONOCOTYLEDONES, ENDOGENÆ, OR AMPHIBRYA,

SUB-CLASS I.—DICTYOGENÆ.

Endogens having Net-veined Leaves, which usually disarticulate with the Stem. Woody Matter of the Rhizome disposed in a circular wedge-like manner.

Nat. Ord. 224.—DIOSCOREACEÆ, the Yam order. Twining shrubs, with epigeal or hypogeal tubers, usually

alternate leaves, and small bracteated, unisexual flowers Botany. growing in spikes. Perianth 6-cleft, in 2 rows, herbaceous. adherent. Stamens 6, inserted into the base of the perianth. Ovary inferior, 3-celled; ovules 1-2, suspended; style trifid. Fruit compressed, 3-celled, 2 cells often abortive, sometimes fleshy. Seeds albuminous; embryo in a cavity. Chiefly found in tropical countries. Tamus grows in temperate regions. Acridity prevails in the order, but is often associated with a large amount of starch. Various species of Dioscorea, such as D. sativa, D. alata, and D. aculeata, produces edible tubers, which are known by the name of Yams, and are used like potatoes. Tamus communis, Black Bryony, has an acrid purgative and emetic root.

Nat. Ord. 225. SMILACEÆ, the Sarsaparilla order

(Fig. 557).—Herbs or shrubby plants, often climbing, with petiolate leaves jointed to the stem, and hermaphrodite or unisexual flowers. Perianth 6-parted. Stamens 6, perigynous or hypogynous. Ovary 3-celled; stigmas 3; ovules orthotropal. Fruit a few or many-seeded berry. Seed albuminous. Natives of temperate and tropical regions. The plants of the order have demulcent, mucilaginous, and diuretic properties. Smilax embraces the various species of Sarsaparilla, the roots of which are used medicinally as leaves which are jointed with the



cinalis supplies Jamaica Sarsaparilla, and according to Seemann, Lisbon or Brazilian, Guatemala, and Rio Paraguay Sarza.

Nat. Ord. 226.—TRILLIACEÆ, the Trillium order.—Herbs with tubers or rhizomes, verticillate leaves, and large terminal \$\forall flowers. Perianth of 6 or eight parts, in 2 rows, the inner sometimes coloured. Stamens 6, 8, or 10, with apicilar processes. Ovary superior, 3-5 celled; placenta axile; styles 3-5. Fruit succulent, 3-5-celled. Seeds ∞ , albuminous. Natives of the temperate parts of Europe, Asia, and North America. The properties of the order are acrid, narcotic, and emetic.

Nat. Ord. 227. - ROXBURGHIACEÆ, the Roxburghia order.—Twining shrubs, with large, solitary ♥ flowers, allied to Trilliaceæ, and distinguished chiefly by their 1-celled, 2-valved fruit, with a basal placenta. Perianth 4-leaved, coloured. Stamens 4, hypogynous. Ovules anatropal. Natives of the hot parts of India.

Nat. Ord. 228.—PHILESIACEÆ, the Philesia order.—A small order, nearly allied to the last, from which it differs in its trimerous symmetry, parietal placentas, and orthotropal ovules. The plants are found in Chili, and seem to have properties like Smilax.

SUB-CLASS II.—PETALOIDEÆ OR FLORIDÆ.

1.—Epigynæ.—Perianth adherent, Ovary inferior, Flowers usually Hermaphrodite.

Nat. Ord. 229.—Hydrochardaceæ, the Frog-bit order. -Aquatic plants, with spathaceous, 💆, or unisexual flowers. Perianth of 6 leaves, the three inner petaloid. Ovary 1celled, or spuriously 3-9-celled; stigmas 3-9; placentas parietal. Fruit dry or fleshy, indehiscent; seeds exalbuminous; embryo straight, orthotropal. This order ought probably to be placed among the unisexual plants, and close to Naiadaceæ. Its perianth, however, differs from that of the plants in the division Incompletæ. Found chiefly in

* Plate

Botany.

Botany. Europe, Asia, and North America. Movements in the cells are seen under the microscope (Fig. 23). Anacharis Alsinastrum has become naturalized in many parts of Britain, and grows so rapidly as to fill up water-courses. Vallisneria (Fig. 22) is remarkable for its mode of impregnation.

Nat. Ord. 230.—Orchidaceze, the Orchis order (Figs. 558 and 559).—Terrestrial or epiphytic herbs or shrubs,

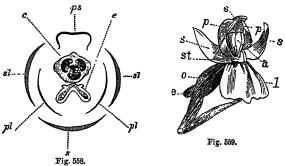


Fig. 558. Diagram of the flower of Orchis, s, sl, sl, the three divisions of the outer perianth, the first being inferior and the other two lateral; pl pl, the two lateral divisions of the inner perianth, ps, the superior division or the labellum, which becomes inferior by the twisting of the ovary; c, the fertile stamen, with its two pollen masses in the anther-lobes, the two lateral stamens are abortive; s, the one-celled ovary out transversely, having three parietal placentas.

centas.

559. Flower of an Orchid, consisting of three outer divisions of the perianth, s s, three inner p p l, the latter l, being the labellum, which is inferior in this figure by the twisting of the ovary; s, the spur of the labellum; o, the twisted ovary; s, the stigma; a, the anther containing pollinia.

with fibrous or tuberous roots (Fig. 69), a short stem or a pseudo-bulb (Fig. 70), entire, often sheathing leaves, and hermaphrodite showy flowers. Perianth of 6 segments, in two rows, mostly coloured, one, the lowest (so situated from the twisting of the ovary) generally differing in form from the rest, and often spurred; it is called the labellum or lip, and has sometimes 3 marked portions,—the lowest being the hypochilium, the middle the mesochilium, and the upper the epichilium. By adhesion or abortion, the parts of the perianth are sometimes reduced to 5 or 3. Essential organs united on a common column or gynostemium. Stamens 3, the 2 outer, sometimes the central one, being abortive; anthers 2-4-8-celled; pollen powdery, or adhering in masses called pollinia (Fig. 265), attached to the rostellum by a naked or saccate gland. Ovary 1-celled, with 3 parietal placentas, stigma a viscid space in front of the column. Fruit usually a 3-valved capsule, which often opens by 6 portions, owing to the midribs of the valves separating. Seeds ∞ , exalbuminous, with a loose reticulated episperm; embryo solid and fleshy. This order is well distinguished by its peculiar gynandrous flowers, labellum, and pollinia. Fragrant, aromatic, tonic, and mucilaginous properties are met with among Orchids. The roots of some of the terrestrial species contain much bassorin, and they constitute the nutritious substance called Salep. Blue colouring matter, like indigo, is met with in the leaves and flowers of some species. Orchis mascula, and other species, such as O. Morio and O. papilionacea, yield Salep. Vanilla planifolia and aromatica yield the fragrant Vanilla, used in confectionary and in the preparation of Chocolate.

Nat. Ord. 231.—Apostasiaceæ, the Apostasia order. -A small order of herbaceous plants closely allied to Orchids, from which they differ chiefly in their regular flowers, 3-celled loculicidal fruit, and in the style being free from the stamens throughout a considerable part of its length. The column is short, and is formed by the filaments along with the lower part of the style. Natives of the hot forests of India.

Nat. Ord. 232.—BURMANNIACEÆ, the Burmannia order. -A small order of herbaceous plants, with tufted, radical, acute leaves, or none, and a slender stem bearing alternate bract-like leaflets. They resemble Orchids in their minute

seeds with a loose reticulated episperm, their parietal placentas, and their solid embryo; and are chiefly distinguished by their regular tubular flowers, stamens 3 or 6, dehiscing transversely, free, and inserted into the tube of the coloured perianth. Natives chiefly of tropical regions in Asia, Africa, and America.

Nat. Ord. 233.—ZINGIBERACEÆ or SCITAMINEÆ, the Ginger order (Fig. 560).—Herbs, with a rhizome, simple sheathing leaves, the veins parallel and diverging from a midrib, and flowers arising from membranous spathes. Perianth tubular, irregular, and in 3 rows, the outer (calyx) 3-lobed, the middle (corolla) and inner (staminodes) each 3-parted, with a segment differing from the rest-Stamens 3, free, the two lateral abortive; anthers 2-celled. Fruit a 3-celled capsule or berry. Seeds numerous, albuminous; embryo in a vitellus. Nearly all tropical plants; abundant in the East Indies. plants of this order have aromatic, stimu- Zingiber officinale, lating properties, and are used as condiments, and as stomachic remedies. * Their or rootstock and spathaceous flowers are often very gaudy, and their bracts flowers.



Fig. 560.

are sometimes finely coloured. The capsules of Amomum Cardamomum are called round Cardamoms; those of A. angustifolium are the Madagascar Cardamoms. Curcuma longa has a yellow coloured rhizome, the branches of which constitute Turmeric. Zingiber officinale (Fig. 560) has an aromatic rhizome which constitutes Ginger.

Nat. Ord. 234.-MARANTACEÆ or CANNACEÆ, the Arrow-root order.-Herbaceous plants closely allied to Zingiberaceæ, from which they differ chiefly in the want of aroma, in having one of the lateral stamens fertile (the other two being abortive), in the single stamen having a petaloid filament, which bears a 1-celled anther (the other antherine lobe being sterile), in the style being petaloid, and in the embryo not being contained in a vitellus (Fig. 420). Natives of the tropics of America, Africa, and Asia. Amylaceous qualities prevail in this order, and starch is prepared from many of the species. The corms or rhizomes of Canna coccinea, C. edulis, and C. Achiras, all yield starch, some of which is known as Tous-les-mois. Maranta arundinacea yields Arrow-root.

Nat. Ord. 235.—MUSACEÆ, the Banana order (Fig. 561).

-Plants with underground stems, their petioles forming a spurious aerial stem (Fig. 86), their leaves having parallel veins diverging from a midrib, and their flowers being bracteated. Perianth irregular and petaloid, 6-parted in 2 rows. Stamens 6, inserted on the perianth. Anthers linear, 2-celled, often crested. Fruit a 3-celled loculicidal capsule, or succulent and indehiscent (Fig. 561). Seeds albuminous; embryo orthotropal. Tropical plants, which are valuable as regards food, clothing, and other domestic fruit of the Banana.

Durposes. They yield much nutritive (Musa sapientum). They yield much nutritive purposes.



Fig. 561.

food, as well as useful fibres. Musa paradisiaca, the Plantain, and M. sapientum, the Banana, supply well-known fruits, which serve for the food of the inhabitants of many tropical countries. M. textilis produces Manilla Hemp, which is used in manufacture.

Nat. Ord. 236.—IRIDACEÆ, the Iris order (Figs. 562 and 563).—Herbs with corms, rhizomes, or fibrous roots, and mostly equitant leaves, and spathaceous flowers. Perianth 6-divided in 2 rows, sometimes irregular. Stamens 3, inserted at the base of the outer row of the perianth; anthers innate, extrorse. Style dividing into 3 petaloid stigmatiferous portions (Fig. 563). Capsule 3-celled, 3-valved,

Found in various Botany. loculicidal. Seeds with hard albumen. temperate and warm parts of the world. The order has its maximum at the Cape of Good Hope. Acrid, purgative, and emetic properties are met with in some plants of the

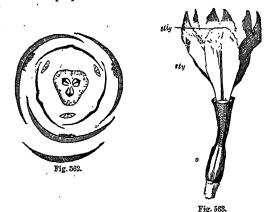


Fig. 562. Diagram of the flower of Iris, showing a bract or spathe below, three outer divisions of the persanth with hairs, three inner, three stamens, and three divisions of the ovary.

... 563. Fower of Iris, with the limb of the persanth removed. The ovary o, tube of persanth, t, upper petaloid and divided part of the style, stylen, stylen, stylen. sty, stigma, stig.

Some are fragrant and aromatic; others supply starch and materials for dyeing. The dried stigmatic processes of Crocus sativus constitute Saffron. The rhizome of Iris florentina, the Florence Iris, is the aromatic Orrisroot, which has the odour of Violets.

Nat. Ord. 237.—AMARYLLIDACEÆ, the Amaryllis order

(Fig. 564).—Bulbous, sometimes fibrous-rooted plants, with ensiform leaves, and showy flowers, which are mostly spathaceous and on scapes (Fig. 149). Perianth coloured, limb 6-parted or 6-cleft, sometimes with a corona, as in Narcissus (Fig. 149). Stamens 6, inserted at the bottom of the segments, sometimes united by a membrane, as in Pancratium; anthers introrse. Stigma 3-lobed. Fruit a 3-celled, Diagram of the flower of Leuco-3-valved, loculicidal capsule, with many seeds; or a berry with 1-3 seeds, spermoderm not crustaceous; albumen fleshy; embryo

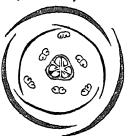


Fig. 564.

olagram of the nower of Leuco-jum versum, Spring Snowflake, with six divisions of the pe-rianth, three outer and three inner, six stamens in two ver-ticits, and a three-celled overy with a contral placents.

with radicle next the hilum. Natives of various parts of the world, but attaining their maximum at the Cape of Good Hope. Many Amaryllids display poisonous properties. Some are emetic and purgative, and some yield useful fibres. The bulbs of the Snowdrop and Snowflake are said to be emetic. Agave americana, American Aloe, is used in America for the manufacture of an intoxicating beverage. Its fibres constitute Pita Flax, and are sometimes made into paper.

Nat. Ord. 238.—HYPOXIDACEÆ, the Hypoxis order.— Herbs, with tuberous or fibrous roots, linear, dry, often hairy leaves, and trimerous flowers in scapes. Closely allied to Amaryllids, and differing chiefly in their strophiolate seeds, and embryo with the radicle remote from the hilum. Natives of warm regions.

Nat. Ord. 239.—Hemodoraceæ, the Blood-root order. -Perennial plants, with fibrous roots, ensiform equitant leaves, and woolly hairs or scurf on their stems and flowers. Perianth tubular, 6-divided. Stamens 3, opposite the segments, or 6; anthers introrse. Ovary 3-celled, sometimes 1-celled; style and stigma simple. Fruit usually capsular and valvular, covered by the withered perianth. Embryo

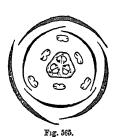
in cartilaginous albumen, radicle remote from the hilum. Botany. Natives of America, the Cape, and New Holland. Bitterness is found in some of the plants of the order (Aletris). Their roots are sometimes nutritious, and many of them are of a red colour, whence the name of the order.

Nat. Ord. 240.—TACCACEÆ, the Tacca order.—Perennial herbs, with tuberous roots, radical curve-veined leaves, and flowers in scapes. Perianth tubular, 6-divided. Stamens 6, inserted in the base of the segments; filaments petaloid; anther below the points of the filaments. Styles 3. Fruit baccate, 1-celled, or half 3-celled. Albumen fleshy. Acrid plants found in the warmest parts of India and Africa, as well as in the South Sea Islands. The tubers of Tacca pinnatifida, and other species, yield starch.

Nat. Ord. 241.—Bromeliace , the Pine-apple order.— American and chiefly tropical plants, with rigid, channelled, often scurfy and spiny leaves, and showy flowers. Outer perianth 3-parted, persistent; inner of 3 withering leaves. Stamens 6, inserted in the tube of the perianth; anthers introrse. Style single. Fruit capsular or succulent, 3-celled, many-seeded. Embryo minute, in the base of mealy albumen. Many of the plants grow in an epiphytic manner, and are called air-plants. This is the case especially with Tillandsias. Some of the species have anthelmintic properties. Some supply edible fruit, gum, colouring matter, and valuable fibres. The fibres of Ananassa sativa, the Pine-apple, are used in manufacture.

2. Hypogynæ.—Perianth free, Ovary superior, Flowers usually Hermaphrodite.

Nat. Ord. 242.—LILIACEÆ, the Lily order (Figs. 565 and 566).—Herbs, shrubs, or trees, with bulbs (Fig. 111),



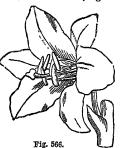


Fig. 565. Diagram of the flower of Fritillaria imperialis, Crown Imperial, showing a perianth of 6 parts, in two verticils, 6 stamens in two rows, and a 3-celled ovary.

... 566. Flower of Lilium album, White Lily, with a 6-leaved perianth, 6 stamens, and 1 style.

corms, rhizomes (Fig. 73), or fibrous roots, simple, sheathing, or clasping leaves, and regular flowers. Perianth coloured, of 6 leaves (Fig 566), or 6-cleft. Stamens 6, inserted in the perianth; anthers introrse. Ovary_3-celled (Fig. 279); style 1; stigma simple or 3-lobed. Fruit trilocular, capsular, or succulent. Seeds in 1 or 2 rows, sometimes in pairs or solitary; albumen fleshy. Natives both of temperate and tropical regions. In the latter we meet with arborescent species, such as the Dragon-trees, and with succulent species, as Aloes. In temperate climes we have species of Tulip, Lily, Hemerocallis, Convallaria, Fritillary, Hyacinth, and Star of Bethlehem. The properties of the order are various. Some of the plants are used as emetics and purgatives, while others are stimulant and diaphoretic. Some yield resinous and astringent matter, while others supply valuable materials for manufactures. Aloe is the genus which supplies the drug called Aloes. It is the inspissated juice of various species, such as A. spicata, vulgaris, socotrina, indica, and purpurascens. Phormium tenax supplies New Zealand flax. Urginea Scilla, known as Scilla or Squilla maritima, a Mediterranean sand plant, has an acrid bulb which, when dried.

Fig. 567.

Botany. constitutes the common Squill of the shops. It is used as an emetic, expectorant, and diuretic.

Nat. Ord. 243.—MELANTHACEÆ or COLCHICACEÆ, the Colchicum order (Fig. 567).—Herbs, with bulbs, corms (Fig. 74), or fasciculated roots, and white, green, or purple flowers, which are sometimes polygamous. Perianth petaloid, of 6 leaves, which are either separate, or united below into a tube. Stamens 6, anthers extrorse. Ovary 3-celled; style 3-parted; capsule 3-valved, septicidal (Colchicum), sometimes loculicidal (Uvularia). Seeds with a membranous episperm, and dense, fleshy albumen. Generally distributed over the world, but most abundant in northern countries. The

Diagram of the flower of Colchicum autumnale, Meadow Saffron, showing a 6-leaved perianth, in 2 verticils, 6 stamens, and an ovary formed of 3 car-pels. plants of this order have acrid, emetic, purgative, and sometimes narcotic properties. They are all more or less poisonous, and nearly all seem to contain the alkaloid called Veratria. Asagræa officinalis, is the chief source of the Cevadilla or Sabadilla seeds, which contain veratria, and are used in neuralgic and rheumatic affections. The corms and ripe seeds of Colchicum autumnale, the Meadow Saffron, contain an alkaloid Colchicia, and are prescribed in gout and rheumatism.

Nat. Ord. 244.—GILLIESIACEÆ, the Gilliesia order.—Bulbous herbs, with grass-like leaves, and umbellate, spathaceous flowers. Perianth of 2 portions,—outer petaloid and herbaceous, of 6 leaves, called by Lindley bracts; inner minute, either a single lobe or urceolate and 5-toothed. The latter is by some considered an abortive staminal row. Stamens 6, sometimes 3 sterile. Capsule 3-celled, 3-valved, loculicidal, polyspermal. Episperm black and brittle; embryo curved; albumen fleshy. Chilian plants.

Nat. Ord. 245.—Pontederia ce.e., the Pontederia order.-Aquatic plants, with leaves sheathing at the base, petioles occasionally dilated, and spathaceous flowers, either solitary or in spikes. Perianth coloured, tubular, 6-parted, irregular, persistent. Stamens 6 or 3, perigynous; anthers introrse. Capsule sometimes slightly adherent, 3-celled, 3-valved, loculicidal. Seeds numerous; placenta central; albumen mealy. Natives of America, India, and Africa.

Nat. Ord. 246.—XYRIDACEÆ, the Xyris order.—Swampy rush-like plants, with ensiform or filiform radical leaves sheathing at the base. Flowers in scaly heads. Perianth of 6 parts, 3 outer glumaceous. Stamens 6, 3 fertile inserted on the inner perianth. Anthers extrorse. Ovary 1celled; placentas parietal; ovules orthotropal. Capsule 1celled, 3-valved, polyspermal. Albumen fleshy; embryo remote from the hilum. Tropical plants. Some species of Xyris have been used in cutaneous affections.

Nat. Ord. 247.—PHILYDRACEÆ, the Water-wort order. -Plants allied closely to Xyrids, and differing chiefly in the want of an outer perianth, in the inner perianth being 2leaved, in having 3 stamens, 2 of which are abortive, and in the embryo being large in the axis of the albumen. The flowers have spathaceous bracts; the roots are fibrous, the stem simple, leafy, and often woolly, and the leaves sheath-

ing at the base. Natives of New Helland and China. Nat. Ord. 248.—COMMELYNACEÆ, the Spider-wort order. -Herbs, with flat leaves, usually sheathing at the base. Outer perianth of 3 parts, herbaceous; inner also 3, coloured, sometimes cohering. Stamens 6, or fewer, hypogynous. Anthers introrse; ovary 3-celled; placenta central; style 1. Capsule 2-3-celled, 2-3-valved, loculicidal. Seeds with a linear hilum; embryo pulley-shaped, in a cavity of the albumen, remote from the hilum. In Tradescantia the filaments are provided with jointed hairs, which show rotation in their cells. The rhizomes of some species of Commelyna are amylaceous and edible.

Nat. Ord. 249.—MAYACACEÆ, the Mayaca order.—Moss- Botany. like plants, with narrow leaves, resembling Spider-worts, but differing in their 1-celled anthers, carpels opposite the inner divisions of the perianth, 1-celled ovary and capsule, and parietal placentas. Natives of America.

Nat. Ord. 250.—Juncaceæ, the Rush order (Figs. 568 and 569).—Herbs, with fasciculate or fibrous roots, fistular or





Fig. 569. Fig. 563. Diagram of the flower of Luzula, Wood-rush, showing 6 divisions of the perianth in 2 rows, 6 stamens, and a 3-celled ovary.

... 569. Perianth of Luzula, with 6 divisions of its glumaceous perianth, 6 stamens, pistil with 1 style and 3 stigmas.

flat and grooved leaves, and glumaceous sometimes petaloid flowers in clusters, cymes, or heads. Perianth dry, greenish or brownish, 6-parted (Fig. 569). Stamens 6 or 3, perigvnous; anthers introrse. Ovary 1 or 3-celled; ovules 1, 3, or many in each cell; style 1; stigmas often 3. Fruit a 3-valved loculicidal capsule, or monospermal and indehiscent. Seeds with a thin spermoderm, which often becomes gelatinous when moistened; albumen fleshy; embryo minute. Natives chiefly of cold and temperate regions. The leaves are used to form matting and the bottoms of chairs, and the pith for the wicks of candles.

Nat. Ord. 251.—Palmæ, the Palm order (Fig. 570 to 573).—Arborescent plants, with a simple (Fig. 570), some-

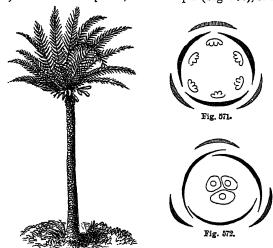


Fig. 570. Fig. 570. Phœnix dactylifera, the Date Palm. ... 571. Diagram of the 5 flower of Chamærops, Fan-palm, showing six divi-sions of the perianth and six stamens. "... 572. Diagram of the Q flower of Chamærops, showing six divisions of the perianth in two rows, and three cells of the ovary.

times branched stem, marked by the bases of the leaves or

their scars, leaves in terminal clusters, pinnate or fan-shaped flowers 5 ♀ or Ş, on a simple or branched spadix, inclosed in a 1 or many-valved spathe. Perianth in two verticils, each of 3 parts (Figs. 571 and 572). Stamens usually 6, seldom 3, sometimes ∞. Ovary 1-3-celled, with a single ovule in each cell. Fruit a nut or drupe, or berry. Albumen cartilaginous or hard, often ruminate,



Botany. with a central cavity; embryo in a particular cavity remote from the hilum (Fig. 573), its cotyledon often becoming enlarged during germination, and filling the central cavity. Chiefly tropical plants, requiring a mean temperature of 78°2 to 81°.5 F. Some, however, extend to temperate regions. Chamærops humilis, the dwarf Fan-palm, is found native in the south of Europe, and C. Palmetto grows in the milder parts of North America. Some have slender, reed-like stems, others attain a considerable diameter. Some have a low caudex, or a subterranean stem, while others have an erect trunk 190 feet high. Palms yield numerous important products, and they are applied to a great many uses. They supply starch, sugar, oil, wax, and edible fruits; their buds are eaten like vegetables; their leaves form coverings for habitations, and materials for manuscripts, the reticulum makes coarse cloth, and the saccharine juice is sometimes fermented, so as to form a spirit called arrack, or palm-wine called toddy. Areca Catechu furnishes the Betel-nut, used all over the East as a masticatory. Cocos nucifera, the Coconut Palm is perhaps put to a greater number of uses than any other Palm, both as regards food, luxuries, clothing, habitations, and utensils. Elais guineensis supplies the solid Palm-oil. Metroxylon læve, a native of Borneo and Sumatra, is one of the sources of the starchy matter called Sago. Phytelphas macrocarpa, a Palm of the Magdalena River district, is called the Vegetable Ivory-Palm, because the hard horny albumen of its seed is used like ivory. Sagus Rumphii is the Sago-Palm of Malacca.

Nat. Ord. 252.—Alismaceæ, the Water-plantain order. -Floating or marsh plants, with a creeping rhizome, narrow or broad leaves, and flowers in umbels, racemes, or panicles. Perianth of 6 pieces; outer 3 herbaceous; inner 3 petaloid. Ovaries several, 1-celled; ovules solitary, or 2 superposed. Fruit indehiscent. Seeds exalbuminous; embryo like a horse-shoe, undivided. Natives chiefly of northern countries. The fleshy rhizomes of Alisma and Sagittaria are edible.

Nat. Ord. 253.—Juncaginaceæ, the Arrow-grass order. -Marsh plants, with narrow radical leaves, and ♥ flowers in spikes or racemes. Perianth greenish. Stamens 6; anthers extrorse. Carpels 3-6, united, or distinct; ovules 1 or 2, erect. Fruit dry, 1-2-seeded. Albumen 0; embryo straight, with a lateral cleft. A small order of plants found in cold and temperate regions.

Nat. Ord. 254.—BUTOMACEÆ, the Flowering-rush order. -Aquatics, with very cellular leaves, often milky, and umbellate handsome flowers. Perianth of 6 pieces, 3 inner petaloid. Stamens definite or ∞ . Ovaries 3-6 or more, distinct or united; ovules ∞ . Fruit, follicles, distinct or united. Seeds ∞ , attached to a reticulated placenta, spread over the whole inner surface of the fruit; albumen 0. Natives chiefly of northern countries.

3. Incomplete.—Flowers incomplete, generally Unisexual, without a proper Perianth, or with a few Verticillate

Nat. Ord. 255.—Pandanaceæ, the Screw-pine order.— Trees or bushes, often branching dichotomously, or in a candelabra-like manner, having adventitious roots (Fig. 66), leaves imbricated, linear-lanceolate or pinnate or fan-shaped, and spiny; and flowers unisexual or polygamous, spathaceous, covering a spadix completely. Perianth 0, or a few scales. Stamens numerous; anthers 2-4-celled. Ovaries 1-celled, collected into parcels; stigmas sessile; ovules solitary or numerous. Fruit either 1-seeded fibrous nuts, or manyseeded berries. Albumen fleshy; embryo minute, without a lateral slit. Natives of tropical regions, and abundant in insular situations.

Nat. Ord. 256.—TYPHACEÆ, the Bulrush order.—Herbs, growing in marshes or ditches, having stems without nodes, igid, ensiform leaves, and monœcious flowers on a spadix, without a spathe. Perianth 3 or more scales, or a bundle Botany. of hairs. Stamens 1-6, distinct or monadelphous; anthers innate. Ovary solitary, 1-celled; ovule solitary, pendulous. Fruit dry or spongy, indehiscent, 1-celled, angular by pressure. Seed solitary, pendulous, with a membranous sper-moderm adhering to the pericarp. Embryo in the axis of mealy albumen, straight with a lateral cleft; radicle next the hilum. Most abundant in northern countries. Starch is a product of the rhizomes of many species of Typha, and the pollen, which is very abundant, is inflammable, and is also used for food.

Nat. Ord. 257.—Araceæ, the Arum order.*—Herbs or *Plate shrubby plants, sometimes climbing, often with corms; leaves CXXXV sheathing at the base, convolute in æstivation, sometimes compound, and usually with branching veins; flowers monœcious, on a spadix (Fig. 166), mostly with a spathe. Perianth 0. Stamens definite or on; anthers extrorse, 1 or 2-celled or more. Ovary with 1 or more cells. Fruit succulent; seeds pulpy; embryo in the axis of fleshy and mealy albumen, with a lateral cleft. Abundant in tropical climates; rare in cold or temperate regions. Acridity prevails in the order, and many of the plants are irritant poisons. The corms sometimes supply starch, which is separated from the acrid matter by washing. Arum maculatum, Cuckow-pint, or Wake-Robin, has an amylaceous acrid corm. The starch used to be separated in large quantities at Weymouth and in the island of Portland, and sold under the name of Portland Sago. Colocasia esculenta, and other species, have edible corms, which are called Cocoes and Eddoes in the West Indies.

Nat. Ord. 258.—Orontiaceæ or Acoraceæ, the Orontium or Sweet-flag order.-Herbs with broad, occasionally ensiform leaves, and spadiceous flowers inclosed by a spathe. They are usually associated with Araceæ, from which they differ in their hermaphrodite flowers, and in having frequently a perianth consisting of 4-8 scales. Lindley, on account of their & flowers, places them near Juncaceæ. Natives both of tropical and cold regions. Acridity is met with in this order, which also contains nutritious, bitter, and aromatic plants. Acorus Calamus, common Sweet-Sedge, has an agreeable odour, and has been used as a stimulant, tonic, and antispasmodic. Its starchy matter is associated with a fragrant oil, and is used as hair-powder.

Nat. Ord. 259.—Pistiaceæ or Lemnaceæ, the Duck-

weed order (Fig. 574).—Floating plants with lenticular or lobed leaves or fronds, bearing 1 or 2 monœcious flowers inclosed in a spathe, but with no perianth. Stamens definite, often monadelphous. Ovary 1celled; ovules 1 or more, erect or horizontal. Fruit indehiscent or membranous, or bursting transversely, or baccate, I or more-seeded. Seeds with a thick ribbed episperm and an indurated micropyle; embryo in the axis of fleshy albumen, with a lateral cleft, or at the apex of the nucleus. Natives both of cool and of warm regions. Lemnas form a green covering of pools in Britain. Pistia Stratiotes, Water - lettuce,

floats in the ponds of warm countries.

Nat. Ord. 260.—NAIADACEÆ or POTAMOGETONACEÆ, the Naias or Lemna minor, lesser Duckweed, showing the imperfect flowers produced on the frond and the distinct pictorhize or sheaths, 7, at the extremities of the roots.

Fig. 574.

Pondweed order.—Plants of fresh or salt water, with cellular leaves and stems, and inconspicuous spiked flowers, which are sometimes hermaphrodite. Perianth of 1-4 scaly pieces or 0. Stamens definite, hypogynous. Ovary free, of one or more carpels, 1-celled; ovule solitary, erect or

Botany. pendulous, rarely 3 and erect. Style simple, or 2-3-cleft. Fruit indehiscent, dry, 1-celled, and usually 1-seeded; albumen 0; embryo with a lateral cleft. What is called the perianth in Potamogeton, and a few other allied genera, is considered by some as composed of bracts, bearing unisexual flowers. If that is the true view, then this order will not include any plants. Natives of temperate and warm climates. Some species are styptic, others yield edible roots, and a few, as Zostera, are used for stuffing cushions and beds.

Nat. Ord. 261.—Triuridaceæ, the Triuris order.—A small tropical order of cellular, unisexual plants, allied to Naiadaceæ, but distinguished in part by their peculiar seed, which consists of a hard striated integument, containing an embryo in the form of a multicellular nucleus.

Nat. Ord. 262.—RESTIACEÆ, the Restio order.—Herbs or undershrubs, with narrow leaves or 0, naked or sheathed stalks, and flowers in bracteated heads or spikes, generally δ ♀; glumaceous bracts 2-6, sometimes 0. Stamens 2-3; anthers usually 1-celled. Ovary 1 or more-celled; ovules, one in each cell, pendulous. Fruit a capsule or nut. Embryo lenticular, outside the albumen. Natives chiefly of South America, Australia, and South Africa. Their wiry stems are used for baskets and brooms, and for thatching.

Nat. Ord. 263.—Eriocaulonaceæ, the Pipewort order. -Marsh plants, with minute, unisexual flowers, allied to the last order, and differing principally in their capitate inflorescence, 2-celled anthers, ovary surrounded by a 2-3toothed membranous tube, and seeds with rows of hairs. The species abound in South America, and they are also found in Australia and North America. Eriocaulon septangulare, jointed Pipewort, is the only species found in Britain. It is met with in Skye and Galway.

Nat. Ord. 264.—Desvauxiaceæ, the Bristlewort order. -Small herbs, like species of Scirpus, having setaceous leaves, flowers glumaceous in a spathe, distinguished from Restiaceæ principally in having separate ovaries attached to a common axis, and fruit consisting of utricles opening longitudinally. They inhabit the South Sea Islands and New Holland.

SUB-CLASS III .-- GLUMIFERÆ.

Nat. Ord. 265.—CYPERACEÆ, the Sedge order (Figs. 575 to 577).—Grass-like, cæspitose plants, have solid, usually unjointed, and frequently angular stems, leaves with en-

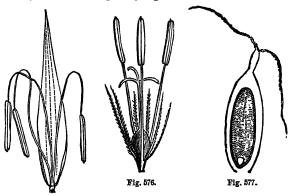


Fig. 575. Fig. 575. Staminiferous flower of Carex, consisting of a scale or glume bearing
3 stamens with long filaments and innate anthers.
... 576. Hermaphrodite flower of Scirpus, Club-rush. The glume has been
removed, and there are seen six hypogynous, retrorsely-toothed
bristles, three stamens with innate anthers, and the pistil with a
single style and three stigmas.
... 577. The ripe pistil of Carex cut vertically, showing the minute embryo
in the base of the albumen.

tire sheaths, and \(\rightarrow \rightarr or glume (Fig. 575), imbricated on a common axis, so as to form a spikelet. The lowermost glumes are often empty. Perianth 0, or existing in the female flowers in the form of

a membranaceous covering called perigynium (Fig. 235). Botany. Stamens hypogynous, definite, varying from 1 to 12, most commonly 3; anthers innate, 2-celled. Ovary superior, often surrounded by hypogynous bristles called setæ (Fig. 576); ovule 1, erect; style single, 2-3-cleft; stigmas 2-3. Fruit a crustaceous or bony achene. Embryo lenticular, in the base of fleshy or mealy albumen (Fig. 577). Generally distributed all over the world, and growing abundantly in moist situations. Some of the Sedges are diaphoretic and demulcent, others are bitter, stomachic, and astringent. The creeping stems of Carex arenaria are used as a substitute for Sarsaparilla.

Nat. Ord. 266.—Gramineæ, the Grass order (Figs. 578 and 579).—Herbaceous plants, with round, usually hollow,

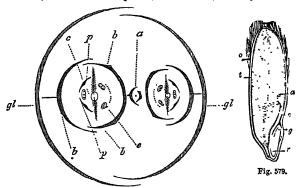


Fig. 578. Fig. 578.

Fig. 578.

Diagram of a spikelet of Avens, Oat, showing two glumes, gl gl, inclosing three flowers, one of which, a, is abortive; the two pales or glumeles, b b the inner apparently formed by the union of two; two scales, lodicules, p p, the third being abortive and marked by a dotted curve; three stamens, e, ovary, c, with two feathery styles.

279. Caryopsis, grain of Oat; pericarp, o, spermoderm, t, farinaceous albumen, a. Embryo plant lying at one side at the base, with radicle, r, plumule, g, and cotyledon, c.

jointed stems; narrow, alternate leaves, having a split sheath and often a ligule at its summit (Fig. 134); hermaphrodite or monœcious, or polygamous flowers, either solitary or arranged in spiked or panicled locustæ (Fig. 165). The flowers are considered as composed of a series of bracts; the outer, called glumes (Figs. 150 and 231), alternate, often unequal, usually 2, sometimes 1, rarely 0; the next, called pales or glumelles (paleæ or glumellæ), usually 2, alternate (Figs. 232 and 233), the lower or outer one being simple, the upper or inner having 2 dorsal or lateral ribs, and supposed to be formed by 2 pales united; sometimes 1 or both are wanting. The glumes inclose either one flower, as in Fox-tail grass, or more flowers, as in Wheat (Fig. 165), and among the flowers there are frequently abortive florets (Fig. 150). Stamens hypogynous, 1-6, usually 3 (Fig. 234); anthers versatile. Ovary superior, 1-celled, with 2 (rarely 1 or 0) hypogynous scales called lodicules (Figs. 234, sq); ovule 1; styles 2 or 3, rarely united; stigmas often feathery (Fig. 234). Fruit a caryopsis. Embryo lenticular, external, lying on one side, at the base of farinaceous albumen (Fig. 579). Germination endorhizal (Fig. 419). Grasses are widely distributed, and are found in all quarters of the globe. Schouw conjectures that they constitute 1-22d of all known plants. They are usually social plants, forming herbage in temperate regions, and sometimes becoming arborescent (50 or 60 feet high) in tropical countries. is perhaps the most important order in the vegetable kingdom, as supplying food for man and animals. To it belong the cultivated grains, Wheat, Oats, Barley, Rye,* Rice, *Plate Maize, and Millet. Most of these have been so long under CXXXVIL constant cultivation that their native state is unknown. The

properties of the order are nutritive in a marked degree.

Some yield fragrant oils, others produce sugar. The fra-

grant odour given out by Anthoxanthum, and other grasses used for hay, has been attributed to benzoic acid. Lolium

Botany. temulentum, Darnel-grass, has been said to be narcotic and poisonous, but this has not been fully proved. Andropogon Schananthus, Lemon-grass, and A. Calamus aromaticus, yield a fragrant oil. Bambusa arundinacea, the Bamboo, attains a great height, and in hothouses in Britain it has sometimes grown at the rate of a foot or more per day. Saccharum officinarum, is the Sugar-cane.

II.—CRYPTOGAMEÆ, ACOTYLEDONEÆ, OR FLOWERLESS PLANTS.

CLASS III.-ACOTYLEDONES OR ACRO-THALLOGENÆ. SUB-CLASS I.—ACROGENÆ, ACROBRYA, OR CORMOGENÆ.1

Nat. Ord. 267.—FILICES, the Fern order (Figs. 580 to 582).—Leafy plants, the leaves, or more properly fronds, being circinate in vernation (Fig. 100), and arising from a rhizome (Fig. 580), or from a hollow arborescent trunk (Fig. 87), having the acrogenous structure. The fronds bear on the veins of their lower surface (Figs 580 and 581), or along



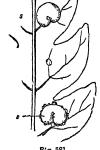


Fig. 580. Fig. 581. Fig. 580.

Fig. 580. Short-fruited Spleenwort or Lady-fern (Athyrium Filia-formina).

1. The entire fern with its short rhizome, and its delicate fronds, which, in the young state, are rolled up in a circinate manner;

2, one of the pinne, with its pinneles, bearing the oblong slightly-entired sori (clusters of sporangia) on their back. The fern is dorsiferous.

581. Portion of the frond of the male Shield-fern (Lastrea Felia-mas), showing two sori, 2 s, or clusters of sporangia covered with a reniform involucre or industum attached by the sinus.

their margins, sporangia, which open in various ways in order to discharge minute spores. The supposed organs of reproduction, called antheridia and archegonia (Figs. 396 and 398) are seen on the young frond, when first developed from the spore in the form of a prothallus.

The following divisions have been adopted:-Suborder 1. Polypodiaceæ, the Polypody tribe (Fig. 580); Sporangia, in variously-shaped clusters, called sori, on the back

or margins of the fronds, each sporangium having a vertical, incomplete ring (annulus), or a horizontal complete one, which, when mature, straightens so as to open the spore-case transversely, or irregularly, and thus discharge the spores (Fig. 354). The sori are covered by an indusium or involucre (Fig. 581), or by the reflexed margins of the frond.—Sub-order 2. Osmundaceæ, the Flowering-fern tribe (Fig. 582); Sporangia dorsal, or clustered on the margin of a transformed frond, with a terminal or dorsal ring, more or less complete, reticulated, and opening vertically.—Sub-order 3. Ophioglossaceæ, the Adder'stongue tribe; Sporangia in a



Fig. 582. Fig. 587.
Frond of the Royal Fern (Osmunda regalis), bearing divided pinne. f. The frond is bipinnate. At the extremity of the frond the pinne are altered so as to bear fructification, consisting of sporangia, arranged in a spikelike manner on a number of short axes.

spike-like form, sessile on the margin of a contracted frond, Botany. without reticulation or a ring (exannulate), 2-valved; fronds with straight vernation.—Sub-order 4. Danæaceæ, the Danæa tribe; Sporangia dorsal, combined in masses, exannulate, splitting irregularly by a central cleft. A moist insular climate is that best adapted for ferns in general. Ferns characterize the flora of New Zealand. Some Ferns are used medicinally as anthelmintics, while others are demulcent and astringent. The rhizomes of several species, are used as food in Australia, the Sandwich Islands, and India. Adiantum Capillus Veneris, true Maiden-hair, has been used in the preparation of Syrup of Capillaire. Lastrea Filix-mas is an effectual vermifuge in cases of Tape-worm.

Nat. Ord. 268.—Marsileaceæ or Rhizocarpeæ, the Pepperwort or Rhizocarp order.—Aquatic plants, with creeping stems, bearing leaves, which are usually divided into 3 or more cuneate portions, and have a circinate vernation. The fructification is produced at the base of the leafstalks, and consists of sporocarps or involucres inclosing clustered organs (Fig. 360), which consist of antheridian and pistillidian cells. The germinating body has an oval form, and occasionally a mammilla on one side, whence roots and leaves proceed. Found in ditches in various parts of the

world, chiefly in temperate regions.

Nat. Ord. 269.—LYCOPODIACEÆ, the Club-moss order.— Plants with creeping stems or corms, which produce leafy branches (Fig. 357), somewhat resembling Mosses. The leaves are small, sessile, and imbricated or verticillate. The fructification occurs in the axil of leaves, and often in a spike-like form (Fig. 357, f), and consists of kidney-shaped, 2-valved cases, which contain antheridian or spermatozoidal cells (Fig. 358), and roundish or four-sided bodies, called oophoridia, opening by 2 valves, and containing 4 large spores (Fig. 359). In the interior of the latter a pro-embryo is developed, in which archegonia are produced (Fig. 400), and thereafter impregnation gives rise to the germinating body. Natives both of cold and warm climates, but abounding in the tropics, and especially in insular situations. Some of the plants have emetic and purgative properties. The powdery matter contained in their fructification is inflammable, and is known as Lycopode powder or vegetable brimstone.

Nat. Ord. 270.—EQUISETACEÆ, the Horse-tail order (Fig. 355).—Cryptogams having rhizomes or underground stems, bearing hollow, striated, siliceous branches, which are jointed and have membranous sheaths at the articulations. The place of leaves is supplied by green-coloured branchlets, which are sometimes verticillate. The fructification consists of cone-like bodies bearing peltate polygonal scales, under which are spore-cases opening inwards by a longitudinal fissure, and inclosing spores with 2 hygrometric clubshaped elaters (Fig. 9). The plants have a confervoid prothallus, and on it antheridian and archegonial cells are developed. Found in ditches and rivers in all parts of the world, both warm and cold. A large amount of silica is found in the cuticle of the Horse-tails, associated also with

fluorine. The rhizomes contain starch.

Nat. Ord. 271. - Musci, the Moss order (Fig. 361). - Erect or creeping, terrestrial or aquatic plants, with cellular stems, bearing minute cellular leaves. The organs of fructification consist of cylindrical, pear-shaped, or ellipsoidal stalked sacs, containing antheridian cells with phytozoa (Fig. 348), and of spherical or obovate archegonia, from which, after impregnation, are developed urn-shaped sporangia (Fig. 393), supported on stalks called setæ, and containing germinating spores. The sporangia have a calyptra, an operculum, and frequently a peristome, consisting of processes called teeth (Fig. 20), which are either 4 or some multiple of that num-

¹ For full details in regard to structure and reproduction in the different Cryptogamic natural orders, see pages 142 and 155.

Botany. ber. They are found in all parts of the world, and abound in moist temperate regions. Species between 1100 and 1200. There are two divisions of the order. Sub-order 1. Andræaceæ, Split-mosses; Sporangia calyptrate, splitting longitudinally into 4 equal valves, which are kept together at the summit by a persistent operculum. Sub-order 2. Bryaceæ, true Urn-mosses; Sporangia calyptrate, opening at the summit, and not by valves.

Nat. Ord. 272.—HEPATICÆ, the Liverwort order (Fig. 362).—Plants having a cellular axis of growth which bears leaves on a thallus (Fig. 362). Antheridia (Fig. 363, a) and archegonia (Fig. 349) are placed either in the substance of the thallus, or on sessile or stalked processes. The stalks support sporangia or peltate sporangiferous receptacles. Sporangia sometimes open by valves, and bear elaters. The plants are generally distributed both in cold and warm climates, and more especially inhabit damp places. Some of the species of *Marchantia*, especially *M. hemisphærica*, have been recommended as poultices in cases of Anasarca. The following are the divisions of the order:—Sub-order 1. Jungermanniaceæ, the Scale-moss tribe; Sporangia opening by 4 valves, the spores mixed with elaters. Sub-order 2. Marchantiaceæ, the true Liverwort tribe; Sporangia not opening by valves, bursting irregularly, spores mixed with elaters. Sub-order 3. Ricciaceæ, the Crystalwort tribe; Sporangia not opening by valves, and having no elaters.

SUB-CLASS II .-- THALLOGENÆ, THALLOPHYTA, OR CELLULARES.

Nat. Ord. 273.—Lichenes, the Lichen order (Fig. 364).— Cellular plants, growing on stones, on the surface of the earth, or on trees, and taking up nourishment by all points of their surface, having a foliaceous, crustaceous, or leprous thallus (Fig. 364). Their fructification consists of thecæ or asci, containing 4, 8, 12, or 16 sporidia (Fig. 346). The thecæ are often mixed with paraphyses, and by their union form circular, cup-shaped, or linear masses, which are called There are also spermogones or conceptacles, containing cells with antherozoa, which are motionless, and have received the name of spermatia. The spermogones are either in the substance of the thallus, or superficial, and the spermatia are discharged through a pore. Between the upper and lower thalloid layers, green cells, called gonidia (Fig. 365), are found. Lichens are found in various parts of the world. The pulverulent species are the first plants which cover the bare rocks of newly-formed islands. of the Lichens are used for dyeing, others are employed as articles of food and medicine. Some Lichens are aromatic, and a fragrant powder called Cyprio at Rome is in part made from them. Oxalate of lime exists largely in some species, more especially in Variolarias. islandica, Iceland-moss, contains starch, along with a bitter principle; it has been used as a tonic and demulcent. Cladonia rangiferina, is called Reindeer-moss, on account of supplying food for that useful animal. Lecanora tartarea, called in commerce Rock-moss, supplies the dye denominated Cudbear. Roccella tinctoria is one of the Lichens imported under the name of Orchella-weed. The colouring matter is called Archil or Orchil; it is used for dyeing purple and red.

Nat. Ord. 274.—Fungi, the Mushroom order (Fig. 367).* -Cellular plants, with a spawn, mycelium (Fig. 18, m), by which they are nourished, and which bears organs of fructi-fication of various kinds. Spores are produced, which are either naked (Figs. 18 and 368), or inclosed in thecæ and mixed with elaters. There appear to be antheridian cells, containing spermatozoids, by the action of which on archegonial cells germinating spores are developed. In Agarics (Fig. 367) the mycelium bears tubercles inclosed in a volva, which ruptures so as to allow of the development of the stalked pileus, with its lamellæ and hymenium. This order contains esculent

and poisonous plants; the genus Agaricus, to which the true Botany. Mushroom belongs, contains both, and it is not easy to give rules for distinguishing the two kinds. Their qualities seem to depend in part on the mode in which they are prepared for food, and this may account for species which are eaten in some countries having proved poisonous in others. Fungi contain much nitrogen in their composition, and they do not appear to give out oxygen gas. They are often developed with great rapidity. The spawn spreads under ground, or in the interior of living or dead organisms, and when favourable circumstances occur, the fructification bursts forth with astonishing quickness. Many of them are developed on living plants, and cause disease and death by their parasitic growth. Agaricus campestris is the common Mushroom of Britain; it is distinguished in part by its pink gills. A. Georgii is another edible British species, which sometimes attains a large size. A. prunulus is said to be the most delicious Mushroom. Amanita muscaria* is a poisonous species, which produces giddiness and *Plate narcotic symptoms. Morchella esculenta, Morel, is an edi-CXXXVL ble Fungus. Penicillium glaucum is the common Mould fig. 1. developed wherever organic substances are in fitting conditions of moisture and temperature. The Vinegar-plant seems to be the abnormally developed mycelium of P. glaucum, or perhaps P. crustaceum. Sphæria sinensis, is a Fungus parasitic on a caterpillar. It is a celebrated drug in

Nat. Ord. 275.—CHARACEÆ, the Chara order (Fig. 21).— Aquatic plants composed of parallel cellular tubes, which give off whorled branches (Fig. 21), and which are often incrusted with carbonate of lime. In their tubes, rotation is observed. Their reproductive organs consist of globules containing antheridian cells with spirilla, and spiral nucules containing germinating cells or spores (Fig. 373). Charas are found submersed in stagnant fresh or salt water in various part of

China. Tuber is the genus which embraces the various kinds of Truffle (Fig. 366), an underground Fungus, which

is scented out by dogs and pigs.

the world. They have a fetid odour. Nat. Ord. 276.—Algæ, the Seaweed order (Fig. 39).— Cellular plants, found in the sea, in rivers, lakes, marshes, and hot springs, all over the world, consisting of a brown, red, or green thallus, sometimes stalked, which bears the organs of fructification (Fig. 39). These consist of antheridian cells containing phytozoa, and of others containing germinating spores of different kinds (Figs. 370 and 371). These organs of reproduction are often united in the same conceptacle (Fig. 369 b). In other cases, they are on different parts of the same plant, or even on different plants. The spores sometimes have moving cilia, and are called zoospores (Fig. 8), at other times four are united so as to constitute tetraspores (Fig. 371). In some of the filamentous Algæ there is a conjugation of 2 cells, so as to produce a spore (Fig. 19), in others there is a fissiparous division of cells (Fig. 13). Species of Algæ abound both in salt and fresh water, whether running or stagnant, and in mineral springs. There are three colours in Algæ, grass-green, olivaceous, and red. Some Seaweeds are microscopic, others growing in the depths of the Pacific have trunks exceeding in length those of the tallest forest trees, and fronds rivalling the leaves of the Palm. Many of the lower Algæ approach nearly to some of the lowest animal forms, and it is difficult to form a line of demarcation. Species of Navicula, Pleurosigma, and other allied forms, are placed by some among Diatoms, by others among animals. Peculiar forms are met with in diseased states of the stomach and bladder, which are referred to Diatoms; one of them is called Sarcinula ventriculi. Achlya prolifera is sometimes produced on the gills of gold fishes and other animals in a state of disease. The order has been divided in the following manner:-Sub-order 1. Melanospermeæ or Fucaceæ, brown-coloured Seaweeds (Fig. 39); Marine plants of an olive-green or olive-brown colour, con-

*Plate CXXXVI.

Botany. sisting of multicellular fronds, which assume a thalloid or a filamentous form; fructification consisting of conceptacles, containing archegonial and antheridian cells, the latter containing phytozoa, the former being developed as germinating spores. Sub-order 2. Rhodospermeæ or Ceramiaceæ, rose-coloured Seaweeds (Fig. 371); Marine plants of a rose-red, purple, or red-brown colour, leafy, cylindrical or filamentous; fructification consisting of conceptacles containing spores, and clavate filaments considered as antheridia. The spores are arranged often in fours, and are called tetraspores. Suborder 3. Chlorospermeæ, or Confervaceæ, green-coloured Seaweeds (Fig. 17); unicellular or multicellular (Figs. 11 and 19), marine or fresh-water plants; the cells contain a green (rarely purple or red) endochrome; reproduction effected by conjugation of cells (Fig. 19); zoospores (Fig. 8) often produced. Sub-order 4. Diatomaceæ, Brittleworts (Fig. 13); plant a frustule, consisting of a unilocular or a septate cell; cells composed of 2 symmetrical valves; gemmiparous increase by self-division; reproduction by conjugation and the formation of sporangia. There are 2 distinct sections: a. Diatomeæ; invested with a siliceous epidermal covering, and found both in salt and fresh water. b. Desmidieæ; minute fresh-water plants of a green colour, without a siliceous epidermis. Agardh divides Algæ into Fucoideæ, corresponding to Melanospermeæ of Harvey, Florideæ equi-

valent to Rhodospermeæ, and Zoospermeæ corresponding Botany. to Chlorospermeæ. The primary divisions into orders he bases on the structure and development of the sporiferous nucleus.

Many of the Algæ supply nutritious matter, and are used as food. Among them may be noticed species of Rhodymenia (Dulse), Sphærococcus, Alaria, Iridæa, Laminaria, Porphyra, Ulva, (Laver), and Gelidium. The edible nests formed by swallows in China have been supposed to be made of portions of gelatinous Seaweeds. Chondrus (Sphærococcus) crispus and C. mammillosus, receive the name of Carrageen or Irish Moss. Their fronds consist in great part of a substance somewhat allied to starch, which is extracted by boiling in water. On cooling it forms a jelly. Diatomaceæ occur in the form of extensive deposits in various parts of the world. It is said that the city of Richmond, in Virginia, is built on a stratum of Diatomaceous remains 18 feet in thickness. Extensive tracts in arctic and antarctic regions are covered with similar relics of a former vegetation. Laminaria saccharina yields upwards of 12 per cent. of Mannite. Nostoc edule is employed in China as an article of diet. Sargassum bacciferum constitutes the Gulfweed, which has been noticed by all who have crossed the Atlantic. The Gulf-weed has never been found attached, but always floating.

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PART III.

GEOGRAPHICAL BOTANY, OR THE GEOGRAPHICAL DISTRIBUTION OF PLANTS.

This department of Botany is one of vast extent and importance, and the consideration of it would require much more space than can be allotted to it in the present article. All that we can attempt to do is to give some general facts regarding the distribution of plants over the globe, and to point out some of the causes which regulate this distribution.

The nature of the vegetation covering the earth varies according to climate and locality. Plants are fitted for different kinds of soil, as well as for different amounts of temperature, light, and moisture. From the Poles to the Equator there is a constant variation in the nature of the Flora. Between the Lichens and Mosses of the Arctic and Antarctic regions, and the Palms, Bananas, and the Orchids of the Tropics, there is a series of regulated changes in the number and forms of the members of the vegetable kingdom. The same thing is observed in the vegetation of lofty mountains at the Equator, in descending from their summit to their base. As we proceed from the Poles to the Equator, vegetation increases in amount and in variety. From a region characterized by the presence of Lichens, Mosses, Saxifrages, and Gentians, we come to that of Cruciferæ and

Umbelliferæ; we then reach the grassy pastures, and the Coniferous and Amentiferous trees of temperate regions; and passing through the districts of the Vine, the Orange, and the dwarf Palm, to those of the Date, Coffee, Cotton, Sugar-cane, and Pine-apple, we arrive at the luxuriant vegetation of Equatorial regions. In this progress, as Humboldt remarks, we find organic life and vigour gradually augmenting with the increase of temperature. The number of species increases as we approach the Equator, and decreases as we retire from it. Each zone, however, has its own peculiar features. The Tropics have their variety and grandeur of vegetable forms, while the North has its meadows and green pastures, and the periodical awaking of nature in spring.

I.—INFLUENCE OF CLIMATE, MORE ESPECIALLY OF TEMPERATURE AND MOISTURE, ON THE DISTRIBU-TION OF PLANTS.

In determining the effects of climate on vegetation, our attention is chiefly directed to temperature and moisture,—to the daily, monthly, and annual distribution of heat, and

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Botany. to the amount of rain. We must also take into account light, the nature of the plant, its exposure, and many other causes, the effects of which are by no means easily estimated. They operate, however, usually within narrow limits, heat and moisture being the general agents. While in a given place the quantity of heat received varies according to different circumstances, it is found that the mean is pretty uniform. The quantity of heat is modified by winds and moisture. In China, for instance, the N.E. monsoon causes a great depression of temperature. The general preponderance of moist warm winds over dry cold ones is the reason why mild winters are more frequent in Europe than severe ones. Mountain chains, by intercepting winds, often produce a marked effect on climate. The effect of the sea in modifying the temperature is seen in insular climates, which are more equable than those of vast continents. Marine currents have also a decided influence on temperature. Thus the gulf-stream in the Northern Atlantic Ocean carries warm water towards the Arctic regions, and materially affects the temperature of the coasts around which it flows; while the Peruvian coast current, by bringing cold water from the antarctic regions towards the Equator, also modifies temperature. The temperature of the globe varies both as regards latitude and altitude, and vegetation at the same time undergoes changes. Latitudinally the globe, as regards temperature, may in a general way be divided into a tropical region extending from the Equator to 23° 28'; a sub-tropical, as far as 40°; a temperate from 40° to 60°; and a cold region beyond 60°. In a hypsometrical or altitudinal point of view, different zones of temperature are recognised, corresponding more or less with those of latitude. On an average, it may be said, that there is a difference of 1° of Fahrenheit for every 300 or 400 feet of ascent, and a difference of 1° of the thermometer in the boiling point of water for every 550 feet of ascent.

Each species of plants can bear a definite range of temperature. A certain amount of heat is also required during a given period of time, in order that a plant may be enabled to perform all its functions properly. Although a plant may continue to live in a certain climate, it may not thrive. The only true indication of climatal adaptation is, that the plant can perfect its seed and produce its various secretions. The latitude of a place does not at once tell the range of temperature. Many places in the same parallel of latitude differ widely in this respect. Lines, called Isothermal, have been drawn through places in which the mean annual temperature is the same, and it is found that while at the Equator these correspond nearly with the lines of latitude, as we recede from the Equator the two are widely separated. Yearly isotherms run in curves, rising in their course from ' the east of America towards the west of Europe, and sinking towards the south in the interior of the Continent. The yearly isotherm of 50° passes through latitude 42° 30' in the east of America, 51° 30' in England, 47° 30' in Hungary, and 40° in Eastern Asia. The want of conformity between the isothermal and latitudinal lines will be easily understood, when we consider that a place having a moderate summer and winter temperature may have the same annual mean as one having a very cold winter and a very warm summer. The vegetation in such districts would, however, be very different, and thus the annual isotherms are not sufficient for the purposes of botanical geography. Plants which stand the winter of London will not withstand the cold of places in Hungary in the same annual isotherm. In estimating, therefore, the effect of different climates on vegetation, attention must be paid also to the summer and winter heat. Lines passing through places with an equal mean summer heat are called Isotheral, while those indicating an equal mean winter temperature are called Isocheimal or Isocheiminal. The latter in continents bend considerably towards the south, while the former bend towards the north,

but approach nearer the parallels of latitude in the interior Botany. of continents. Some plants require a long period of winter repose and a few weeks only of warm and continued summer; others demand a dry season succeeded by a moist one. Some require a hot summer after an extremely cold winter of moderate duration; others succeed in a climate where the temperature of both seasons is moderate. In determining the limits of distribution in the vegetable kingdom, we must know the mean monthly and the mean daily temperature during those periods when vegetation is active. We. must ascertain the number of days which a plant requires to produce successively its leaves, flowers, and fruit, and we must estimate the mean temperature during that period. The conditions which define the limits of a plant require that we should know at what degree of temperature its vegetation begins and ends, and further, the sum of the mean temperatures during that time.

Light and heat are so intimately connected, and so generally accompany each other, that the laws of the one are very nearly those of the other. Both of them are of the utmost importance in vegetation. Light is concerned in the various functions of plants. The physiological action of the leaves cannot go on without it, and the activity of vegetable life is in no small degree dependent on it. Some plants require full exposure to light, others luxuriate in the shade. The difference of the intensity of light in different countries influences the secretions of plants, and has a certain effect on the nature of the vegetation. While the chemical constitution of the atmosphere is nearly the same everywhere, This depends both on elevaits density varies much. tion and on the matters which may be suspended in it. It is probable that the varying density of the atmosphere at different elevations produces little or no effects in comparison with those which result from the modifications which the temperature, light, and humidity of the air undergo.

Moisture is an agent which exerts a powerful influence on the distribution of plants. Vegetation develops itself only when moisture is present. Very dry regions are deficient in vegetable productions, while the luxuriance of tropical vegetation is connected with great heat and moisture. Plants differ in regard to the quantity of moisture they require. Some are of a loose, spongy texture, with large, soft leaves, little or no pubescence, and many stomata, and demand a great deal of water. Others, growing in sandy, dry situations, where little rain falls, are firm and succulent, and often have long hairs and few stomata. The hard dry texture of the leaves of Banksias and other Australian plants, seems to be connected with the small amount of moisture in the atmosphere. Forests have a marked effect on the humidity of climates, and the felling of them has often been productive of very injurious consequences, by diminishing the quantity of water. In warm climates, the dry season may be said to correspond to our winter in its effects on vegetation. In some parts of South America, where no rain falls for many months of the year, the leaves during the dry season fall; buds are developed in their axils, and it is only when the wet season arrives that the trees become clothed with verdure, and the herbage appears.

Epirrheology or the influence of various physical agents on plants, is well illustrated by the variations in the epochs of foliation, defoliation, flowering, and fruiting. The unfolding of the leaves takes place at different periods of the year in different countries. Thus the Elm (Ulmus campestris) unfolds its leaves at Naples at the beginning of February, at Paris in the month of March, in England 15th April, and at Upsal about the middle of March. Schubler found in general that in the middle latitudes of Europe and North America, the flowering of plants is delayed four days for each degree of latitude towards the north. Berghaus remarks that in higher latitudes, in districts situated in the north of Germany, the development of vegetation is less re-

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Wheat harvest begins at Naples in June, in central Germany in July, in the south of England and the middle districts of Sweden about the 4th of August. Barley harvest commences at Naples in June, in central Germany about the end of July or beginning of August, in the south of England about the 14th of August, and in the middle districts of Sweden about the 4th of August. Ripe Cherries may be had at Naples during the first days of May, at Paris and in central Germany about the end of June, and in the south of England about the 22d of July. From observations made during two years in Saxony, we find, as a mean result, that from the flowering to the ripening of the fruit, 56 days are required for Wheat, 59 for Rye, 31 for Barley, 45 for Oats. Thurmann states that in the Jura, generally speaking, a delay of 17 days in the harvest corresponds to a difference of altitude of 1000 feet. On the Alps, according to Schlagintweit, there is a delay of 11 days in the development of vegetation for every 1000 feet. Quetelet finds that in the climate of Europe every 600 or 700 feet produces a delay of about 4 days, which is equal to about 1° of latitude.

As regards the fall of the leaf, or defoliation, Berghaus remarks, that the Hazel-nut tree, the Ash, Lime, Poplar, and Maple, lose their leaves at Upsala at the very beginning of autumn; while in the neighbourhood of Naples they remain in full foliage during the whole month of November. The Apple-tree, the Fig-tree, the Elm, Birch, and different kinds of Oak, which in Paris are deprived of their leaves at the beginning of November, retain them at Naples till the end of December. In England, the Walnut is one of the first trees that loses its leaves; and after it the Mulberry, the Ash (especially when it has had much blossom), and then the Horse-chestnut.

II.—INFLUENCE OF SOILS ON THE DISTRIBUTION OF PLANTS.

Soils, or the media in which the roots of plants grow, regulate to a certain degree their distribution. In estimating this influence we must take into account the geognostic nature of the soil, its state of aggregation, its temperature, moisture, and exposure. Some plants are terrestrial, others are aquatic; some grow suspended in the air, others are parasitic. The effects produced by ordinary soils depend perhaps more on their mechanical nature than on their chemical composition. Hard, undecomposed felspar will bear a scanty vegetation, but when disintegrated and loose it affords abundant nourishment. The vegetation of limestone and trap rocks is more luxuriant than that of sandy soils. The moisture retained by aluminous soils is much greater than that by siliceous soils. Many plants seem to thrive best on chalky soils, others on siliceous, argillaceous, or peaty soils. Certain species grow only on soils impregnated with saline matters; others require to be within the influence of the sea. Parasites are often confined to peculiar species of plants.

Plants, in reference to the physical localities or stations in which they grow, have been divided into terrestrial, aquatic, marshy, epiphytic, and parasitic. Among terrestrial plants, the nature of the soil in which they grow gives rise to various groups. Arenaceous or sand plants have a peculiar character in all parts of the world, and the greater number are probably grasses. Some of them bind the loose sand by their creeping stems. Calcareous or chalk plants are found on limestone rocks. Many Orchids belong to this division, especially species of Ophrys and Cypripedium.

Saline plants are those found in maritime situations, or near salt lakes, and which seem to require much soda in their composition, and which have been called Halophytes. Among them are species of Salsola, Salicornia, and Statice. Rupestral and mural plants are those found on rocks and walls, such as species of Saxifrage, Sedum, Draba, Sisymbrium, Parietaria, Linaria Cymbalaria, Asplenium Rutamuraria, A. Trichomanes, Lichens, and Mosses. Some also grow on the ruins of old buildings, and on rubbish-heaps, &c., near the habitations of man and animals. Among these are included Nettles, Docks, Hyoscyamus, Xanthium, and Sempervivum tectorum. Plants which grow in cultivated grounds, as in fields and gardens, may be said to form a special division. Among them may be noticed Centaurea Cyanus, Lychnis Githago, Spergula arvensis, Sinapis arvensis, Lolium temulentum, Stellaria media, species of Lamium, Chenopodium and Euphorbia.

Plants of uncultivated ground are:—Meadow and Pasture plants, such as Grasses, Trefoils, Clovers, species of Ranunculus, Veronica, Campanula, Galium, and Myosotis, Bellis perennis, Lotus corniculatus, Pimpinella Saxifraga, Gentiana campestris: Heath plants, such as Calluna vulgaris, the species of Erica, Juniperus communis, species of Ledum, Andromeda, and Polytrichum: Forest plants, growing in woods, such as the different kinds of trees; and the plants which grow under their shade, as Oxalis Acetosella, Trientalis europæa, Linnæa borealis, Geum rivale, Hepatica triloba, Vaccinium Myrtillus, and species of Orchis: Bush-plants, or those growing in bushy places, as Origanum vulgare, Corydalis bulbosa, Vincetoxicum officinale: Mountain plants, which vary much according to elevation. and which include species of Saxifraga, Gentiana, Primula, Rhododendron, Salix, Cyperaceæ, Juncaceæ, Labiatæ, &c.: Hedge plants, such as Hawthorn and Sweet-briar, and the plants which twine among their branches, as Lonicera, Humulus, Bryonia, Tamus, Člematis, Lathyrus, as well the species of Viola and Adoxa, which grow at their roots.

Aquatic plants may either grow in salt or in fresh water. Among the former are marine species, such as the common species of Fucus, and other Seaweeds which grow buried in the ocean, and the Sargassum, or Gulf-weed, which floats on its surface; with them may be included such Phanerogamous plants as Zostera. Among the latter are some which root in the mud, and flower above the water, as species of Nymphæa, Nuphar, Potamogeton, Ranunculus, Utricularia, and Sagittaria; others flower under water, as Subularia aquatica; while others float in the water, as species of Lemna, Pistia, Stratiotes, and various green fresh-water Algæ. Some aquatics are fluviatile, as Ranunculus fluviatilis and Œnanthe fluviatilis; others grow in fresh clear

water springs, or near them, as Montia fontana.

Marshy plants are those which grow in different kinds of wet soil. Some of them, as Comarum, Menyanthes, species of Bidens, Œnanthe, Cicuta, and Carex, grow in very wet places, which are not always easily accessible; others, as Primula farinosa, and Pinguicula alpina, grow in firmer, peaty soil. To this class may be referred certain amphibious plants, which generally grow submerged, but which can live in dry soil. Among them are included various forms of Ranunculus, Polygonum amphibium, Nasturtium amphibium, Limosella aquatica, as well as species of Rhizophora and Avicennia, which are found in warm countries at the muddy mouths of rivers.

Epiphytic plants are those which send their roots into the air, and grow attached to other plants. Among them are enumerated numerous species of tropical orchids (Fig. 70), and other air-plants, such as species of Tillandsia and Pothos. Parasitic plants are those which derive nourishment from other plants. Among them are included those growing on living vegetables, such as species of Loranthus, Viscum *Plate (Fig. 488), Lathræa, Orobanche, Cuscuta* (Fig. 426), Raf-cxxv.

Botany. flesia (Fig. 549), and many Fungi; those growing on dead vegetable or animal tissues, as the various Mould-plants (Figs. 422 to 425).

> III .- DISTRIBUTION OF CLASSES, ORDERS, GENERA, AND SPECIES OF PLANTS OVER THE GLOBE.

Some plants are generally distributed over the globe, occurring in both hemispheres, and having an extensive latitudinal range; others are restricted and endemic in their distribution. There are numerous interesting facts in regard to geographical distribution in Hooker's Antarctic Flora, a work from which many of the following examples are taken. Trisetum subspicatum is a Grass having a very wide range. It extends from Tierra del Fuego over the whole of the Peruvian Cordilleras, and over the Rocky Mountains to Melville Island, Greenland, and Iceland; it is found in the Swiss and Tyrolese Alps, on the Altai, in Kamtschatka, and in Campbell's Island. The range is from 54° S. Lat. to $74\frac{1}{2}$ ° N. Lat., through $128\frac{1}{2}$ degrees of latitude. Drimys Winteri* extends over no less than 86 degrees of latitude, or 5160 geographical miles, forming at the southern limit of its growth one of the trees which advance nearest to the antarctic circle, and reaching as high a latitude as any flowering plant, save the solitary Grass of the South Shetland Islands. Gentiana prostrata has a great range, both in longitude and latitude. In southern Europe it inhabits the Carinthian Alps between 6000 and 9000 feet high; in Asia, it occurs on the Altai Mountains about N. Lat. 52°; in America, on the tops of the Rocky Mountains, in Lat. 52° N., at an elevation of 15,000 to 16,000 feet; and on the east side of the Andes of South America, in 35°S. It descends to the level of the sea at Cape Negro, in the Straits of Magalhaens, in Lat. 53° S.; and at Cape Good Hope, in Behring's Straits, Lat. 681° N. Potentilla anserina is widely distributed both in the northern and southern hemispheres. It grows throughout Europe, from the shores of the Mediterranean to the Arctic Sea; over all Asia to the north of the Altai range; in North America, from Lat. 40° to Whalefish Island in 70° N. Lat.; and from the Oregon River to Kotzebue's Sound on the west coast. Epilobium tetragonum, a British plant, extends from Canada to Fuegia. Callitriche verna is universally diffused through the temperate regions of both hemispheres. Many species in the Falkland Islands are identical with those found in Iceland. Galium Aparine is a British plant, found at the Cape of Good Hope, at the Straits of Magalhaens, in the island of Chiloe; and in North America it ranges between the latitude of Fort Vancouver and the Mississippi River. Cryptogamic cellular plants have generally a very wide range; many of them are universally distributed.

Some plants which have a great latitudinal range are restricted to a narrow space as regards longitude. This is the case with the species of Erica, which extend from the Cape of Good Hope to northern regions. Certain species of Rhododendron, Magnolia, Azalea, Actæa, and Andromeda, occur on the east of the Rocky Mountains, and are not found on the western side. In the western part of Ireland we meet with Daboecia polifolia, Erica mediterranea, and Arbutus Unedo, which are not met with in other parts of Britain, and which again appear on the mountains of Asturias. On the western side of the Cordilleras of Chili, Calceolarias grow, which are not found on the eastern side. Lobelia Dortmanna seems to be confined to the western European coun-

While some plants are generally and widely distributed, others are limited to particular countries, and sometimes confined within very narrow limits. The floras of the different quarters of the world contain certain plants, which are restricted to them, and some which are only found in a few localities. One region in the Andes is marked by the occurrence of species of Bejaria, and another by Cinchonas.

Certain plants belonging to the natural order Polemoniaceæ Botany. are peculiar to California; an Orchid, called Disa grandiflora, is confined to Table Mountain; Codon Royeni and Protea acaulis are restricted to a few localities at the Cape of Good Hope. Numerous instances of a similar kind may be given, more particularly in the case of islands. The flora of islands near continents partakes of the character of that of the mainland. Those remote from continents, however, have often a more or less endemic flora. St Helena had a peculiar flora, which has been strangely altered by foreign introductions. Pringlea antiscorbutica, Kerguelen's Land Cabbage, is an interesting plant growing on an island, the remotest of any from a continent, and which, according to Hooker, yields, besides this esculent, only 17 other flowering plants.

We sometimes meet with marked centres, where the maxima of the genus of an order, or of the species of a genus, occur, the number of the genera or species diminishing as we recede from these centres, and ending perhaps in a solitary representative in some distant country. Gentians and Saxifrages have their maxima in the European Alps; Eriocaulons have their great centre in Brazil, but a few species are found in other countries. Epacridaceæ are restricted to Australia. The genus Viola has two marked centres, one in Europe and another in America. The form of the European and American species are quite distinct. The maximum of the genus Erica is at the Cape of Good Hope; but members of the Heath family extend to northern regions in the form of Erica Tetralix, E. cinerea, and Calluna vulgaris. The tropical Myrtaceæ have Myrtus communis to represent them in Europe, Leptospermeæ in Australia, and Metrosideros lucida in Lord Auckland's group, Lat. 501° S.

An order, or a genus, or a species, in one country is occasionally represented in another by forms which are either allied, or have a physiognomic resemblance. There is thus sometimes a repetition of resembling or almost similar forms in countries separated by seas or extensive tracts of land. The Ericaceæ of the Cape have in Australia a representative in the nearly allied Epacridaceæ; the Cactaceæ of America are represented by certain succulent forms of Mesembryanthemaceæ and Euphorbiaceæ in Africa; and by some Crassulaceæ in Europe. Trientalis europæa has a representative form in America, T. americana; Cornus suecica occurs in Europe, C. canadensis in Canada. Empetrum nigrum, in arctic regions, has E. rubrum to take its place in the antarctic; Pinguicula lusitanica, in the northern hemisphere, has P. antarctica closely resembling it in the southern; Hydnora africana and H. triceps in South Africa are represented in South America by H. americana.

The mode in which the globe has been clothed with vegetation, has given rise to much discussion. We know from the Sacred Record, that on the third day of the Creation the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit after his kind; but whether the whole earth was at once clothed with vegetation, or certain great centres were formed, whence plants were gradually to spread, we have no means of knowing. The endemic limitation of certain orders, genera, and species, would certainly lead to the opinion, that, in many instances, there have been definite centres, whence the plants have spread only to a certain extent. But the general distribution of other tribes of plants, and the occurrence of identical species in distant parts of the world, would favour the view, that countries with similar climates had originally many species of plants in common. In the case of Grasses, we would naturally suppose that they must have been produced in their social state, forming pasture for the nourishment of animals; and such we might conjecture to be the case with social plants in general.

Edward Forbes advocates strongly the view of specific

Botany. centres, and endeavours to account for the isolation of certain species or assemblages of plants from their centres, by supposing that these outposts were formerly connected, and have been separated, by geological changes, accompanied with the elevation and depression of land. Schouw opposes this. He thinks that the existence of the same species in far distant countries is not to be accounted for on the supposition of a single centre for each species. The usual means of transport, and even the changes which have taken place by volcanic and other causes, are inadequate, he thinks, to explain why many species are common to the Alps and the Pyrenees on the one hand, and to the Scandinavian and Scotch mountains on the other, without being found on the intermediate plains and hills; why the flora of Iceland is nearly identical with that of the Scandinavian mountains; why Europe and North America, especially the northern parts, have various plants in common, which have not been communicated by human aids. Still greater objections to this mode of explanation, he thinks, are founded on the fact that there are plants at the Straits of Magalhaens, and in the Falkland and other antarctic islands, which belong to the flora of the arctic pole; and that several European plants appear in New Holland, Van Diemen's Land, and New Zealand, and which are not found in intermediate countries. Schouw, therefore, supposes that there were originally not one, but many primary individuals of a species.

Provision has been made for the extension of plants over the globe. The usual modes of transport are man, tides of the sea, rivers, winds, and birds. The Coco-nut wafted on the ocean is able to resist the action of the salt water by means of its fibrous covering, and lands on islands and shores in a state fit for germination. In this way recently produced coral islands are covered with vegetation. The hairy fruits and seeds of many plants are wafted to a distance by the winds, and rivers carry down the seeds of plants which have grown at their source. Birds which feed on pulpy fruits, often deposit the hard seeds at distant parts. Man, in his migrations, has distributed many plants, including common weeds, as well as plants useful for food or

clothing.

Great changes have taken place in the distribution of many useful plants, chiefly by the agency of the Caucasian races, who have transplanted to their own countries the characteristic plants of other nations. Thus Schouw remarks they have brought the Apricot, the Peach, and the Almond, from Asia Minor and Persia, and the Orange from China; they have transplanted Rice and Cotton to the Mediterranean coasts; they have brought the Maize and Potato from America to Europe. They have also carried their own characteristic plants to their colonies, and have transported into various climates useful and ornamental vegetable productions. European Corn plants have been widely spread through North America, in Mexico, the elevated countries of South America, Chili, Buenos Ayres, in South Africa, in the temperate parts of Australia and Van Diemen's Land. The Vine has been spread to Madeira, the Canary Islands, South Africa, and the high lands of South America. The Coffee-tree and Sugar-cane have been transplanted by man into the West Indies and Brazil; the Nutmeg and Clove into the Mauritius and Bourbon, and various West India islands; plantations of Tea have been formed in Brazil, Java, and India; Rice and Cotton have been cultivated in the warmer parts of North America and Brazil, and New Zealand Flax in New Holland.

The consideration of the distribution of the Cereal grains and of the Potato is a subject of much interest. The former have been so long cultivated, and so extensively spread, They that it is difficult to discover their native country. are not seen in a wild state, unless it be true, as Esprit Fabre says, that Ægilops ovata is the wild condition of Wheat, and they have a wide geographical range, so as to

be fitted for various climates. Rice is the grain which fur- Botany. nishes food to the greatest number of the human race; it is extensively used in warm countries, and more especially in China. Maize bears the greatest range of temperature, and succeeds in the hottest climates. Millet also is associated with it in hot countries. Wheat succeeds best on the limits of the sub-tropical region, and, as we proceed north, is succeeded by Rye, and then by Barley and Oats, which extend farthest north in Europe.

IV.—PHYSIOGNOMY OF VEGETATION IN DIFFERENT QUARTERS OF THE GLOBE.

In this department of botanical geography we consider plants according to the distribution of forms, marking the predominance of this or that form of plants by the absolute mass of its individuals or by the impression it makes from the character given to the flora. The prevalence of a single form will often produce a much greater physiognomic effect than the number and variety of the floral productions. Hinds says that a general physiognomic impression is sometimes conveyed by the prevalence of colour. Social plants in an especial manner, affect the landscape from growing in There are certain marked vegetable forms which are concerned in determining the aspect or physiognomy of nature in different countries. Some of these leading forms coincide with natural orders; at other times, several distinct botanical groups require to be united.

The Palm Form (Fig. 82)—gives a marked character to the warmest regions of the globe, between 10 deg. north and 10 deg. south Lat. The true Palm climate has a mean annual temperature of 78.2 deg. to 81.5 deg. F. South America is conspicuous for the beauty and number of its Palms. With the Palm form has been associated the Cycadaceous order (Fig. 556),* which resembles it somewhat in the ap-*Plate pearance of its naked stems and tufts of pinnated leaves.

The Banana and Plantain Form (Fig. 86)—is usually associated with the Palms in the torrid zone. In this form the physiognomist includes the natural orders Musaceæ, Zingiberaceæ, and Marantaceæ. The plants representing this form have succulent herbaceous stems and long delicately-veined verdant leaves.

The Malvaceous Form*—represented in warm climates *Plate by trees with thick trunks, large soft cordate or lobed leaves, CXIV. and gorgeous flowers. It includes the orders Malvaceæ, Byttneriaceæ, Sterculiaceæ, and Tiliaceæ.

The Mimosa Form—is represented by Leguminosæ, with delicately pinnate leaves (Fig. 132), and is met with both in warm and in temperate regions. It is not seen in the temperate zone of Europe, though found in the United States.

The Heath Form—belongs especially to the African continent and islands, as well as to Australia. Under it are included the species of Erica (Fig. 503) and Calluna, the Epacridaceæ of Australia, the sub-order Diosmeæ of the order Rutaceæ, and some Proteaceæ.

The Cactus Form (Figs. 142 and 483)—with its peculiar jointed or spherical or polygonal stems without true leaves, is exclusively American. Some of the stems become hard and ligneous, and are very indestructible. Certain Euphorbias may be said to represent this form in Africa.

The Orchideous Form (Fig. 70)—is represented by the epiphytes which enliven the rocks and the trunks of trees in tropical climates, and which are distinguished by the animal

shapes and colouring of their flowers.

The Casuarina Form—consists of leafless trees, with branches resembling those of Equisetums, found chiefly in the islands of the Pacific Ocean and in India. Along with phyllodiferous Acacias and some Myrtaceæ, Casuarinas give a uniform character to the Tasmanian flora

The Coniferous Form-is represented by the needleleaved trees of northern regions, the Pines, Cypresses, and Thujas; and by the broader-leaved Dammara and Salis-

Botany. buria of more southern regions. In the Himalaya and the Mexican mountains Coniferous and Palm forms are associated.

*Plate CXXXV.

The Pothos Form-prevails chiefly in the tropics, and is represented by Pothos, Dracontium, Caladium, and Arum.* They have succulent stalks, large thick-veined leaves, and flowers more or less spathaceous.

The Liane Form-is represented by the twining ropeplants, the Paullinias, Banisterias, Bauhinias, Bignonias, Passifloras, and Aristolochias, of the hottest parts of South America, and the Hop and Vine of temperate climes.

The Aloe Form-consists of plants with succulent tufted leaves, found in arid regions, often growing singly, and imparting, according to Humboldt, a peculiar melancholy character to the tropical regions in which they are found.

The Gramineous or Grassy Form—illustrated in tropical regions by arborescent Bamboos, and in temperate regions by meadows and pastures. Along with true Grasses are associated Cyperaceæ, Juncaceæ, Restiaceæ, and Eriocaulonaceæ. The genus Carex, is one of the Grassy forms of

cold regions.

The Fern Form—gives a character to the landscape of warm and tropical regions. Like Grasses, Ferns have a gigantic appearance in the hotter parts of the globe. On the Andes they are associated with the Cinchona trees. In temperate insular climates, such as that of New Zealand,

Ferns predominate.

The Liliaceous Form-includes the orders Liliaceæ, Amaryllidaceæ, and Iridaceæ. In Southern Africa the species of Amaryllis, Ixia, and Gladiolus, with their ensiform leaves and gorgeous blossoms, represent this form. In America the Liliaceous form is represented by Alstræmerias and species of Pancratium, Hæmanthus, and Crinum, which, however, are less social than the European Iri-

The Willow Form—is represented by the species of Salix which spread over the northern hemisphere from the equator to Lapland. They increase in northern countries.

The Myrtle Form—gives a peculiar character to the south of Europe, especially the Mediteranean islands; to New Holland, in species of Eucalyptus, Melaleuca, Metrosideros, and Leptospermum; and to the district of the Paramos in the Andes, where certain species of Escallonia, Symplocos, Myrica, and Myrtus, are found.

The Melastoma Form—is represented by the species of Melastoma and Rhexia, with their ribbed and beautifully veined leaves, which abound in tropical America, and some of which ascend to 10,000 and 11,000 feet on the Andes.

The Laurel Form—is represented in South America by species of Laurus and Persea, as well as by some of the Guttiferæ.

The Form of Dicotyledonous Trees—is represented in northern climates by the Oak, Beech, Elm, Horse-chestnut, Poplar, Alder, and Birch; in warmer climates by the. Olive, and in the hottest regions by the large-leaved Breadfruit trees and Cecropias.

The Moss Form-is characteristic of cold regions. Hooker mentions, that in New South Shetland there are specks of Mosses struggling for existence. In Cockburn Island five

Mosses are found.

The Lichen Form—is associated with Mosses, and may be said to extend still farther. It forms the limit of terrestrial vegetation. On Deception Island Lichens only exist.

V.—THE STATISTICS OF VEGETATION OVER THE GLOBE.

This subject involves the consideration of the number of known vegetable species in the world, their numerical distribution, and the relative proportion of classes, orders, genera, and species in different countries. In the present

imperfect state of our knowledge of the floras of different Botany. countries, it is impossible to tell the exact number of species of plants in the globe. Those known at the present day, described and undescribed, amount probably to nearly 120,000, and from this estimates have been made of the total vegetation, the numbers varying from 150,000 to 200,000. The following is the estimated number of known and described plants :-

	Genera.	species.
Acotyledonous plants	1,400	15,000
Monocotyledonous plants	1,450	14,000
Dicotyledonous plants	6,300	67,000
	9.150	96,000

The relative numerical proportion of these great classes of plants varies in different quarters of the world. It is estimated that Cryptogamic plants are to Phanerogamous plants as 1 to 7. In northern and alpine regions the proportion of the former increases. In equatorial regions, Monocotyledons are to Dicotyledons in the proportion of 1 to 5 or 6; in temperate regions as 1 to 4; and arctic regions as 1 to 3. In temperate and cool climates there is an increase of Monocotyledonous plants, particularly of Gramineous forms. Tropical islands in general possess proportionally more Monocotyledons than do the continents; the usual proportion in these islands is said to be 1 to 4. An equable temperature, and a rather humid climate, are favourable to Monocotyledons. They diminish both under the extreme cold of the arctic zone and the great heat of the tropics. They increase towards the southern temperate and antarctic zones. Hooker remarks, that in St Helena Monocotyledons are to Dicotyledons nearly as 1 to 5, in the Society Islands as 1 to 4.2, in the Sandwich Islands 1 to 4, in the Cape de Verd Islands 1 to 5, in the Canaries 1 to 6, in Madeira 1 to 5.4, in the Azores 1 to 4.1, in Great Britain 1 to 4, in Shetland 1 to 3.3, in the Faroe Islands 1 to $2\frac{1}{4}$. There is thus an increase in the proportion of Monocotyledons in passing from the Canaries, Lat. 28°, to Madeira, Lat. 32°, the Azores, Lat. 38°, Great Britain, Lat. 50° 57′, Shetland, Lat. 60°, and Faroe, Lat. 62°. In the arctic regions, on the other hand, Hooker remarks, the proportion seems to be inverted. In central and southern Europe, the proportion of Monocotyledons to Dicotyledons, which is 1 to 4 in the plains, decreases with the elevation on dry mountain slopes, till, at the height of 8526 feet, it is 1 to 7. Moist mountain slopes favour Monocotyledons, the proportion on them being as 1 to 3. In South Australia, Monocotyledons are to Dicotyledons as 1 to 4, varying, however, according to latitude, the mean being between the vegetation of New South Wales and Van Diemen's Land. In Western Australia, the proportion is 2 to 9. while the Acotyledons are to Dicotyledons as 1 to 6.

In the low plains of the great continents within the tropics, Ferns are to Phanerogamous plants as 1 to 20; on the mountainous parts of the great continents, in the same latitudes, as 1 to 8 or 1 to 6; in Congo as 1 to 27; in New Holland as 1 to 26. In small islands, dispersed over a wide ocean, the proportion of Ferns increases; thus, while in Jamaica the proportion is 1 to 8, in Otaheite it is 1 to 4, and in St Helena and Ascension nearly 1 to 2. In the temperate zone, Humboldt gives the proportion of Ferns to Phanerogamous plants as 1 to 70. In colder regions the proportion increases, that is to say, Ferns decrease more slowly in number than Phanerogamous plants. The proportion is least in the middle temperate zone, and it increases both towards the equator and towards the poles; at the same time, it must be remarked, that Ferns reach their absolute maximum in the torrid zone, and their absolute minimum in the arctic zone.

Taking other natural orders, we find that Juncaceæ, Cyperaceæ, and Gramineæ increase in proportion to all the

Botany. Phanerogamous species as the latitude becomes higher; thus, in the torrid zone, the proportion is 1 to 11, in the temperate zone 1 to 8, and in the arctic zone 1 to 4. Cinchonaceæ, Leguminosæ, Euphorbiaceæ, and Malvaceæ, increase in their proportion to Phanerogamæ as we approach the equator. The natural orders Cruciferæ, Umbelliferæ, and Compositæ, have their highest quotients in the temperate zone. Piperaceæ are plants of the hottest regions; Papaveraceæ are chiefly European; Chinchonaceæ, within the tropics, form 1-29th of the flowering plants; Scrophulariaceæ, in the middle of Europe, are to Phanerogams as 1 to 26, in North America as 1 to 36. Labiate have their maximum between 40° and 50° N. Lat. Boraginaceæ are chiefly confined to the temperate regions, while Primulaceæ and Gentianaceæ abound in colder zones.

The proportion of species as well as of genera, belonging to the same natural order, varies in different countries. Of Ranunculaceæ 1-5th of the species are European, 1-7th North American, 1-17th South American, and 1-25th Indian; of Papaveraceæ nearly 2-3ds are European; of Cruciferæ 205 species, according to De Candolle, are found in the frigid zone of the northern hemisphere, 30 in the tropics (chiefly on mountains), 548 in the northern temperate zone, and 86 in the southern temperate zone. De Candolle states that about 1600 species of Leguminosæ are found in the equinoctial zone, about 1300 to the north of the tropics, and about 500 to the south. Of 9030 Compositæ mentioned by authors, 3590 are found in America, 2224 in Africa, 1827 in Asia, 1042 in Europe, and 347 in the South Sea Islands. Of 2500 species of Euphorbiaceæ 3-8ths are found in equinoctial America, 1-8th in tropical Africa, 1-6th in India, 50 species in America, and 120 in Europe. Lomler calculates that 165 Coniferæ exist in the northern and 51 in the southern hemispheres. There are, according to him, 22 in Europe, 87 in Asia, 16 in Africa, 83 in America, and 35 in Australia.

VI.—ZONES OF VEGETATION AS REGARDS LATITUDE.

We have already seen that the vegetation varies according to latitude, and that we may trace a series of changes in the flora from the equator to the poles. Meyen proposes to mark out round the world a number of climacteric zones or belts, and to connect with the fact of these zones of climate the peculiarities of the vegetation of the belts. Meyen's plan is not quite correct, because he has made his belts to correspond with the parallels of latitude, and has asserted that between such and such parallels a certain form of vegetation would be found all over the world. The boundary lines of the zones, in order to be accurate, should be undulatory; they should correspond with the isotherm of the particular month in which there is the greatest development of vegetable life. Such undulatory zones, in which the plants present a certain resemblance to each other by sea and land, are denominated by Forbes Homoizoic.

As regards vegetation, Meyen divides the Torrid zone into—1. The equatorial, extending 15° on both sides of the equator, having a mean annual temperature of 78°8 to 82°4 F. 2. The tropical, reaching from the 15th degree on each side of the equator to Lat. 23°, having a mean annual temperature of 73° 4 to 78° 8, a summer heat of 80° 6 to 86°, and a winter temperature in the eastern coast countries of 59°. The Temperate zone is divided by Meyen into-1. The sub-tropical, from the tropics to 34° Lat., with a mean annual temperature of 62° 6 to 71° 6, and a summer temperature of 73° 4 to 82° 4. 2. The warmer temperate zone, from Lat. 34° to 45°, having a mean annual temperature of 53°6 to 62° 6, the summer temperature, in North America 77°, in Europe 68° to 75° 2, and in eastern Asia 82° 4; the winter temperature in America being 32°-54 to 44°-6, in VOL. V.

colder temperate zone, between the parallels of 45° and 58°, the temperature of the year 42°8 to 53°6; the minimum summer temperature on the west coast 56°:31, in the interior of the continent 68°; the minimum winter temperature in the interior of Europe 14°. 4. The sub-arctic zone, from Lat. 58° to the polar circle in Lat. 66°·32, mean annual temperature 39°·2 to 42°·8; temperature of summer in America 66°·2, in the Old World 60°·8 to 68°; winter temperature of America 14°, of western Europe 24°·8, and of the interior of Russia 10°·4 to 14°. The Frigid zone is divided into—1. The arctic, from the polar circle to Lat 72°, mean annual temperature being 28°.4 to 32°, and towards the eastern continental regions much lower. 2. The polar, beyond 72° of latitude; mean annual temperature in the Old World 16°.7, in the New World 1°.4; the summer of the former 38°.3, of the latter 37°.4; winter of the former $-2^{\circ}.2$, of the latter $-28^{\circ}.$

Equatorial Zone.—This embraces central Africa, including the Guinea coast and Abyssinia, &c., Ceylon, the southernmost part of Hindustan, Malaya, Cochin-China, Sumatra, Borneo, Java, New Guinea, islands in the eastern seas, the northernmost part of Australia, the northern part of South America, including Columbia, Peru, the Guianas, and part of Brazil. The vegetable forms characteristic of this zone are Palmæ, Musaceæ, arborescent Grasses, Zingiberaceæ, Marantaceæ, Orchidaceæ, and Lianas. Species of Bombax and Ficus occur here, with gigantic trees such as the Baobab, species of Swietenia, Hymenæa, and Cæsalpinia. The orders Malpighiaceæ, Anonaceæ, Anacardiaceæ, Lecythidaceæ, Sapindaceæ, Artocarpaceæ, Sterculiaceæ, Ebenaceæ, Meliaceæ, Lauraceæ, and Rafflesiaceæ, are also well represented in this zone.

Tropical Zone.—This includes parts of Bolivia, Brazil. and Paraguay in South America, the majority of the West India Islands, Yucatan, Guatemala, and part of Mexico, Nubia and Senegambia in Africa, Madagascar, Mauritius, and North Australia, part of China and India, Burmah, and the south of Arabia. As Palms and Bananas may be said to characterize the equatorial zone, so may arborescent Ferns and species of Ficus be said to predominate in the tropical zone. Besides many equatorial forms, we meet here with plants belonging to the orders Piperaceæ, Melastomaceæ, and Convolvulaceæ.

Sub-tropical Zone.—This embraces the north of Africa, including the Great Desert, Morocco, Barbary, Algiers, Tunis, Tripoli, and Egypt; in Asia, Palestine, Syria, north of Arabia, Persia, Cabul, Beloochistan, Thibet, the north of India, and China; the southern part of Australia; south Africa; Paraguay, La Plata, Chili, and Banda, in South America; the Bahamas, Bermuda, Mexico, Texas, the Southern States, and California, in North America. In this zone vegetation is green throughout all the year, like the forests of the damp regions of the torrid zone. It is called the region of Myrtaceæ and Lauraceæ. Certain Palm forms are seen, such as Phœnix dactylifera in Egypt (represented in India by Phœnix sylvestris and P. humilis), Hyphæne thebaica, Chamærops Palmetto. In this zone we meet with succulent Crassulaceæ, Mesembryanthemaceæ, Cactaceæ, and arborescent Euphorbiaceæ, plants belonging to the orders Ternströmiaceæ and Magnoliaceæ; and in the southern hemisphere especially Proteaceæ, Epacridaceæ, and Ericaceæ, along with species of Zamia and Diosma.

Warmer Temperate Zone.—In Europe this includes the southern flora as far as the Pyrenees, the mountains in the south of France, and those in the north of Greece. Asia Minor, the country between the Black Sea and the Caspian, the north of China, and Japan lie in this zone. It has been called the region of evergreen trees. Chamærops humilis represents the Palms, Erica arborea the Heaths, Laurus nobilis the Laurels, and Myrtus communis the Myrtles, in Europe 34° 7 to 50°, and in eastern Asia 26° 6. 3. The this zone, in which there are many sub-tropical forms. Spe-

Botany. cies of Cistus, Vaccinium, Smilax, Eucalyptus, and Mela leuca are met with, as well as many forms of Compositæ, also Figs, Oranges, Pomegranates, and the Vine.

Colder Temperate Zone.-In the northern hemisphere the characteristic forms of the vegetation of this zone are seen in England, the north of France, and Germany. The forests consist of Dicotyledonous trees and especially Coniferæ; the successful cultivation of Wheat scarcely extends beyond the limits of this zone. Heaths, covered with Calluna vulgaris, add a feature in the physiognomy of this zone. The floras of Tierra del Fuego, the Straits of Magalhaens, the Falkland Islands, and Kerguelen's Land, are also included in this zone. We meet with Drymis Winteri, Fagus antarctica, and F. Forsteri, Dactylis cæspitosa, Pringlea antiscorbutica, and many other interesting forms described by Dr Hooker in his Flora Antarctica.

Sub-arctic Zone.—This zone is of less extent than the preceding, and in the interior of Asia it is perhaps not so easily distinguishable from it as it is in Europe. In the northern hemisphere it is the zone of Firs and Willows. In the southern hemisphere it embraces a few barren islands. The northern parts of Siberia and Norway, the Faroe Islands, and Iceland, belong to this zone. In the Faroe Islands Barley does not always ripen, but the Turnip and Potato succeed. The Amentiferæ in them, as well as in Iceland, do not become trees. Grasses, Calluna vulgaris, and Juniperus communis, form features in the physiognomy of Iceland, and Alpine species come down nearly to the sea level. In Siberia, forests of Pinus Cembra, Larch, Spruce, Poplar, and Birch occur.

Arctic Zone.—In this zone the Birch predominates, and along with it are seen Pinus sylvestris and Abies excelsa. The Birch reaches nearly to North Cape, and Firs extend to 69° or 70°. Grasses are also found, and numerous Lichens and Mosses. At Hammerfest, in Lat. 71°, Potatoes, Turnips, Carrots, and Cabbage succeed. Species of Rhododendron, Andromeda, and Azalea occur in the American arctic zone.

Polar Zone.—In this zone there are no trees nor bushes, and no cultivation of plants for food. Species of Saxifrage, Dryas, Papaver, Ranunculus, Cardamine, Cochlearia, Pedicularis, Silene, Potentilla, Salix, Juncus, Eriophorum, Parrya, Platypetalum, Phippsia, Dupontia, and a few others, are found in this inhospitable belt. In Melville Island there are 67 species of flowering plants, in Spitzbergen 45. In cold zones we find more genera and fewer species than in warmer regions.

VII.—ZONES OF VEGETATION AS REGARDS ALTITUDE.

The vertical range of vegetation has been divided into zones similar to those of the horizontal range. The relation of plants to such zones of elevation is called Hypsometrical. As we ascend from the plain to the top of a mountain we pass through different belts of vegetation, the extent and variety of which differ in different countries. When Tournefort ascended Mount Ararat he was struck with the circumstance, that, as he left the low ground at the base of the mountain, he passed through a series of belts, which reminded him of the countries he had passed through in travelling from the south to the north of Europe. At the base the flora was that of the west of Asia; as he ascended higher he reached the flora of the countries on the north of the Mediterranean, then that of northern Europe, and when he reached the summit he found the Lapland plants. Humboldt found that on all mountains there occurs such a representation of different floras, and that particular alpine forms are found almost over the whole world at a particular elevation. In describing the South American alpine flora, he says-"In the burning plains scarce raised above the level of the Southern Ocean, we find Musaceæ, Cycadaceæ, and Palmæ, in the greatest luxuriance; after them, shaded by the lofty

sides of the valleys in the Andes, arborescent Ferns; next Botany. in succession, bedewed by cool misty clouds, Cinchonas appear. When lofty trees cease, we come to Aralias, Thibaudias, and Myrtle-leaved Andromedas; these are succeeded by Bejarias abounding in resin, and forming a purple belt around the mountains. In the stormy region of the Paramos, the more lofty plants and showy flowering herbs disappear, and are succeeded by large meadows covered with Grasses on which the Llama feeds. We now reach the bare trachytic rocks, on which the lowest tribes of plants flourish. Parmelias, Lecideas, and Leprarias, with their many-coloured thalli and fructification, form the flora of this inhospitable zone. Patches of recently fallen snow now begin to cover the last efforts of vegetable life, and then the line of eternal snow begins."

Madden and Strachey give the following account of the Himalayan vegetation, proceeding from the plains of India through Kemaon to Thibet:- "Ascending, we find forms of temperate climates gradually introduced above 3000 feet, as seen in species of Pinus, Rosa, Rubus, Quercus, Berberis, Primula, &c. At 5000 feet the arborcous vegetation of the plains is altogether superseded by such trees as Oaks, Rhododendron, Andromeda, Cypress, and Pine. The first ridge crossed ascends to a height of 8700 feet in a distance of not more than 10 or 12 miles from the termination of the plains. The European character of the vegetation is here thoroughly established, and although specific identities are comparatively rare, the representative forms are most abundant. From 7000 to 11,000 feet, the region of the alpine forest, the trees most common are Oak, Horse-chestnut, Elm, Maple, Pine, Yew, Hazel growing to a large tree, and many others. At about 11,500 feet the forest ends, Picea Webbiana and Betula Bhojpatra being usually the last trees. Shrubs continue in abundance for about 1000 feet more; and about 12,000 feet the vegetation becomes almost entirely herbaceous. On this southern face of the mountains the snow-line is probably at about an elevation of 15,500 feet. The highest dicotyledonous plant noticed was at about 17,500 feet, probably a species of Echinospermum. An Urtica also is common at these heights. The snow-line here recedes to 18,500 or 19,000 feet. In Thibet itself the vegetation is scanty in the extreme, consisting chiefly of Caragana, species of Artemisia, Astragalus, Potentilla, a few Gramineæ, &c. The cultivation of Barley extends to 14,000 feet. Turnips and radishes on rare occasions are cultivated at nearly 16,000 feet. Vegetation ends at about 17,500 feet, scanty pasturage being found in favoured localities at this elevation; and the highest flowering plants are Corydalis, Cruciferæ, Nepeta, Sedum, and a few others."

If we examine the vegetation of the mountains of Europe we shall find a series of similar changes. In the regions of the plains and lower hills of the Alps, extending to 1700 feet, the Vine grows; to this succeeds the zone of Chestnuts, which extends to 2500 feet; the zone of the Beech, and of the higher dicotyledonous trees, reaches from 2500 to 4000 feet; we then come to the sub-alpine region, the zone of Coniferæ, extending to about 6000 feet, in which are found the Scotch Fir, the Spruce, the Larch, and the Siberian Pine, along with certain sub-alpine forms of herbaceous plants; next comes the alpine region, or the zone of shrubs, extending to 7000 feet, characterized by Rhododendron hirsutum, and R. ferrugineum, which represent the Bejarias of the Andes; finally, we reach the subnival region, extending to 8500 feet, and comprehending the part between the limits of shrubs and the snow-line, where we meet with numerous species of Ranunculus, Draba, Saxifraga, Gentiana, Primula, and Poa, besides other genera belonging to Ranunculaceæ, Cruciferæ, Caryophyllaceæ, Leguminosæ, Compositæ, Gramineæ, Lichenes, and Musci. On some of the Alps we find flowering plants reaching to the height of between 10,000 and 11,000 feet or more. Schlagintweit

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Rotany. found, on the central and southern Alps, at from 10,650 to 11,700 feet, Androsace glacialis, A. helvetica, Cerastium latifolium, Cherleria seloides, Chrysanthemum alpinum, Gentiana bavarica, Ranunculus glacialis, Saxifraga bryoides, S. oppositifolia, and Silene acaulis. The extreme limit of Mosses in the Alps is in general little above that of Phanerogamous plants. The last Lichens are to be found on the highest summits of the Alps, attached to projecting rocks, without any limitation of height.

On the Pyrenees the following zones are observed:-The zone of Vine and Maize cultivation, and of the Chestnut woods. 2. A zone extending from the limit of the Vine to about 4200 feet, at which limit the cultivation of Rye ceases; here we meet with Buxus sempervirens, Saxifraga Geum, Erinus alpinus, Arnica montana, &c. 3. From the limit of the cultivation of esculent vegetables at 4200 feet, to the zone of the Spruce Fir. 4. From the limit of the Spruce Fir zone at 6000 to 7200 feet, characterized by the presence of the Scotch Fir. 5. From 7200 to 8400 feet, is an alpine zone, characterized by the dwarf Juniper, Draba aizoides, Saxifraga bryoides, Soldanella alpina, Juncus trifidus, &c. 6. A zone above 8400 feet, exhibits a few alpine species, as Ranunculus glacialis, Draba nivalis, Stellaria cerastoides, Androsace alpina, and Saxifraga gröen-

There are thus in lofty mountain districts evident belts of vegetation. At the lower part is the region of Lowland Cultivation, where the ordinary cultivated plants of the country thrive. In cold regions this is very limited, while in warm regions it is extended. To this region succeeds that of Trees. In high northern latitudes, as at 70°, it reaches to between 700 and 800 feet; on Ætna to 6200; on the Andes to 10,800, and it is marked by Escallonia myrtilloides, Aralia avicennifolia, and Drymis Winteri; on the mountains of Mexico to 12,000 feet, and is marked by Pinus Montezumæ; on the south side of the Himalaya to 11,500, and on the north side to 14,000. On the Pyrenees its limits are marked at about 7000 feet by Pinus uncinata, on the Alps at about 6000 feet by Pinus Picea, on the Caucasian mountains at 6700 feet, and in Lapland at about 1500 feet by the Birch. Next in order comes the Shrubby region, the limits of which in Europe are marked by Rhododendrons, which cease on the Alps of 7400 feet, and on the Pyrenees at 8332 feet; on the Andes it is limited by Bejarias and shrubby Compositæ, at a height of 13,420 feet; on the south side of the Himalaya, by species of Juniper, Willow, and Ribes, at an elevation of 11,500 feet. In Lapland, species of Willow and Vaccinium, with the dwarf Birch, reach 3300 feet. The next region is that of Grasses, which on the Andes and the Himalaya extends to between 14,000 and 15,000 feet. Finally, we come to the region of Cryptogamic plants, which extend to the snow-line, Lichens being the last plants met with.

In contrasting the zones of altitude with those of latitude, Meyen gives the following regions of alpine vegetation:— The region of Palms and Bananas (equatorial) extending from the sea level to 1900 feet; the region of Tree-ferns and of Figs (tropical) 1900 to 3800 feet; the region of Myrtles and Laurels (sub-tropical) 3800 to 5700 feet; region of evergreen dicotyledonous trees (warm temperate) 5700 to 7600 feet; region of deciduous dicotyledonous trees (cold temperate) 7600 to 9500 feet; region of Abietineæ (sub-arctic) 9500 to 11,400 feet; region of Rhododendrons (arctic) 11,400 to 13,300 feet; region of alpine plants (polar) 13,300 to 15,200.

VIII.—SCHOUW'S PHYTO-GEOGRAPHIC REGIONS.

In dividing the globe into Phyto-geographic regions, Schouw takes into account the nature of the flora in regard to species, genera, and orders, irrespective of the effects

they may produce on the physiognomy of the country. In constituting a botanical region, he lays down the principle that at least one-half of the species and one-fourth of the genera should be peculiar to it, and that individual orders should either be peculiar to it or reach their maximum in He constitutes 25 Regions:—1. Region of Saxifrages and Mosses. 2. Region of Umbelliferæ and Cruciferæ. 3. Region of Labiatæ and Caryophyllaceæ. 4. Region of Asters and Solidagos. 5. Region of Magnolias. 6. Region of Camellias and Teas. 7. Region of Zingiberaceæ. 8. Himalayan Alps. 9. Asiatic Islands. 10. Mountains of Java. 11. Islands of the Pacific. 12. Region of Balsam trees. 13. The Desert Region. 14. Region of Tropical Africa. 15. Region of Cactuses and Peppers. 16. Mountains of Mexico. 17. Region of the Medicinal Barks. 18. Region of Calceolarias and Escallonias. 19. West Indian Region. 20. Region of Palms and Melastomas. 21. Region of Tree Compositæ. 22. Antarctic Region. 23. Region of Mesembryanthemums and Stapelias. 24. Region of Epacridaceæ and Eucalypti. 25. Region of New Zealand.

REGION I.—The region of Saxifragaceæ and Musci or the Alpine Arctic Flora.—This embraces the north polar lands from the limits of ice to the zone of trees, or what is called the Arctic flora, in which Mosses, Lichens, and Carices abound; and the upper parts of the mountains of Europe and northern Asia from the snow-line down to the arborescent belt, or the Alpine flora, in which Primulaceæ and Saxifragaceæ are prevalent. The mean temperature of the arctic division is 41° to 66°, that of the Alpine districts is 36° to 47°. In this region there is no cultivation.

REGION II.—The region of Umbelliferæ and Cruciferæ.— This extends over northern Europe and Asia from the southern limit of the last region to the Pyrenees, the Alps the Balkan mountains, the Caucasus, and the Altai; the mean temperature being 36° to 57°. It is distinguished by the presence of Umbelliferous and Cruciferous plants. Coniferæ, Amentiferæ, Ranunculacæ, Rosaceæ, and Fungi are abundant.

REGION III.—The region of Labiatæ and Caryophyllaceæ or the Mediterrannean Flora.—This comprises the countries of the Mediterranean Sea, Spain, the south of France, Italy, Greece, Asia Minor, Egypt, the whole of northern Africa to the Sahara and the great Atlas chain, the Canaries, and Madeira. The upper mountain regions belong to Schouw's first region, and the middle to his second. The mean temperature is 54° to 72°. The region is characterized by the prevalence of plants belonging to the Labiate and Clovewort orders. Species of Compositæ, Galiaceæ, and Boraginaceæ also abound, and there is an increase in the plants belonging to the orders Leguminosæ, Malvaceæ, Solanaceæ, Urticaceæ, and Euphorbiaceæ.

REGION IV .- The region of Asters and Solidagos --This extends over the northern part of North America from the limits of the first region to the parallel of 36° north. Besides the number of species of Aster and Solidago (belonging to Compositæ), this region is marked by a great variety of Oaks and Firs, by numerous species of Vaccinium, by the smallness of the number of Cruciferæ, Umbelliferæ, Cinchonaceæ, Cynarocephalæ, and by the absence of the genus Erica. The mean temperature is 54° to 72°. The Californian and Oregon districts, to the west of North America, constitute a region not yet fully explored. Many showy Polemoniaceæ and interesting Coniferæ are found here; also Eschscholtzia californica.

REGION V.—The region of Magnolias.—This embraces the southern part of North America between the parallels of 30° and 36°. Here we meet with numerous tropical forms, ! as Zingiberaceæ, Cycadaceæ, Anonaceæ, Sapindaceæ, Melastomaceæ, and Cactaceæ. Mean temperature 59° to 72°.

REGION VI.—The region of Ternströmiaceæ and Celastraceæ, or the Japanese region.—This extends between the parallels of 30° and 40° N. Lat., and embraces Japan, the

Botany. north of China, and Chinese Tartary, constituting the eastern temperate parts of the Old World. The flora seems to be intermediate between that of the Old and the New World. The vegetation is more tropical than European, for we meet with Zingiberaceæ, Musaceæ, Palmæ, Cycadaceæ, Anonaceæ. The mean temperature is 54° to 68°.

REGION VII.—The region of Zingiberaceæ, or the Indian Flora.—This embraces India, the island of Ceylon, and the south-eastern peninsula, to the height of 4500 to 5500 feet above the level of the sea. There are here numerous specimens belonging to the Ginger order as well as to Leguminosæ, Cucurbitaceæ, and Tiliaceæ. The Coco-nut, Mangosteen, Turmeric, Cinnamon, Cotton, Indigo, Clove, and Pepper, are abundant. Mean temperature 65° 75 to 81° 50. The south of China and Cochin-China may be considered as a distinct region. It partly resembles that of India,

but contains many peculiar plants.

Region VIII.—The Emodic region.—This embraces the Alpine region of India south of the ridge of the Himalaya, including Sirmore, Gurwal, Kemaon, Nepal, and Bhotan, to a height of from 4500 to 10,700 feet above the level of the sea. Some European species are met with in these high districts. Cedrus Deodara, Pinus excelsa, P. longifolia, Picea Webbiana, and other Coniferæ, along with Chamærops Khasyana, species of Oak, Dammar, Rhododendron, Berberis, Primula, &c., also occur. In the lower parts of the region tropical plants grow. The mean temperature is 37° to 66°.

REGION IX.—The region of the Asiatic Islands.—This comprises the mountainous districts of the islands between the south-eastern peninsula and Australia, to a height of 5500 feet above the level of the sea. Myristica moschata, Dryabalanops Camphora, and Dammara orientalis, grow in this region. Much of it is still unexplored. The mean temperature is 66° to 84°.

REGION X .- The region of Upper Java. - This comprehends the districts of the island of Java, and probably also of the numerous islands of the Asiatic archipelago, having an absolute elevation of 5500 feet above the level of the sea. Little is known in regard to the vegetation.

REGION XI.—The Polynesian region.—This comprises all the islands of the Pacific Ocean within the tropics. Among the plants of this region may be mentioned Artocarpus incisa, Tacca pinnatifida, Cocos nucifera, Lodoicea seychellarum, Jambosa malaccensis, and many species of Arum, Dioscorea, Musa, and Ficus. The genera Dissochæta, Orophea, Pterisanthes, Arthrophyllum, and Visenia, occur in this region. The mean temperature is 72° to 82°.

REGION XII.—Theregion of Amyridaceæ.—This includes the south-western part of the highlands of Arabia. In the flora are many trees yielding gum and balsamic resins, such as species of Mimosa, Acacia, Balsamodendron, and Amyris. Coffee and the Sensitive-plant occur here.

REGION XIII.—The Desert region.—This comprehends northern Africa, to the south of the Atlas Mountains, between Lat. 15° and 30° N., and the northern part of Arabia. Phœnix dactylifera and Hyphæne thebaica are characteristic plants of the region. The mean temperature is 72° to 86°.

REGION XIV.—The region of tropical Africa.—This comprises that part of Africa which lies between 15° N. Lat. and the tropic of Capricorn, or, more correctly, between the northern and southern limits of periodical rains, with the exception of Abyssinia and the unknown countries of the interior. On the western part of this region, Elais guineensis the Palm-oil plant, and Adansonia digitata the Baobab, grow. On the coast of Guinea and Congo, the flora is intermediate between that of America and Asia, but chiefly resembling the latter. Species of Sorghum, Sterculia acuminata the Kola-nut, and the Poison-hean of Calabar, belong to this region. The mean temperature of the region is 72° to 86°.

REGION XV.—The region of Cactaceæ and Piperaceæ.— Botany. This embraces Mexico, Guatemala, the Isthmus of Panama, and South America as far as the river Amazon, and to an elevation of 5500 feet above the level of the sea, between Lat. 30° N. and the equator. Guiana, New Grenada, and certain parts of Peru are included. Cactuses and Peppers abound in this region.

REGION XVI. The region of the Mexican Highlands. This embraces the districts of Mexico which have an elevation of more than 5500 feet above the level of the sea. Some important Coniferæ are met with here, such as Pinus religiosa, P. apulcensis, P. Hartwegii, P. Montezume, and Taxodium distichum. The mean temperature is 64° to 78°.

REGION XVII.—The region of Cinchonas or medicinal Bark-trees. This comprehends the Cordilleras of South America, between the parallels of 5° N. Lat. and 20° S. Lat., at an elevation of 5000 to 9600 feet. The mean temperature is 59° to 68°. In the lower part of the region Coffee and Maize are cultivated, and in the higher regions the European grains and fruits, along with the Potato and Ceroxylon Andicola is also the Chenopodium Quinoa. found in this region of the Andes.

REGION XVIII.—The region of Escallonias and Calceolarias.—This comprises the highest districts in South America above the upper limit of Cinchonas. The mean temperature varies from 59° to 84°. Besides Escallonias and Calceolarias, we meet with many alpine plants.

REGION XIX.—The West Indian Region.—This region comprehends the West India Islands, the flora of which may be said to be intermediate between that of Mexico and the northern parts of South America. Ferns and Orchids prevail. Mean temperature 59° to 78°.

REGION XX.—Region of Palms and Melastomas.—This comprises that part of South America to the east of the Andes which lies between the equator and the tropic of Capricorn. Mean temperature 59° to 82°. Here we have the luxuriant Brazilian flora. Palms, Melastomaceæ, Myrtaceæ, Tree-ferns, and Crotons, form the thick underwood, and beneath these, delicate herbaceous Ferns; Dorstenias, Heliconias, with a few tall Grasses, are found in the open

REGION XXI.—The region of arborescent Composites. This embraces South America on both sides of the Andes from the tropic of Capricorn to Lat. 40. S. In it are included the southern part of Brazil, La Plata, and Chili. Mean temperature 59° to 75°. In Chili there are many genera which also are represented in Australia and at the Cape of Good Hope. Araucaria imbricata, the Banksian or Chili pine, is a hardy Conifer of this district, extending on the Chilian Andes from 37° to 40° S. Lat.

REGION XXII.—The Antarctic region.—This embraces the southern part of America, the Straits of Magalhaens, Tierra del Fuego or Fuegia, the Falkland Islands, and others more to the south. Mean temperature 41° to 46°. Many mountainous plants are found in this region. The vegetable forms of the north temperate and arctic zones prevail. Species of Saxifraga, Gentiana, Arbutus, and Primula, with many other European genera, abound. In Fuegia the Evergreen Beech, Fagus Forsteri, which never sheds its coriaceous foliage, is a very prevalent tree, also the Deciduous Beech, Fagus antarctica, the leaves of which change colour and fall, and Drymis Winteri. In the Falkland Islands there are about 120 flowering plants, consisting chiefly of those found on the mountains of Fuegia, and on the arid coast and plains of Patagonia.

REGION XXIII.—The region of Mesembryanthemums and Stapelias.—This embraces southern Africa from the the tropic of Capricorn to the Cape Coast. Mean temperature 55° to 73°. Besides species of Mesembryanthemum and Stapelia there are a prodigious number of species of Erica. The latter genus attains its maximum here. We

Botany. also meet with plants belonging to the orders Iridaceae Bruniaceæ, and Selaginaceæ.

REGION XXIV.—The region of Epacridaceæ and Eu calypti.—This comprehends Australia beyond the tropics with the island of Tasmania or Van Diemen's Land. Mean temperature 52° to 72°. The number of known Australian plants amounts to about 7000 or 8000. The flora of Australia approaches in its tropical portion to the plants of India, and in its extra-tropical portion to those of South Africa. The flora may be divided into a western, southern, eastern, and Tasmanian flora. In the western districts Leguminosæ and Proteaceæ predominate, forming one-fourth of the entire vegetation; Ferns and Grasses are rare. In the southern flora, Compositæ and Leguminosæ abound along with Salsolas, Myoporaceæ, Halorageaceæ, Caryophyllaceæ, and Cruciferæ. The genus Mesembryanthemum is here seen as a connecting link with the South African flora; Nitraria with the Siberian, and Crantzia with the North American flora. In the eastern flora Proteaceæ and Epacridaceæ are found, with fewer Composite than in the south, and a larger number of Ferns and Grasses than in the western district. In South Australia Compositæ form 1-8th of the whole vegetation; Compositæ and Leguminosæ form together one-third of the whole of the Dicotyledons.

REGION XXV.—The region of New Zealand.—This includes the islands of New Zealand and those which are adjacent. Between Lat. 34° and 36° S. the mean temperature is 61° to 63°. Here we meet with Phormium tenax the New Zealand Flax-plant, Corypha australis the southern Palm, abundance of Ferns, many of them arborescent, species of Dracæna, many Myrtaceæ, and some peculiar Coniferæ. The known flora of New Zealand amounts to about 1900 or 2000 species, of which 730 are flowering plants, thus making Phanerogams to Cryptogams nearly as 2 to 3. Among the orders to which the endemic species belong may be noticed Coniferæ, Scrophulariaceæ, Epacridaceæ, Compositæ, Araliaceæ, Umbelliferæ, Myrtaceæ, and The flora of the Auckland group and Ranunculaceæ. of Campbell's Island may be considered as a continuation of that of New Zealand, differing only in being more typical of the antarctic regions.

IX.-ZONES OF MARINE VEGETATION.

The ocean, as well as the land, possesses its vegetable forms, which are of a peculiar kind, and exist under different conditions of pressure, of surrounding medium, and of light. Some seaweeds, Harvey remarks, are cosmopolitan or pelagic, as species of Ulva and Enteromorpha, which are equally abundant in high northern and southern latitudes, as they are under the equator, and in temperate regions. Codium tomentosum, Ceramium rubrum, C. diaphanum, species of Ectocarpus, and several Confervæ, have a range nearly as wide. Plocamium coccineum and Gelidium corneum are common to the Atlantic and Pacific oceans; Rhodymenia palmata, the common Dulse of Britain, is found at the Falkland Islands and Tasmania. cus tuberculatus extends from Ireland to the Cape of Good Hope; Fucus vesiculosus occurs on the north-west coasts of America, and on the shores of Europe; while Desmarestia ligulata is found in the north Atlantic and Pacific oceans, as well as at the Cape of Good Hope and Cape Horn.

In general, however, Sea-weeds are more or less limited in their distribution, so that different marine floras exist in various parts of the ocean. The northern ocean, from the pole to the 40th degree, the sea of the Antilles, the eastern coasts of South America, those of New Holland, the Indian Archipelago, the Mediterranean, the Red Sea, the Chinese and Japanese Seas, all present so many large marine regions, each of which possesses a peculiar vegetation. The degree of exposure to light, and the greater or less motion of the

waves, are very important in the distribution of Algæ. The Botany. intervention of great depths of the ocean has a similar influence on sea-plants as high mountains have on landplants. Laminariæ are confined to the colder regions of the sea; Sargassa only vegetate where the mean temperature is considerable. Under the influence of the Gulfstream, Sargassum is found along the east coast of America, as far as Lat. 44°; and the cold south polar current influences the marine vegetation of the coasts of Chili and Peru, where we meet with species of Lessonia, Macrocystis, D'Urvillæa, and Iridæa, which are characteristic of the antarctic flora. Melanospermeæ, according to Harvey, increase as we approach the tropics, where the maximum of the species, though, perhaps, not of individuals, is found; Rhodospermeæ chiefly abound in the temperate zone; while Chlorospermez form the majority of the vegetation of the polar seas, and are particularly abundant in the colder temperate zone. The green colour is characteristic of those Algæ which grow either in fresh water or in the shallower parts of the sea; the olive-coloured Algæ are most abundant between the tide-marks; while the red-coloured species occur chiefly in the deeper and darker parts of the sea.

As regards perpendicular direction, Forbes remarks, that one great marine zone lies between high and low watermarks, and varies in species according to the kind of coast, but exhibits similar phenomena throughout the northern hemisphere. A second zone begins at low water-mark, and extends to a depth of 7 to 15 fathoms. This is the region of the larger Laminarias and other Fuci. Marine vegetation, including the lower forms, extends to about 50 fathoms in the British seas, to 70, 80, or 100, in the Mediterranean and the Ægean Sea. Ordinary Algæ, however, seem scarcely to exist below 50 fathoms. Diatomaceæ exist in the deep abysses of the ocean, and Nullipora and Corallines increase as other Algæ diminish, until they characterize a zone of depth where they form the whole obvious vegetation.

The distribution varies also in a latitudinal or horizontal direction. Chorda Filum lies in beds of 15 to 20 miles in length, and only about 600 feet in breadth, in the North Sea and the British Channel. Sargassum bacciferum constitutes the Gulf-weed, which has been noticed by all who have crossed the Atlantic. The Sargasso Sea occupies the eddy or whirl caused by the revolution of the current in the Atlantic, and occupies a space of 260,000 square miles. The most remarkable of marine plants, both for their size and the extent of their range, are the Macrocystis pyrifera and the Laminaria radiata. Immense masses of the Macrocystis, like green meadows, are found in every latitude. It ranges from the antarctic to the arctic circle through 120 degrees of latitude. The tribe Fucoideæ abounds towards the poles, and there the plants attain their greatest bulk, diminishing rapidly towards the equator and ceasing some degrees from the Line itself. Cystoseireæ represent the Fucoideæ in the higher latitudes of the southern hemisphere. Laminarias abound in the antarctic ocean and northwards to the Cape of Good Hope. The red, green, and purple Lavers of the British seas are found at the Falkland Islands. Lessonia, with a stem 10 feet long and 12 inches in circumference, and its frond 2-3 feet long and about 3 inches broad, is found in immense masses off the Patagonian regions. D'Urvillæa utilis is another large antarctic Seaweed, which, along with Lessonias, is often found at the Falkland Islands, formed by the surf into enormous vegetable cables, several hundred feet long, and thicker than the human body.

X.—DISTRIBUTION OF PLANTS IN BRITAIN.

The climate of Britain is warmer than that of other places in the same parallel of latitude. Its most striking feature is the absence of extremes, either as regards cold or heat. It is, generally speaking, mild and damp. While the winters are mild, the heat of the three summer months, June, July,

Botany. and August, in which the growth and ripening of crops take place, is by no means great, being very little above that due to the latitude. The eastern coasts of Britain partake more of the continental climate, while on the western the climate is of an insular and equable character. The mean temperature varies from 46° to 52° F. Some of the mountains rise to the height of 4400 feet, and there is a fall of 1° of the thermometer of every 240 or 250 feet of ascent. The number of Phanerogamous species of plants amounts to about

1600, while the Cryptogamous are about 2800.

Taking a general view of the distribution of British Flowering Plants and Ferns (excluding the Hibernian and Sarnian species), Watson recognises the following types: -1. British type-species widely and generally spread over Britain, and forming probably 2-5ths of the British species, such as Alnus glutinosa, Betula alba, Corylus Avellana, Salix capræa, Rosa canina, Lonicera Periclymenum, Hedera Helix, Sarothamnus scoparius, Calluna vulgaris, Ranunculus acris, Cerastium triviale, Potentilla Tormentilla, Trifolium repens, Stellaria media, Lotus corniculatus, Bellis perennis, Senecio vulgaris, Carduus palustris, Leontodon Taraxacum, Myosotis arvensis, Prunella vulgaris, Plantago lanceolata, Polygonum aviculare, Urtica dioica, Potamogeton natans, Lemna minor, Juncus effusus, Carex panicea, Poa annua, Festuca ovina, Anthoxanthum odoratum, Pteris aquilina, Polypodium vulgare, Lastrea Filix-mas. 2. English type—species chiefly o exclusively found in England, and decreasing in frequency northwards, constituting about 1-5th of the whole flora, as Rhamnus catharticus, Ulex nanus, Tamus communis, Bryonia dioica, Hottonia palustris, Chlora perfoliata, Sison Amomum, Moenchia erecta, Linaria Elatine, Ranunculus parviflorus, Lamium Galeobdolon, Hordeum pratense, Alopecurus agrestis, Ceterach officinarum, besides very local plants such as Cyperus longus and Cicendia filiformis. 3. Scottish type—species chiefly prevalent in Scotland or the north of England, forming about 1-20th of the flora, as Empetrum nigrum, Rubus saxatilis, Trollius europæus, Geranium sylvaticum, Trientalis europæa, Habenaria albida, Haloscias scoticum, Mertensia maritima; also Primula farinosa, Goodyera repens, Corallorhiza innata, and Saxifraga Hirculus, which are comparatively limited in their distribution and partial in their localities; besides some very local plants such as Arenaria norvegica, Primula scotica, and Ajuga pyramidalis. 4. Highland type-species either limited to the Scottish Highlands or extending to the mountains of the north of England and Wales; a more boreal flora than the last, the species being especially limited to the mountains or their immediate vicinity, and forming probably about 1-15th of the flora, as Azalea procumbens, Veronica alpina, Alopecurus alpinus, Phleum alpinum, Juncus trifidus, Sibbaldia procumbens, Erigeron alpinus, Gentiana nivalis; to these may be added the following, which, however, descend also lower, Salix herbacea, Silene acaulis, Saxifraga stellaris, Oxyria reniformis, Thalictrum alpinum, Luzula spicata, Juncus triglumis, Rubus Chamæmorus, Epilobium alsinifolium, Draba incana, Dryas octopetala, Alchemilla alpina; likewise some very local species, as Lychnis alpina and Oxytropis campestris. 5. Germanic typespecies chiefly seen in the east and south-east of England (bounded by the German ocean eastward)—forming about 1-15th or 1-20th of the flora, as Frankenia lævis, Anemone Pulsatilla, Reseda lutea, Silene noctiflora, Silene conica, Bupleurum tenuissimum, Pimpinella magna, Pulicaria vulgaris, Lactuca Scariola, Halimus pedunculatus, Aceras Anthropophora, Ophrys aranifera, Spartina stricta; also very local plants such as Veronica verna. 6. Atlantic typespecies found in the west and south-west of England and Wales, having a tendency to the western or Atlantic parts of the island-forming about 1-15th or 1-20th of the flora, as Sinapis monensis, Matthiola sinuata, Raphanus mariti-

mus, Sedum anglicum, Cotyledon Umbilicus, Eufragia vis- Botany. cosa, Pinguicula lusitanica, Euphorbia Peplis and E. Portlandica, Scirpus Savii; also more limited species, as Sibthorpia europæa, Erica vagans, E. ciliaris, Physospermum cornubiense, Polycarpum tetraphyllum, Adiantum Capillus-Veneris, Cynodon Dactylon. 7. Local or doubtful type—species which cannot be referred to any of the preceding types, as Potentilla rupestris, Lloydia serotina, confined to peculiar mountains in Wales, Draba aizoides and Cotoneaster vulgaris, found on the rocky coasts of Wales very locally, Draba muralis and Hutchinsia petræa; also Eriocaulon septangulare, found in the Isle of Skye, and formerly included under Watson's Hebridean type. If Ireland and the Channel Islands are also taken into account, Hibernian and Sarnian types would be added.

On ascending lofty mountains in Britain, there is a marked variation in the nature of the vegetation. On Ben-muich-Dhui, which attains an elevation of upwards of 4000 feet, Watson gives a full list of the species observed in succession. On leaving the plants of the low country we find Myrica Gale, extending on this mountain to 1400 feet, and in succession we came to the upper limits of the following species: - Erica cinerea, Pinus sylvestris, Carex pauciflora, Pedicularis sylvatica at 1838 feet, Tofieldia palustris, Erica Tetralix, at 2370 feet, Arctostaphylos Uva-Ursi, Thalictrum alpinum, Vaccinium Vitis-Idæa, Hieracium alpinum, Juniperus communis var. nana, at 2660 feet, Potentilla Tormentilla, Calluna vulgaris, 2690 feet, Azalea procumbens, Armeria maritima, Cochlearia gröenlandica, Arabis petræa, Rubus Chamæmorus, Epilobium alpinum, E. angustifolium, Vaccinium uliginosum, Sibbaldia procumbens, Saxifraga stellaris, Alchemilla alpina, Empetrum nigrum, Juncus trifidus, Gnaphalium supinum, and on the summit Silene acaulis, Carex rigida, Luzula arcuata and L. spicata, Salix

Considering British plants in climatic or ascending zones. they are divided by Watson into-

- I. Agrarian Region.—limited generally by the Pteris aquilina, and indicating the region of Corn cultivation. In the Highlands it may be said to extend as high at least as 1200 feet. It is subdivided into three zones:-
 - 1. Infer-agrarian Zone-embracing all the country southward from the Dee and Humber, except the mountainous parts of Wales, and the higher hills and moors in the provinces of the Severn and Peninsula (including Gloucester, Worcester, Warwick, Stafford, Hereford, Monmouth, Cornwall, Devon, and Somerset). Some of the peculiar species are Clematis Vitalba, Rubia peregrina, Cyperus longus, Erica
 - ciliaris, Sibthorpia europæa, and Scilla autumnalis.

 2. Mid-agrarian Zone—all the low grounds, clear from the mountains, situate between the entrance of the Clyde and Tay on the north, and those of the Humber and Dee on the south, also probably a narrow coast-line of the East Highlands, extending from Perth to Aberdeen, and possibly even to Inverness. Also a narrow belt extending round the hills of Wales. Rhamnus catharticus and Frangula, Tamus communis, Bryonia dioica, Acer campestre, Ulex nanus, Viburnum Lantana, Euonymus europæus, and Cornus sanguinea, occur in this zone, but are not re-
 - stricted to it. There is no Clematis. 3. Super-agrarian Zone-coast-line and low plains and

moors in the north and nort-west of Scotland, where alpine plants descend to the sea-shore; such as Thalictrum alpinum, Draba incana, Saxifraga oppositifolia, Arctostaphylos alpina, and Dryas octopetala. Also other parts where the elevation of the ground leads to the production of the same species, or of such plants as Arctostaphylos Uva-Ursi, Saxifraga stellaris, Alchemilla alpina, Tofieldia palustris, Juncus triglumis. Also tracts of slight elevation in the proximity of high mountains, upon which a corresponding flora prevails. At its lower limits appear Ilex, Corylus, Quercus, Fraxinus, Lonicera, Cratægus. and fruticose Rubi.

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- Botany.
- Arctic Region—characterized by the absence of Corn cultivation.
 - Infer-arctic Zone—this has its terminal line at the limit of Erica Tetralix.
 - Mid-arctic Zone—space above the limit of Erica Tetralix, and within or below that of Calluna vulgaris. In this zone most of the rare alpine plants are found, such as Saxifraga nivalis, Gentiana nivalis, Erigeron alpinus, Astragalus alpinus, Veronica alpina, Alopecurus alpinus, &c.
 - Super-arctic Zone—above the limit of Calluna, characterized by Saxifraga cernua and rivularis, and Luzula arcuata.

Professor Edward Forbes has followed Watson in his views of distribution, and has promulgated a theory in regard to the origin of the flora of Britain. He considers the vegetation of Great Britain and Ireland as composed of several floras, which are to be reckoned outposts separated by gcological changes from more extended areas. The following five floras, according to him, make up the vegetation of Britain and Ireland: 1. A west Pyrenean flora (Iberian or Asturian type), confined to the mountainous districts of the west and south-west of Ireland, characterized by botanical peculiarities, which depend on the presence of a few prolific species belonging to the families Saxifragaceæ, Ericaceæ, Lentibulariaceæ, and Cruciferæ. 2. A flora in the southwest of England and south-east of Ireland (Armorican type), which is intimately related to that of the Channel Isles and the neighbouring coast of France (Brittany and Normandy). This is Watson's Atlantic type. 3. The flora of the south east of England, where the rocks of the Cretaceous system are chiefly developed, and in which many species occur common to this district and the opposite coast of France. This corresponds nearly to Watson's Germanic type. 4. An alpine flora (Boreal or Scandinavian type), developed chiefly on the mountains of Scotland, and also partially on those of Cumberland and Wales. The species found on the latter are all, with the exception of Lloydia serotina, inhabitants also of the Scotch Highlands. The Scotch alpines all occur in Scandinavia, where they are associated with numerous additional species. This flora corresponds nearly to Watson's Highland type. This flora is represented in Shetland by Arenaria norvegica, and in Orkney by Primula scotica. It is largely developed on the Scottish Alps. 5. The general flora of the British slands, identical with that of central and western Europe, and which is called a Germanic flora. It corresponds to Watson's British, English, and Scottish types. It is a flora which overspreads many local floras throughout Europe, and gives a general character to the vegetation.

Forbes endeavours to prove that the specific identity, to any extent, of the plants of one area with those of another, depends on both areas forming, or having formed, part of the same specific centre, or on their having derived their vegetable population by transmission, through migration, over continuous or closely contiguous land, aided, in the case of alpine floras, by transportation on floating masses of ice. According to him, "the oldest of the floras now composing the vegetation of the British isles, is that of the mountains of the west of Ireland. Though an alpine flora, it is southernmost in character, and is quite distinct as a system from the floras of the Scottish and Welsh Alps. Its very southern character, its limitation, and its extreme isolation, are evidences of its antiquity, pointing to a period when a great mountain barrier extended across the Atlantic from Ireland to Spain. The distribution of the second flora, next in point of probable date, depended on the extension of a barrier, the traces of which still remain, from the west of France to the south-east of Britain, and thence to Ireland. The distribution of the third flora depended on the connexion of the coast of France and England towards the eastern part of the channel. Of the former

existence of this union no geologist doubts. The distribution of the fourth, or alpine flora of Scotland and Wales, was effected during the glacial period, when the mountain summits of Britain were low islands, or members of chains of islands, extending to the area of Norway through a glacial sea, and clothed with an arctic vegetation, which in the gradual upheaval of those islands and consequent change of climate, became limited to the summits of the new-formed and still existing mountains. The distribution of the fifth or Germanic flora, depended on the upheaval of the bed of the glacial sea, and the consequent connection of Ireland with England, and of England with Germany, by great plains, the fragments of which still exist, and upon which lived the great elk, and other quadrupeds now extinct. The breaking up or submergence of the first barrier led to the destruction of the second; that of the second to that of the third; but the well-marked epoch of migration of the Germanic flora indicates the subsequent formation of the straits of Dover, and of the Irish Sea, as now existing."

While there are evident and distinct features in the plants which constitute the floras of different parts of Britain, there are many difficulties to be overcome before we can adopt the speculative views of Forbes. The connection between the Tertiary and the present epoch is not made out as far as the species of plants are concerned, and we are disposed to look upon the existing flora of the globe as a distinct and independent one. Schouw differs from Forbes in his explanation of the flora of the British islands. He does not believe in the migration and geological changes to which Forbes alludes. He thinks that the west and south-west coast of Britain and Ireland had at first a mild climate, especially in winter, and that in consequence plants were produced there common to the analogous climates of Spain and the south of France; while the Scotch and English mountains were distinguished throughout by a polar climate, and produced nearly the same vegetation as the Lapland and Scandinavian mountains.

D'Archiac says, that in a botanical point of view, it would, perhaps, be desirable to determine whether the external circumstances under which the five floras of Great Britain now live, such as latitude, altitude, temperature, winds, humidity or dryness, exposure, nature of the soil, greater or less distance from the coast, &c., are altogether insufficient to explain their different characters. We know that plants have very different geographical limits. Thus there are some which we meet with over an extent of 25° in latitude, and much more in longitude, while others occupy only zones extremely restricted in both senses; it would, therefore, be useful to study the five British floras in this point of view. The radiation of plants from a centre is by no means satisfactorily proved; and it may be asked, for example, what is the original centre from which the species common to North America and southern Europe could have radiated? D'Archiac thinks that inconvenience arises from an attempt to give an account of facts hitherto inexplicable in one science, by drawing from another science suppositions made, as it appears, with the sole view of these explanations, and for which there is no sufficient authority. Proofs drawn from geology must rest on more certain data, he thinks, than those which have been adduced by Professor Forbes.

British marine vegetation presents two well-marked types according to Forbes, a southern and a northern. The genera Padina and Halyseris have their northern limit on the south coast of England, where they are rare. The genera Cystoseira, Sporochnus, Cutleria, and certain species of Sphacelaria, Mesogloia, Rhodymenia, Gigartina, and Dictyota, mark out a southern region, including the British Channel and part of the east coast, the Bristol Channel, and the south and west of Ireland; while the presence of Odonthalia dentata, Rhodomela cristata, R. lycopodioides, and Fucus Mackaii, characterize a northern flora, on the coasts of Scotland,

Botany. the north of England and of Ireland. The proportion of the different marine plants on the shores of Britain are as follows:-Melanospermez 1-5th, Rhodospermez 3-8ths,

and Chlorospermeæ 1-4th of the whole.

The British marine plants, according to Forbes, are distributed in depth or bathymetrically in a series of zones or regions which extend from high water mark down to the greatest explored depths. The first or littoral zone is that tract which lies between high and low water marks, and therefore is very variable in extent according to the amount of rise and fall of the tides. It has been divided into subregions characterized by the prevalence of certain marine species. 1. The sub-region of Fucus canaliculatus, 2. The sub-region of Lichina. 3. The sub-region of Fucus articulatus (Chylocladia articulata), F. nodosus, and Corallina officinalis. 4. The sub-region of Fucus serratus. The Lit-

toral zone is succeeded by narrow belts of such Seaweeds Botany. as Himanthalia lorea, Conferva rupestris, Laurencia pinnatifida, Chondrus crispus, and C. mammillosus. The second or Laminarian zone commences at low water-mark, and extends to a depth of from 7 to 15 fathoms. Here we meet with the great Tangle Seaweeds and deep-water Fuci. Species of Laminaria, Rhodymenia, and Delesseria, are found in an upper sub-region of this zone. In the lower sub-region they are rare, and are succeeded by the corallike Nullipore. The zones below them are entitled the Coralline zone, extending from 15 to 50 fathoms, and the region of the deep-sea corals from 50 to beyond 100 fathoms. These zones do not exhibit any conspicuous vegetable forms; they are characterized by the presence of certain animals. At the depth of 50 fathoms in the British seas, there seems to be a total absence of vegetable life

PART IV.

PALÆONTOLOGICAL BOTANY, OR THE STUDY OF FOSSIL PLANTS.

The changes which have taken place in the nature of living beings since their first appearance on the globe till the period when the surface of the earth having assumed its present form, has been covered by the creation which now occupies it, constitutes one of the most important departments in geology. It is, as Brongniart remarks, the history of life and its metamorphoses. The researches of geologists show clearly that the globe has undergone various alterations since that "beginning" when "God created the heavens and the earth." At various periods of the world's history, new mineral beds have covered the surface of the earth, and elevations of different portions of its crust have taken place, while at the same time the living beings inhabiting it have been buried in sedimentary deposits, to be replaced by a creation more or less different from the preceding. Some of these epochs have been marked apparently by great changes in the physical state of our planet, and they have been accompanied with equally great modifications in the nature of the living beings which inhabited The study of the fossil remains of animals is called Palæozoology, while the consideration of those of vegetables is denominated Palæophytology. Both are departments of the science of Palæontology, which has been the means of bringing geology to its present state of advancement. The study of these extinct forms has afforded valuable indications as to the physical state of the earth and as to its climate at different epochs.

The vegetation of the globe, during the different stages of its formation, has undergone very evident changes. the same time there seems to be no reason to doubt that the plants may all be referred to the great classes distinguished at the present day, namely, Thallogens, Acrogens, Gymnosperms, Endogens, and Exogens. The relative proportion of these classes, however, has been different, and the predominance of certain forms has given a character to the vegetation of different epochs. The farther we recede in geological history from the present day the greater is the difference between the fossil plants and those which now occupy the surface. At the time when the coal-beds were formed, the plants covering the earth belonged to genera and species not recognised at the present day. As we ascend higher, the similarity between the ancient and the modern flora increases, and in the latest stratified rocks we have in certain instances an apparent identity, at least as regards genera. At early epochs the flora appears to have

been uniform, to have presented less diversity of forms than at present, and to have been similar in the different quarters of the globe. The vegetation also seems to indicate that the nature of the climate was different from that which characterizes the countries in which these early fossil plants are now found.

Fossil plants are by no means so easily examined as They are seldom found in a complete recent species. state. Fragments of stems, leaves, and fruits, are the data by which the plant is to be determined. It is very rare to find any traces of reproductive organs. The parts of fossil plants are usually separated from each other, and it is very difficult to ascertain what are the portions which should be associated together so as to complete a specimen. The anatomical structure of some of the organs, especially of the stem, can sometimes be detected by thin microscopic slices being placed under the microscope; and in the case of Coniferous wood, the punctated woody tissue has proved

of great service as regards fossil Botany. Brongniart says that the mode in which plants are preserved in a fossil state may be referred to two principal classes:—1. The impression or cast of the plants, accom-

panied with the complete destruction of the vegetable tissue, and the preservation of few of its constituent parts. 2. Petrifaction and Carbonization, which preserve more or less completely the structure of the tissues of vegetable organs, by changing them completely or only modifying them. The first state is rather rare, but it is the usual condition of fossil vegetables in the variegated sandstone and tertiary limestones. The place of the vegetable is either empty or replaced by a substance of a ferruginous, calcareous, or earthy nature, having no organization. The second state or the impression with some preserved portion of vegetable tissue, is very frequent in the case of stems found in the carboniferous system. This is their ordinary mode of preservation. In such stems we must carefully distinguish the different zones of tissue, and their external and internal surfaces, which produce so many different appearances. The silicified stems of trees have been observed in various parts of the world, with their structure well preserved, so that their Endogenous and Exogenous character can be

easily determined. In order to study fossil plants well, there must be an acquaintance with systematic botany, a knowledge of the microscopical structure of all the organs of plants, such as

Botany, their roots, stems, barks, leaves, fronds, and fruit; of the markings which they exhibit on their different surfaces, and of the scars which some of them leave when they fall. It is only thus we can expect to determine accurately the living affinities of the fossil. Brongniart says, that before comparing a fossil vegetable with living plants, it is necessary to reconstruct as completely as possible the portion of the plant under examination, to determine the relations of these portions to the other organs of the same plant, and to complete the plant if practicable, by seeing whether, in the fossils of the same locality, there may not be some which belong to the same plant. The connection of the different parts of the same plant is one of the most important problems in Palæophytology, and the neglect of it has perhaps led to a needless multiplication of fossil species; portions of the same plant having been described as separate species or genera. In some instances the data have been sufficient to enable botanists to refer a fossil plant to a genus of the present day, so that we have fossil species of the genera Ulmus, Alnus, Pinus, &c. Sometimes the plant is shown to be allied to a living genus, but differing in some essential point, or wanting something to complete the identity, and it is then marked by the addition of the term ites, as Pinites, Thuites, Zamites, &c.

Before drawing conclusions as to the climate or physical condition of the globe at different geological epochs, the botanist must be well informed as to the vegetation of different countries, as to the soils and localities in which certain plants grow, whether on land or in the sea, or in lakes, in dry or marshy ground, in valleys or on mountains, or in estuaries, in hot, temperate, or cold regions. It is only by a careful consideration of all these particulars that any correct inferences can be drawn as to the condition of the globe.

The rocks of which the globe is composed are divided into two great classes, those which contain fossil remains, and which are called fossiliferous, and those having no such remains, and which are designated non-fossiliferous or azoic. The igneous unstratified rocks, included under the names of Granitic and Trappean, show no appearance of animal or vegetable remains. Trap rocks, however, have in some cases covered or inclosed vegetable structures, and these are found in an altered condition. Fossil remains have not been found in certain rocks having a stratified appearance, and which, from the changes they have undergone, were denominated by Hutton Metamorphic. These include Gneiss and Mica-slate, which are looked upon as stratified rocks, which have probably been formed at a high temperature, and have been subsequently altered by the effects of The absence of organic remains in rocks, however, is not always sufficient to enable us to state that these rocks were formed before animals or vegetables existed. Forbes has shown that, even at the present day, there are depths in the ocean which are destitute of organic life. Hence rocks deposited at such depths might contain no organic remains.

The stratified rocks which contain fossils have been divided into three great groups, the Palæozoic, the Secondary, and the Tertiary. The formations included under these are exhibited in the following table, as condensed from Ansted's geology:-

- 1. PALÆOZOIC ROCKS, containing the earliest fossil remains. They include the transition, Primary fossiliferous and Grauwacke rocks.
 - 1. Lower Palæozoic.-These comprehend the Silurian and Cambrian rocks.
 - 2. Middle Palæozoic.-The Devonian system, or Old Red Sandstone, so well developed in Scotland.
 - 3. Upper Palæozoic.—The Carboniferous system, or the Coal Measures, with millstone grit, carboniferous limestone and shales; and the Permian system, or the magnesian limestone.
- II. SECONDARY OF MEZOZOIC ROCKS, constituting a second great epoch in the history of fossils. VOL. V.

1. Lower Secondary .- The Upper New Red Sandstone of Botany. Britain, or the Triassic system of Germany. Here we meet with Red Sandstone and conglomerates, saliferous red and variegated marks.

2. Middle Secondary .- The Liassic system, with its limestones and marls; the Oolitic divided into Lower Oolite (Calcareous sand, Stonesfield slate, Bradford clay, &c.), Middle Oolite (Oxford clay, Coral clay, Calc grit, &c.), and Upper Oolite (Kimmeridge clay, Portland stone); the Wealden, as illustrated in Purbeck beds and Hastings sand.

3. Upper Secondary .- The Cretaceous system, with its lower and upper greensand and chalks, and the Gault. III. TERTIARY OF CAINOZOIC ROCKS, constituting the third grand fossiliferous epoch. These are well developed in Asia, America, and in the south of Europe, and only partially in Britain.

1. Lower Tertiary or Eccene.—This is seen in the London clay, the Paris basin, the Basin of Brussels, &c.

2. Middle Tertiary or Miocene. This is shown in the Coralline and Red Crag of Britain, the Basin of the

Rhine, of the Loire, and Garonne, &c.
3. Upper Tertiary or Pliocene.—This is illustrated by the Norwich crag, the Till of the Clyde, the Brown coal of Germany, &c.

These are succeeded by Superficial or Pleistocene Deposits, which consist of diluvium or diluvial drift, formed of gravel, with boulders, which indicate the violent action of water; and alluvium or deposits of fine mud, resembling those caused by ordinary fluviatile action. The tertiary formations and those of the present day appear to pass into each other.

The plants found in different strata are either terrestrial or aquatic, and the latter exhibit species allied to the salt and fresh-water vegetables of the present day. Their state of preservation depends much on their structure. Cellular plants have probably in a great measure been destroyed or changed in their aspect, and hence their rarity; while those having a woody and vascular structure have been preserved. The following is the number of fossil genera and species, as compiled from Unger's work on Palæophytology:-

DICOTYLEDONES.	Genera.	Species.
Thalamifloræ	24	84
Calycifloræ	56	182
Corollifloræ		60
Monochlamydeæ Angiosperm	æ 48.	221
		363
Monocotyledones.		
Dictyogenæ	2	5
Petaloideæ	36	125
Glumiferæ		12
ACOTYLEDONES.		
Thallogenæ	31	203
Acrogenæ		969
Doubtful		197
	437	2421

These plants are arranged in the different strata as fol-

T 130.11	(11	
Lower and Middle	Cambrian, Silurian, Devonian, Old Red Sandstone	and 7	3
	Carboniferous	68	3
Upper Palæozoic	Lower New Red Sandstone (Pe	rmian) 70	6
	Magnesian Limestone	$(D_0,)$ 2	1
	Upper New Red Sandstone (Tr Shell Limestone (Variegated Marls (Lias.	iàssić) 3	8
Lower Secondary	Shell Limestone (Do.) '	7
	Variegated Marls	Do.) 7	0
	(Lias	12	6
Middle Secondary	Upper, Middle, and Lower Ool	ite16	8
	Upper, Middle, and Lower Ool Wealden	6	1
Upper Secondary	Upper and Lower Greensand Upper and Lower Chalk	7.0	
	Upper and Lower Chalk	12	4
Tertiary	Cocene	41	4
	Miocene	49	6
	Miocene		5
Pleistocene			1
	Fossil Species	242	1

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On taking a general survey of the known fossil plants, Brongniart thinks that he can trace three periods of vegetation, characterized by the predominance of certain marked forms of plants. In the most ancient period there is a predominance of Acrogenous Cryptogamic plants; this is succeeded by a period in which there is a preponderance of Gymnospermous Dicotyledons; while a third period is marked by the predominance of Angiospermous Dicotyledons. There is thus-1. The reign of Acrogens, which includes the plants of the Carboniferous and Permian periods. During these periods, there seems to be a predominance of Ferns, a great development of Lycopodiaceæ, arborescent forms of Lepidodendron and Sigillaria, Gymnosperms allied to Araucaria, and anomalous Gymnosperms, as Nöggerathia. 2. The reign of Gymnosperms, comprehending the lower and middle secondary periods. Here we meet with numerous Coniferæ and Cycadaceæ, while Ferns are less abundant. 3. The reign of Angiosperms, embracing the Cretaceous and the Tertiary periods. This is characterized by the appearance of Angiospermous Dicotyledons, a class of plants which constitute more than threefourths of the present vegetable productions of the globe, and which appear to have acquired a predominance from the commencement of the Tertiary formations. These plants appear even at the beginning of the Chalk formation.

I. Reign of Acrogens.—In the lower Palæozoic strata the plants which have been detected are few. In the Silurian, Cambrian, and Old Red Sandstone systems, we meet with the remains of ancient marine plants, as well as a few terrestrial species. In the Old Red Sandstone of Scotland, Miller has detected Fucoids, Ferns, a Lepidodendron, and Lignite with a distinct Coniferous structure resembling that of Araucaria, besides a remarkable pinnate frond. In the Old Red Sandstone rocks at Oporto, Bunbury detected Pecopteris Cyathea, P. muricata, and Neuropteris tenuifolia —ferns allied to those of the Coal Measures.

The Carboniferous period is one of the most important as regards fossil plants. The vegetable forms are numerous and uniform throughout the whole system, whether exhibited in the Old or the New World. The important substance called Coal owes its origin to the plants of this epoch. It has been formed under great pressure, and hence the appearance of the plants has been much altered. On examining thin sections of coal under the microscope, we can detect vegetable tissues both of a cellular and vascular nature. In Wigan cannel coal, vegetable structure is seen throughout the whole mass. Such is likewise the case with other cannel, parrot, and gas coals. In common household coal, also, evident traces of organic tissue have been observed. In some kinds of coal punctated woody fibre has been detected, in others dotted and scalariform tissue, as well as cells of different kinds. Sporangia are also occasionally found in the substance of coal, as shown by Mr Daw in that from Fordel. The structure of coal in different beds, and in different parts of the same bed, seems to vary according to the nature of the plants by which it has been formed. Hence the different varieties of coal which are worked. The occurrence of scalariform and dotted vessels in coal indicates the presence of Ferns, and their allied forms, such as Sigillaria, Stigmaria, and Lepidodendron; while true punctated wood (which is rarely seen except in brown coal) implies the presence of Coniferæ. The anatomical structure of the stems of these plants will undoubtedly have some effect on the microscopic characters of the coal produced from them. The proportion of carbon varies in different kinds of coal. Along with it there is always more or less of earthy matter, which constitutes the ashes. When the earthy substances are in such quantity that the coaly deposit will not burn as fuel, then we have what is called a shale. The coal contains plants similar to those of the

shales and sandstones above and below it. In a coal-seam there is the Under-clay, containing roots only; then the Coal composed of plants, whose roots are in the clay, with others which have grown along with them, or have been drifted; while above the coal is the Shale bearing evidences of vigorous vegetation, and which appears like a great deposit from water charged with mineral matter, into which broken pieces of plants have fallen. There is frequently no clear division between coal and shale.

Unger enumerates 683 plants of the coal measures, while Brongniart notices 500. Of the last number there are 6 Thallogens, 346 Acrogens, 135 Gymnosperms, and 13 doubtful plants. This appears to be a very scanty vegetation, as far as regards the number of species. It is only equal to about 1-20th of the number of species now growing on the surface of the soil of Europe. Although, however, the number of species was small, yet it is probable that the individuals of a species were numerous. The proportion of Ferns was very large. There are between 200 and 300 enumerated.

Ferns are the only carboniferous fossil group which present an obvious and recognisable relationship to an order of the present day. While cellular plants and those with lax tissues often lose their characters by fossilization, Ferns are more durable, and retain their structure. It is rare, however, to find the stalk of the frond completely preserved down to its base. It is also rare to find fructification present. In this respect, fossil Ferns resemble Tree-ferns of the present day, the fronds of which rarely exhibit fructification. Only one surface of the Fern-frond is exposed to view, and that generally the least important in a botanical point of view. Fructification is sometimes evidently seen, as figured by Corda in Senttenbergia. The absence of fructification presents a great obstacle to the determination of fossil Ferns. The Acrogenous flora of the coal epoch seems to favour the idea of a humid as well mild and equable climate at the period of the coal formation—the vegetation being that of islands in the midst of a vast ocean.

Among the Ferns found in the clays, ironstones, and sandstones of the Carboniferous period, we may give the characters of some by way of illustration. Pecopteris seems

to be the fossil representative, if not congener, of Pteris. Pecopteris heterophylla (Fig. 583) has marked resemblance to Pteris esculenta New Zealand. The frond of Pecopteris pinnatifid or bitri-pinnatifidthe leaflets adhering to the rachis by the whole ength of their base, sometimes confluent; the midrib of the leaflets runs to the point, and the veins come off from it nearly

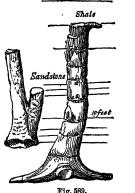


Fig. 583. Pecopteris (Alethopteris) heterophylla. ... 584. Neuropteris Loshif. ... 585. Neuropteris gigantea. ... 586. Neuropteris gigantea. ... 587. Sphenopteris affinis. ... 587. Sphenopteris affinis. ... 588. Cyclopteris dilatata.

perpendicularly, and the fructification when present is at the ends of the veins. Neuropteris (Figs. 584 to 586), has a pinnate or bipinnate frond, with pinnæ somewhat cordate

Botany. at the base—the midrib of the pinnæ vanishing towards the apex, and the veins coming off obliquely, and in an arched manner. Neuropteris gigantea (Fig. 585) has a thick bare rachis, according to Miller, and seems to resemble much Osmunda regalis. Sphenopteris (Fig. 587) has a twice or thrice-pinnatifid frond, the leaflets being narrowed at the base, often wedge-shaped, and the veins generally arranged as if they radiated from the base. Sphenopteris elegans resembled Pteris aquilina in having a stout leafless rachis, which divided at a height of seven or eight inches from its club-like base into two equal parts, each of which continued to undergo two or three successive bifurcations. A little below the first forking two divided pinnæ were sent off. A very complete specimen, with the stipe, was collected in the coal-field near Edinburgh, by Hugh Miller, who has described it as above. Cyclopteris (Fig. 588) has simple orbicular leaves, undivided or lobed at the margin, the veins radiating from the base, with no midrib. Caulopteris is the name given to the stems of Tree-ferns found in the coal fields. They are marked externally by oblong scars similar to those of Tree-ferns of the present day. These stems probably belong to some of the fronds to which other names are given, but as they have not been found attached, it is impossible to determine the point.

Sigillaria is perhaps the most important plant in the coal formation. It is found in all coal shales over the world. There are upwards of 60 species. It occurs in the form of lofty stems, 40-50 feet high, and 5 feet broad (Figs. 589 and 590), standing erect at right angles to the planes of al-



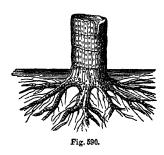


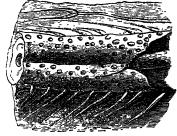
Fig. 589. Stems of Sigillaria pachyderma in an erect position, covered by successive deposits of sandstone and shale; one is bifurcated. ... 590. Sigillaria stem with markings, and Stigmaria roots.

ternating strata of shale and sandstone. The stem of Sigillaria is fluted in a longitudinal manner, and has a succession of single and double scars, which indicate the points of insertion of the leaves. When the outer part of the stem separates like bark, it is found that the markings presented by the inner surface differ from those seen externally. This has sometimes given rise to the erroneous supposition that they belong to different genera. In Sigillaria elegans there is a woody system which is broken up into cuneiform plates, separated by medullary rays, and there are two vascular systems, one forming a series of bundles in the medullary axis of the stem, and another external to the woody system. The vessels are dotted, scalariform, and more or less referrible to the spiral type. The external bundles which go directly to the leaves are placed opposite to the woody wedges (not, as in Stigmaria, opposite to the medullary rays), and such is also the case with the inner vascular system.

It has been recently ascertained by Mr Binney of Manchester, that the plant called Stigmaria (Fig. 591) is not a separate genus, but the root, or rather the rhizome of Sigillaria. It is one of the most common productions of the coal measures, and consists of long rounded or compressed fragments, marked externally by shallow circular, in some species they occupy the faces of diamond-shaped

oblong, or lanceolate cavities in the centre of slight tu-

bercles, arranged irregularly, but sometimes in a quincuncial manner. The cavities occasionally present a radiating appearance. The axis of the fragments is often hollow, and different in texture from the parts around. This axis consists of a vassystem, divided into
wedge-shaped masses
by medullary rays of
of a Sigillaria. The markings are the points
whence rootlets proceed. cular cylinder or woody



originate probably from the outer cellular axis, and not from the central woody cylinder. From the scars and tubercles arise long ribbon-shaped processes, which appear to have been hollow roots compressed. Stigmaria ficoides (Fig. 591), is often found creeping in the under-clay of a coal seam, sending out numerous roots from its tubercles, and pushing up its aerial stem, in the form of a fluted Sigillaria. While the rhizomes, stem, and roots have thus been determined, we have no means of ascertaining the foliage. It probable that Sigillaria was an acrogenous plant allied to Lycopodiaceæ, and probably intermediate between that order and Cycadaceæ. In coal from Fordel Mr Daw has detected numerous seed-like organisms, which may be the fructification either of a Sigillaria or of some plant allied to Lycopodium. The same bodies have been seen by Dr Fleming in many specimens of Cherry, Splint, and Cannel Coals from various quarters.

Lepidodendron (Fig. 592), is another genus of the coal measures which differs from those of the present day. It seems to occupy an intermediate place between Lycopodiaceæ and Coniferæ. The stem is from 20 to 45 feet high, marked outside by peculiar scaly-like scars (Fig. 592, a), hence the name of the plant. The linear or lanceolate leaves are arranged in the same way as those of Lycopodiums or of Coniferæ, and the branches fork like the former.

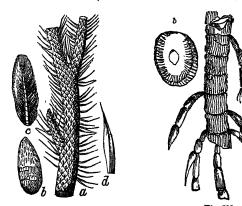


Fig. 592.

Fig. 593.

Fig. 592. Lepidodendron obovatum (elegans); a, bifurcating stem; b, Lepidostrobus; a, the same out vertically; d, Lepidophyllum.

593. Calamites Lindleyi (C. Mongeotii L. and H.), a jointed reed-like stem, with furrows on the surface. Stem a, with branches according to some, roots according to Binney; b, partition of one of the joints.

There is a double vascular system in the trunk, one in the centre, and another placed externally to the woody mass. The latter vascular system forms a continuous zone outside the wood; its inner edge is well defined, and its outer, whence bundles are given off to the leaves, is sinuous. Although the scars on Lepidodendron are usually flattened, yet

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projections, elevated one-sixth of an inch or more above the surface of the stem, and separated from each other by deep furrows:—the surface bearing the leaf being perforated by a tubular cavity, through which the bundle of vessels that diverged from the vascular axis of the stem to the leaf passed out. The fruit of Lepidodendron is seen in Lepidostrobus (Fig. 592, b and c), which appears to consist of scales covering sporangia, in the interior of which are spores, consisting of three or four angular sporules, which have been seen in a separate state. It is probable that many other fossil forms are connected with or allied to Lepidodendrons. Thus Lepidophyllum (Fig. 592, d) is probably the leaf of some species of the genus, while Strobilites is a form of the fruit.

Calamites (Fig. 593) is a reed-like fossil, having a subcylindrical, furrowed, and jointed stem, the furrows of the joints alternating and often converging. The stem is often crushed and flattened, and may probably have been originally hollow. At the joints there are toothed sheaths or tubercles, which are disposed symmetrically between the furrows. The fructification is unknown. There appears to have been a bark which could be separated from the woody tissue below. The plants have been seen erect by Mr Binney, and he has determined that what were called leaves or branches by some, are in reality roots. There are 51 species recorded. They have been compared to Equisetaceæ.

True Exogenous trees exist in the carboniferous system both of England and Scotland. These Exogenous trees are Gymnosperms, having woody tissue like that of Coniferæ. We see under the microscope punctated woody tissue, the rows of disks being usually two, three, or more, and alternating. They seem to be allied in these respects to Araucaria and Eutassa of the present flora. Stems of Dadoxylon or Pinites Withami, D. medullare, and Peuce Withami have been found in the sandstone of Craigleith quarry, near Edinburgh. Sternbergia is considered by Williamson as a Dadoxylon, with a discoid pith like that seen now-a-days in the Walnut and Jessamine.

The plants of the coal measures seem to be evidently terrestrial plants, and fresh-water aquatics. Brongniart agrees with Lyell in thinking that the lavers of coal have in general accumulated in the situation where the plants forming them grew. The remains of these plants covered the soil in the same way as layers of peat, or the vegetable mould of great forests. In a few instances, however, the plants appear to have been transported from a distance, and drifted into basins. Phillips is disposed to think that this was the general mode of formation of coal basins. He is led to this conclusion by observing the fragmentary state of the stems and branches, the general absence of roots, and the scattered condition of all the separable organs. Those who support the drift theory, look on the coal plants as having been swept from the land on which they grew by watery currents at different times, and deposited in basins and large sea-estuaries, and sometimes in lakes. The snags in the Mississippi, the St Lawrence, and other large rivers, are given as instances of a similar drifting process.

The nature of the vegetation during the Permian Period, which is associated with the Carboniferous, under the reign of Acrogens, has not been positively determined. genera of Ferns here met with are also found in the Carboniferous epoch; the Gymnosperms are chiefly species of Walchia and Nöggerathia. Lepidodendron elongatum, Calamites gigas, and Annularia floribunda, are also species of this period.

II. Reign of Gymnosperms.—In this reign the Acrogenous species are less numerous, the Gymnosperms almost equal them in number, and ordinarily surpass them in frequency. There are two periods of this reign, one in which Coniferæ predominate, while Cycadaceæ scarcely appear, and another in which the latter family preponderates as regards the number of species, and the frequency and variety

of generic forms. Cycadaceæ occupied a more important Botany, place in the ancient than in the present vegetable world. They extend more or less from the coal formation, up to the Tertiary. They are rare in the Grès-bigarré, or lower strata of the Triassic system (Upper New Red Sandstone) and in the Chalk. They attain their maximum in the Lias and Oolite, in each of which upwards of 40 species have been enumerated, and they disappear in the Tertiary formations.

In Brongniart's Vosgesian period, the Grès-bigarré, or the Red Sandstones and Conglomerates of the Triassic system, there is a change in the flora. Sigillarias and Lepidodendrons disappear, and in their place we meet with Gymnosperms, belonging to the genera Voltzia, Haidingera, Zamites, Ctenis, Æthophyllum, and Schizoneura. Species of Neuropteris, Pecopteris, and other acrogenous coal genera are still found, along with species of Anomopteris and Crematopteris-peculiar Fern-forms, which are not found in later formations. In the saliferous red and variegated marls of the Triassic system, the Acrogens are changed as regards species, and frequently in the genera. Thus we have the genera Camptopteris, Sagenopteris, and Equisetum. Among Gymnosperms, the genera Pterophyllum and Taxodites occur.

In the Lias the essential characters of the flora are the predominance of Cycadaceæ, in the form of species of Cycadites, Otozamites, Zamites, Ctenis, Pterophyllum, and Nilsonia, and the existence among the Ferns of many genera with reticulated venation, such as Camptopteris and Thaumatopteris. Coniferous genera, as Brachyphyllum, Taxodites, Palissya, and Peuce, are found.

In the Oolitic epoch, the flora consists of numerous Cycadaceæ and Coniferæ, some of them having peculiar forms. Its distinctive characters are, the rarity of Ferns with reticulated venation, which are so numerous in the Lias, the frequency of the Cycadaceous genera Otozamites and Zamites, which are most analogous to those now existing; and the greater frequency of the Coniferous genera, Brachyphyllum and Thuites.

There is an absence of true coal fields in the secondary formations generally; but in some of the Oolitic series, as in the lower Oolite at Brora, in Sutherlandshire, and the Kimmeridge clay of the upper Oolite, near Weymouth, there are considerable deposits of carbonaceous matter. The upper Oolite at Portland contains an interesting bed about a foot in thickness, of a dark brown substance, containing much earthy lignite. This is the dirt-bed, made up of black loam, which, at some far distant period, nourished the roots of trees, fragments of whose stems are now found fossilized around it. These consist of an assemblage of silicified stumps or stools of large trees, standing from 1-3 feet from





Fig. 504.

Fig. 594. Cycadoidea megalophylla (Mautellia nidiformis of Brongniart), a sub-globose depressed trunk, with a concave apex, and with the remains of the petioles disposed in a spiral mainer, the markings being transversely elliptical. It is found in the Oolite of the Island of Portland, in a silicified state.

595. Zamiostrobus ovatus (Zamia ovata of Lindley and Hutton), an ovate cone with a truncated base and obtuse apex. The genus seems to be intermediate between Encephalartos and Zamia. It is found in the green-sand at Faversham (Lindley and Hutton).

the mould. Most of them are erect, some slightly inclined,

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> The flora of the Wealden epoch is characterized in the north of England by the abundance of the Fern called Lonchopteris Mantellii, and in Germany by the predominance of the Conifer denominated Abietites Linkii, as well as by numerous Cycadaceæ, such as species of Cycadites, Zamites, Pterophyllum, Zamiostrobus (Fig. 595), Cycadoidea, Clathraria. Mantell states that he has found 40 or 50 fossil cones in the Wealden of England. The remains are those of land vegetables. The Wealden fresh water formation terminates the reign of Gymosperms.

III. Reign of Angiosperms. - This reign is characterized by the appearance of Angiospermous Dicotyledons, plants which constitute more than three-fourths of the present vegetable productions of the globe, and which appear to have acquired the predominance from the commencement of the Tertiary epoch. These plants, however, appear even at the beginning of the Cretaceous period. In this reign, therefore, Brongniart includes the upper secondary period, or the Cretaceous system, and all the Tertiary period. The Cretaceous may be considered as a sort of transition period between the reign of Gymnosperms and Angiosperms. The Chalk flora is characterized by the Gymnospermous almost equalling the Angiospermous Dicotyledons, and by the existence of a considerable number of Cycadaceæ, which do not appear in the Tertiary period. The genus Credneria is one of the characteristic forms.

The Tertiary period is characterized by the abundance of Angiospermous Dicotyledons and of Monocotyledons, more especially of Palms. By this it is distinguished from the more ancient periods. Angiosperms at this period greatly exceed Gymnosperms. Cycadaceæ are completely wanting in the European Tertiary strata, and the Coniferæ belong to genera of the temperate regions. Although the vegetation throughout the whole of the Tertiary period presents pretty uniform characters, still there are notable differences in the generic and specific forms, and in the predominance

of certain orders at different epochs.

The Eocene epoch in general is characterized by the predominance of Algæ and marine Naiadaceæ, such as Caulinites and Zosterites; by numerous Coniferæ, the greater part resembling existing genera among the Cupressineæ, and appearing in the form of Juniperites, Thuites, Cupressites, Callitrites, Frenelites, and Solenostrobus; by the existence of a number of Extra-European forms, especially of fruits, such as Nipadites, Leguminosites, Cucumites, and Hightea; and by the presence of some large species of Palm belonging to the genera Flabellaria and Palmacites. Amber is considered to be the produce of many Coniferæ of this epoch, such as Peuce succinifera.

The most striking characters of the Miocene epoch consist in the mixture of exotic forms of warm regions with those of temperate climates. Thus we meet with Palms, a kind of Bamboo, and other plants of warm climates, mingled

with Amentiferous and other forms, belonging to temperate and cold climates.

The flora of the Pliocene epoch has a great analogy to that of the temperate regions of Europe, North America, and Japan. We meet with Coniferæ, Amentiferæ, Rosaceæ, Leguminosæ, Rhamnaceæ, Aceraceæ, Aquifoliaceæ, Ericaceæ, and many other orders. There is a small number of Dicotyledons with gamopetalous corollas. In this flora there is the predominance of Dicotyledons in number and variety; there are few Monocotyledons and no Palms. No species appear to be identical, at least with the plants which now grow in Europe.

Brown coal occurs in the upper Tertiary beds, and in it vegetable structure is easily seen under the microscope. Goeppert, on examining the brown coal deposits of northern Germany and the Rhine, finds that Coniferæ predominate in a remarkable degree; among 300 specimens of bituminous wood collected in the Silesian brown coal deposits alone, only a very few other kinds of Dicotyledonous wood occur. The coniferous plants of these brown coal deposits belong to Taxineæ and Cupressineæ chiefly; among the plants are

Pinites Protolarix and Taxites Ayckii.

We have thus seen that the vegetation of the globe has undergone various changes at different periods of its history, and that the farther back we go, the more are the plants different from those of the present day. There can be no doubt that there have been successive deposits of stratified rocks, and successive creations of living beings. We see that animals and plants have gone through their different phases of existence, and that their remains in all stages of growth and decay have been imbedded in rocks superimposed upon each other in regular succession. It is impossible to conceive that these were results of changes produced within the limits of a few days. Considering the depth of stratification, and the condition and nature of the living beings found in the strata at various depths, we must conclude (unless our senses are mocked by the phenomena presented to our view) that vast periods have elapsed since the Creator in the beginning created the heavens and the earth.

When we find animals and plants of forms unknown at the present day, in all conditions as regards development, we read a lesson in regard to the history of the earth's former state as conclusive as that which is derived from the Nineveh relics (independent of Revelation) in regard to the history of the human race. There is no want of harmony between Scripture and geology. The Word and the Works of God must be in unison, and the more we truly study both, the more they will be found to be in accordance. Any apparent want of correspondence proceeds either from imperfect interpretation of Scripture or from incomplete knowledge of science. The changes in the globe have all preceded man's appearance on the scene. He is the characteristic of the present epoch, and he knows by Revelation that the world is to undergo a further transformation, when the elements shall melt with fervent heat, and when all the present state of things shall be dissolved ere the ushering in of a new earth, wherein righteousness is to dwell.

EXPLANATION OF THE PLATES.

Plate CX. Helleborus fœtidus, Stinking Hellebore, belonging to the Nat. Ord. Ranunculaceæ, Sub-ord. Helleboreæ. The leaves

are pedate, the inflorescence cymose, and the fruit follicular.

Plate CXI. Drimys Winteri, Winter's bark plant, belonging to the Nat. Ord. Magnoliaceæ, and Sub-ord. Wintereæ. The plant was discovered by Captain Winter. Its bark is aromatic and stimulant, and its leaves are dotted.

Plate CXII. Papaver Rhœas, common Red Poppy, belonging to the Nat. Ord. Papaveraceæ. The leaves are pinnatifid, the peduncles have spreading hairs, the calyx consists of 2 caducous sepals, inclosing 4 crumpled petals, the stamens are indefinite and hypogynous, and the ovary is surmounted by a radiating

1. Stamens inserted on the thalamus, below the ovary with its sessile stigma.

2. Capsule of the Poppy opening by pores below the sessile stigma.

Plate CXIII. Janipha Manihot and Eschscholtzia californica.

Fig. 1. Janipha Manihot, Cassava plant, belonging to the Nat. Ord. Euphorbiaceæ. The leaves are digitately-partite, and the flowers are in racemose cymes.

Fig. 2. Racemose cyme, with a pentacoccous capsule, which

separates in an elastic manner into 5 single-seeded carpels. The cyme bears male as well as female flowers.

Fig. 3. Pistil with stigma.

Fig. 4. Stamens and fleshy disk.

Fig. 5. Seed with strophiole. Fig. 6. Eschscholtzia californica (nat. size), belonging to the Nat. Ord. Papaveracess. It has multipartite leaves, a peculiar caducous calyx like a candle-extinguisher, and a tetrapetalous corolla, with numerous hypogynous stamens.

Fig. 7. Hollowed end of the peduncle, with the pistil. The

calyx separates in one piece from the peduncle.

Fig. 8. Section of ovary, with numerous seeds attached to 2 parietal placentas.

Fig. 9. Ceratium or Siliquæform capsule (nat. size), opening by 2 valves, and bearing seeds on each margin of the valves.

Fig. 10. Section of the seed, with the Dicotyledonous embryo. Fig. 11. Embryo separated from the seed, showing the 2 cotyledons and the radicle.

Plate CXIV. Malva sylvestris, common Mallow, belonging to the Nat. Ord. Malvaceæ. The leaves have 5 lobes, the inflorescence consists of cymose fascicles, the æstivation is contorted, petals 5 obcordate, and stamens monadelphous.

Fig. 1. Calyx with a three-leaved epicalyx or involucre.

Fig. 2. Obcordate petal, with monadelphous stamens.

Fig. 3. Tube of stamens formed by union of the filaments.

Fig. 4. Pistil with numerous carpels and styles.

Fig. 5. Stamen with reniform anther opening round the margin.

Fig. 6. Section of ovary composed of numerous carpels.
Plate CXV. Linum catharticum, and Linum usitatissimum, belong-

ing to the Nat. Ord. Linaces.

Fig. 1. Linum catharticum, Purging Flax, having opposite oblong leaves, and a corymbose cyme.

Fig. 2. Linum usitatissimum, Common Flax, having alternate lanceolate leaves and a corymbose cyme.

Plate CXVI. Anacardium occidentale, Cashew-nut plant, belonging to the Nat. Ord. Anacardiaceæ.

Fig. 1. Branch (somewhat reduced), bearing flowers and fruit. The flowers are in cymes, and the peduncles are enlarged in a pear-like form, bearing the nut (the true fruit) at their apex.

Fig. 2. Flower not expanded, showing calyx and petals, with single fertile stamen and pistil.

Fig. 3. Flower expanded.

Fig. 4. Stamen and pistil, with the calyx. One fertile stamen longer than the others.

Fig. 5. Stamen separated.

Fig. 6. Nut constituting the fruit. Fig. 7. Nut opened longitudinally. Fig. 8. Seed separated from the nut.

Fig. 9. Cotyledons opened to show the radicle a, and the

Plate CXVII. Sarothamnus scoparius (Spartium or Cytisus of many anthers), Common Broom, belonging to the Nat. Ord. Leguminosæ or Fabacæ, Sub-ord. Papilionaceæ. The angled branches bear ternate leaves, papilionaceous flowers, and legumes.

Fig. 1. Two-lipped calyx.

Fig. 2. Broadly ovate Vexillum or standard.

Fig. 3. One of the Alæ, or wings, of the corolla.

Fig. 4. Carina or Keel, which consists of 2 petals, and incloses

the essential organs of reproduction.

Fig. 5. Monadelphous stamens, i.e. united into a tube by their filaments

Fig. 6. Hairy ovary with the long style, thickened upwards, and spirally curved.

Fig. 7. Legume or Pod, many-seeded and hairy at the margin.

Plate CXVIII. Carica Papaya and Andromeda hypnoides.

Fig. 1. Carica Papaya, the Papaw tree (much reduced), belonging to the Nat. Ord. Papayacee. The leaves are palmatelycleft, and the flowers are unisexual.

Fig. 2. Portion of a racemose cyme of infundibuliform male flowers, with united petals.

Fig. 3. Gamopetalous male flower cut open, showing the ten epicorolline stamens alternately shorter.

Fig. 4. Stamen consisting of filament and anther lobes.

Fig. 5. Female flowers with a deeply-5-parted corolla and 5 stigmas above the ovary.

Fig. 6. Andromeda hypnoides (nat. size), belonging to the Nat. Ord. Ericacese, with a creeping moss-like stem and pendulous, solitary, somewhat bell-shaped flowers.

Fig. 7. Flower of Andromeda, with 5-parted calyx, gamopetalous, campanulate corolla.

Fig. 8. Back view of stamen with its 2-horned anther.

Fig. 9. Front view of stamen with bicornute and biporose anther.

Fig. 10. Pistil with its ovate acuminate style and 5-grooved Botany.

Fig. 11. Capsule, 5-celled, with a central 5-lobed placenta

bearing numerous ovules.

Plate CXIX. Æthusa Cynapium, Fool's Parsley, belonging to the
Nat. Ord. Umbelliferæ. The leaves are bipinnate or tripinnate, with a sheathing pericladium, flowers in compound umbels, with a reflexed unilateral. 3-leaved involucel connected with the

Plate CXX. Conium maculatum, Common Hemlock, belonging to the Nat. Ord. Umbelliferæ. The stem is spotted and hollow, leaves compound (tripinnate), with a pericladium, flowers in compound umbels, with an involucre and an involucel, fruit a cremocarp with waved ridges.

Plate CXXI. Œnanthe crocata, Hemlock Water-Dropwort, belonging to the Nat. Ord. Umbelliferæ. Leaves compound and sheathing, roots composed of fusiform sessile knobs, stem hollow, and flowers in compound umbels, with general and partial involucres.

Fig. 1. Flower composed of 5 petals, with inflexed apicula, 5 stamens, and 2 styles with an epigynous disk.

Fig. 2. Lateral view of the cremocarp composed of 2 mericarps or achenes, with blunt convex ribs, surmounted by the lanceolate teeth of the calyx, and two styles with a disk at their base.

Fig. 3. Back view of the cremocarp, with ribs, teeth of calvx, and styles.

Plate CXXII. Valeriana officinalis, Great Wild Valerian, belonging to the Nat. Ord. Valerianaceæ, showing the roots, which are officinal, the hollow stem, the alternately-pinnate leaves, and flowers in corymbose cymes.

Fig. 1. Separate flower, consisting of an adherent calyx, with an obsolete limb, an irregular gamopetalous corolla, exserted stamens, and 1 style.

Fig. 2. Pistil separated, with ovary, style, and stigma.

Fig. 3. Monospermal fruit, with the persistent pappose limb of the calyx.

Plate CXXIII. Lactuca virosa, Strong-scented Wild Lettuce, belonging to the Nat. Ord. Compositæ, Sub-ord. Cichoraceæ. leaves are sessile, amplexicaul at the base, and dentate. The flowers in capitula, and the calyx pappose.

Plate CXXIV. Leontodon Taraxacum, Common Dandelion, belonging to the Nat. Ord. Compositæ, Sub.-ord. Cichoraceæ. The leaves are radical and runcinate, the flowers ligulate, and arranged in capitula. The outer phyllaries (involucral leaves) are reflexed, and all of them become deflexed when the fruit is ripe; the receptacle becomes dry and convex.

Fig. 1. Capitulum with reflexed phyllaries and ligulate flowers. Fig. 2. A single flower, with inferior achene (cypsela), stipitate pappus, a ligulate corolla, 5 stamens united by their anthers, and 1 style with 2 stigmas.

Fig. 3. Receptacle of the flowers, become dry and convex, with deflexed phyllaries, so as to allow the pappose fruit to be scat-

Fig. 4. Linear-obovate Achene, or Cypsela, consisting of an indehiscent single-seeded seed-vessel, which is muricated towards the apex, and longitudinally striated.

Plate CXXV. Cuscuta verrucosa, Warty Dodder, belonging to the Nat. Ord. Cuscutaceæ, which is often considered as a sub-order of Convolvulaceæ.

Fig. 1. Leafless flowering stem of Dodder (nat. size) turning from right to left (contrary to the motion of the sun), and bearing racemose cymes

Fig. 2. Campanulate corolla, cut open, showing 5 epicorolline stamens, with alternating scales at their base.

Fig. 3. Persistent calyx, surrounding the pistil.

Fig. 4. Capsule opening transversely near the base, exposing seeds and dissepiment.

Fig. 5. Dissepiment and 2 seeds, the upper part of the capsule being removed.

Fig. 6. Bilocular capsule cut transversely, showing 2 seeds in

each loculament.

Fig. 7. Roundish compressed seed.

Fig. 8. Seed cut longitudinally, showing the albumen with portions of the spirally-rolled-up embryo immersed in it.

Plate CXXVI. Solanum nigrum and Solanum Dulcamara, belong-

ing to the Nat. Ord. Solanaceæ.
Fig. 1. Solanum nigrum, Common Nightshade. Leaves ovate and wavy. Flowers in extra-axillary umbellate cymes.

Fig. 2. Solanum Dulcamars, Woody Nightshade or Bitter-sweet. Stem shrubby, leaves auricled, flowers in corymbose cymes opposite the leaves.

Fig. 3. Anther opening by 2 pores at its apex. Fig. 4. Transverse section of baccate fruit, showing 2 locula. ments, with seeds attached to a central placenta.

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Fig. 5. Coiled embryo with cotyledons and radicle.

Plate CXXVII. Atropa Belladonna, Common Dwale, Deadly Nightshade, belonging to the Nat. Ord. Atropaces. Large rhizome, giving off buds and roots. Leaves ovate, in pairs of unequal sizes, flowers solitary, drooping.

Fig. 1. Gamosepalous 5-partite calyx, and flower-bud.

Fig. 2. Campanulate corolla cut open, lobes unequal, 5 stamens, epicorolline, and distant above.

Fig. 3. Calyx and ovary.

Fig. 4. Transverse section of baccate fruit, with 2 loculaments and seeds attached to a central placenta.

Plate CXXVIII. Hyoscyamus niger, Common Henbane, belonging to the Nat. Ord. Atropaceæ. Leaves amplexicaul, sinuated, flowers nearly sessile, axillary, and unilateral.

Fig. 1. Calyx laid open, showing the pistil.

Fig. 2. Corolla laid open, showing reticulations, and stamens attached to it.

Fig. 3. Stamen, with anther opening by a longitudinal slit. Plate CXXIX. Digitalis purpurea, Purple Foxglove, belonging to the Nat. Ord. Scrophulariaceæ.

Fig. 1. Calyx in 5 deep segments, with the pistil. Fig. 2. Pistil separated.

Fig. 3. Didynamous stamens, with the anther-lobes continuous and dehiscent

Fig. 4. Didynamous stamens, with the anther-lobes collateral and unopened.

Fig. 5. Capsule cut transversely, showing two loculaments. Plate CXXX. Polygonum Bistorta, Common Bistort or Snakeweed, belonging to the Nat. Ord. Polygonaceæ. Leaves subcordateovate, waved, the radical ones with a winged footstalk, long ochreate stipules, flowers in a dense cylindrical racemose cyme, root large and tortuous.

Plate CXXXI. Myristica moschata, the nutmeg-tree, belonging to

the Nat. Ord. Myristicaceæ.

Fig. 1. Male plant (nat. size) with oblong nearly elliptical leaves, and flowers in axillary umbellate cymes.

Fig. 2. Perianth of male plant laid open to show the stamens with their united filaments.

Fig. 3. Anther, bilocular, and opening longitudinally.

Fig. 4. Female flower cut open, showing the single pistil, with short style and 2-lobed stigma.

Fig. 5. Young fruit.

Fig. 6. Ripe drupaceous fruit in the act of bursting, and showing the mace or arillode.

Fig. 7. Section of the ripe fruit, containing mace and seed

Fig. 8. The nut consisting of a hard endocarp inclosing the seed. Fig. 9. The oval seed.

Fig. 10. The seed cut vertically.

Fig. 11. Vertical section of endocarp and seed, showing ruminate albumen and the embryo.

Fig. 12. Embryo, showing 2 large foliaceous plicate cotyledons

Fig. 13. Embryo with radicle and cotyledons.

Plate CXXXII. Euphorbia hypericifolia, Tutsan-leaved Spurge, belonging to the Nat. Ord. Euphorbiaceæ.

Fig. 1. Plant (nat. size) with opposite oblong leaves, half heart-shaped at the base, and flowers in corymbose cymes

Fig. 2. Involucre with appendages, inclosing male and female

Fig. 3. Involucre cut open, to show the insertion of the numerous achlamydeous male monandrous flowers, and the single naked female flower, all pedicellated.

Fig. 4. Involucre deprived of its petaloid appendages, with female flower showing forked styles.

Fig. 5. Involucre inclosing the ripe fruit (regma).

Fig. 6. Stamen and anther dehiscing.

Fig. 7. Fruit with one of the cocci separated from the columella, and bursting to discharge the seed.

Fig. 8. Seed.

Fig. 9. Seed cut open longitudinally, showing fleshy albumen and inverted embryo.

Plate CXXXIII. Artocarpus incisa, the Bread-fruit tree, belonging to the Nat. Ord. Artocarpaceæ.

Fig. 1. Branch reduced to \(\frac{1}{3} \) its natural size, with cuneate-ovate leaves, lobed in a pinnatifid manner, male flowers in a clubshaped deciduous catkin, female flowers in rounded clusters.

Fig. 2. Transverse section of the male amentum with numerous flowers around the margin of a cellular receptacle.

Fig. 3. Male flowers, each formed by a single perianth. Fig. 4. Single male flower separated with a perianth in 2 segments and a single stamen.

Fig. 5. Cluster of female flowers.

Fig. 6. Single female flower separated, with ovary, style, and bifid stigma; the perianth is one piece with a contracted mouth.

Fig. 7. Ovary.

Fig. 8. Ovary laid open to show the ovule. Fig. 9. A variety of the ovary with 2 loculaments.

Fig. 10. Transverse section of a bilocular ovary.

Plate CXXXIV. Cycas circinalis. a species of false Sago-plant, belonging to the Nat. Ord. Cycadaceæ.

Fig. 1. Plant reduced to 12 its natural size. The stem or stipe is round and erect, the leaves pinnately-divided and forming a crown round the stem.

Fig. 2. Male amentum (nat. size), consisting of scales bearing on their under side 2-valved anthers.

Fig. 3. Upper side of one of the scales; it is somewhat triangular, tapering from apex to base, and terminating at the apex by a recurved point.

Fig. 4. Under side of a scale, bearing anthers.

Figs. 5, 6, and 7. Anther.

Fig. 8. Pollen magnified.

Plate CXXXV. Arum maculatum, Cuckow-pint, or Wake-Robin, belonging to the Nat. Ord. Araceæ.

Fig. 1. Flowering stalk, with hastate-sagittate spotted leaves, a spathe convolute at the base, inclosing a spadix bearing male and female flowers.

Fig. 2. Amylaceous corm, whence arise buds and roots.

Fig. 3. Berried fruit, after leaves and spadix have decayed, crowded into an oblong spike, which is of a bright scarlet colour. Plate CXXXVI. Plants belonging to the Nat. Ord. Fungi, the Mushroom order.

Fig. 1. Amanita muscaria, Fly Amanita, with a red warty pileus, and stipe surrounded by an annulus.

Figs. 2, 3, 4. Amanita verrucosa, Warty Amanita.

Figs. 5, 6. Agaricus semiglobatus, Glutinous Agaric. with a greenish-yellow, semiglobate pileus and an annulate stipe

Plate CXXXVII. Secale cereale, Rye, belonging to the Nat. Ord. Gramineæ.

Fig. 1. Culm, leaf, and spike of Rye.

Fig. 2. British specimen of Rye affected with Ergot. It is called Spurred Rye.

Fig. 3. Specimen of Ergotized Rye from East Florida.

Fig. 4. Spikelet of Rye, with subulate glumes, inclosing 2 or 3 florets, lower paleze with very long awns, upper bifid.

Fig. 5. Appearance presented by Ergot.

Fig. 6. Transverse section of Ergot, consisting of polygonal (J. H. B-R.) cells with oil globules.

BOTANY BAY, a spacious bay on the east coast of Australia, New South Wales, 5 miles south of Sydney, in Lat. 34. S. Long. 157. E. It was discovered by Captain Cook in 1770, and named from the profusion of then unknown plants found on its shores. The bay is about 5 miles in length and breadth, but the entrance is little more than a mile across. See Australia.

BOTARGA (a Spanish word), a kind of sausage prepared from the roe of the mullet. It is much used on the shores of the Mediterranean as a relish with wine.

BOTH, Jan and Andreas, Flemish painters, and pupils of Bloemart, were born at Utrecht about the year 1610. The union of these brothers was remarkable; they were

alike inseparable in their studies, their travels, and their painting. Jan painted the landscape part of their pictures in the manner of Claude Lorrain, and Andrew drew the figures and animals in the style of Bamboccio. They both died in 1650; Andrew having been drowned at Venice, his brother Jan, through grief, soon afterwards followed him to the grave. In the museum at Paris there are two pictures by these masters, one a View of Italy at Sunset, the other a Defile. The gallery at Dresden also contains two landscapes by these excellent artists.

BOTHNIA, a district on the north and west of the gult of the same name, belonging partly to Sweden, and partly to Russia. The rivers Muonio and Tornea separate SwedBottle.

Bothnia ish from Russian Bothnia, the former constituting the governments of Pitea and Umea, and the latter being included in the Russian government of Finland.

BOTHNIA, Gulf of. See BALTIC.

BOTHWELL, a village and parish of Scotland, county of Lanark, on the Clyde, 9 miles S.E. of Glasgow. In the vicinity are the remains of Bothwell Castle, and Bothwell Bridge, where a battle was fought on 22d June 1679 between the Covenanters and the royal forces, in which the former were defeated with great slaughter.

BOTHWELL, James Hepburn, Earl of. See Scotland. BOTRYOIDAL (βοτρύς and ἐιδός), having the form of a bunch of grapes.

BOTS. See ENTOMOLOGY, Index.

BOTTICELLI, Alessandro, an Italian painter, born at Florence in 1437, was a pupil of Filippo Lippi. He executed several pictures for Pope Sixtus IV. and for the city of Florence, for which he received large sums of money; but he expended all his acquisitions in thoughtless extravagance, and at last died in great distress aged seventy-eight. He was not only a painter, but a man of letters. Baldini, according to the general report, communicated to him the secret of engraving, then newly discovered by Finiguerra, their townsman. The famous edition of Dante's Inferno, printed at Florence by Niccolo Lorenzo della Magna in 1481, and to which, according to some authors, Botticelli undertook to write notes, was intended to have been ornamented with prints, one for each canto; and of these prints, as many as were finished were designed, if not engraved by Botticelli. It is remarkable that the first two plates only were printed upon the leaves of the book, and, for want of a blank space at the head of the first canto, the plate belonging to it is placed at the bottom of the page. Blank spaces are left for the rest, that as many of them as were finished might be pasted on. The first two, as usual, are printed on the leaves; while the others, seventeen in number, which follow regularly, are pasted on the blank spaces; and these, apparently, were all that Botticelli ever executed. About the year 1460 he is said to have engraved a set of plates, representing the Prophets and Sibyls. Basan tells us that he marked these plates with a monogram composed of the first two letters of the alphabet joined together.

BOTTLE. The first bottles were probably made of the skins of animals. In the Iliad (iii. 247), the attendants are represented as bearing wine for use in a bottle made of goat's skin, 'Αςκφ ἐν αἰγείφ' The ancient Egyptians used skins for this purpose, and from the language employed by Herodotus (ii. 121), it appears that a bottle was formed by sewing up the skin and leaving the projection of the leg and foot to serve as a cock; hence it was termed ποδεών. This aperture was closed with a plug or a string. Skin-bottles of various forms occur on Egyptian monuments. Greeks and Romans also were accustomed to use bottles made of skins; and in the southern parts of Europe they are still used for the transport of wine. The first clear notice of them in Scripture occurs in Joshua (ix. 4), where it is said that the Gibeonites took "old sacks upon their asses, and wine-bottles old and rent and bound up." Our Saviour's language is thus clearly explained: "Men do not put new wine into old bottles, else the bottles break." Skins are still most extensively used throughout Western Asia for water.

It is an error to represent bottles as being made exclusively of skins among the ancient Hebrews (Jones, Biblical Cyclopædia, sub voc.) The Egyptians possessed vases, bottles, &c., of hard stone, alabaster, glass, ivory, bone, porcelain, bronze, silver, or gold; and also, for the use of the people generally, of glazed pottery or common earthenware. As early as Thothmes III, assumed to be the Pharaoh of the Exodus, B.C. 1490, vases existed of a shape so elegant and of workmanship so superior, as to show that the art was

not, even then, in its infancy. The British Museum contains a fine collection of these articles. The process of making glass bottles is described under the head GLASS. Bottomry. Perhaps the largest manufactory of wine bottles in the world is at Folembray in France, which is said to produce no fewer than eight millions annually. See GLASS.

BOTTOM, in mercantile language, is a familiar expression for a ship; as in the phrase to ship goods in foreign

BOTTOMRY, a maritime contract, by which a ship (or bottom) is hypothecated in security for money borrowed for the purposes of her voyage, under the condition, that if the ship arrive at her port of destination, the borrower personally, as well as the ship, shall be liable for the repayment of the loan, together with such premium thereon as may have been agreed on; but that if the ship be lost, the lender shall have no claim against the borrower, either for the sum advanced, or for the premium. In consideration of the risk thus incurred by the lender, the premium (which is sometimes termed maritime interest) is usually high: it may range from ten to twenty-five per cent., or even more, according to the nature of the risk, or the difficulty of procuring the necessary funds. The freight may be pledged as well as the ship, and, if necessary, the cargo also. When money is borrowed on the security of the cargo, it is said to be taken up at respondentia, a term which seems to have been introduced from the circumstance of the borrower engaging to answer for the repayment of the loan on the arrival of the goods. But though the terms are distinctive, there is no essential difference in the nature of bottomry and respondentia contracts, and both are regulated by the same principles of maritime law. Indeed the contract of respondentia is now seldom or never entered into unless in conjunction with that of bottomry.

A bottomry contract may be written out in any form which sufficiently shows the conditions agreed on between the parties; but it is usually drawn up in the form of a bond. The document must show, either by express terms or from its general tenor, that the risk of loss is assumed by the lender; this being the consideration for which the high premium is conceded. The lender may transfer the bond by indorsation, in the same manner as a bill of exchange or bill of lading, and the right to recover its value becomes vested in the indorsees.

According to the law of this country, a bottomry contract remains in force so long as the ship exists in the form of a ship, whatever amount of damage she may have sustained. Consequently, the "constructive total loss" which is recognized in marine insurance, when the ship is damaged to such an extent that she is not worth repairing, is not recognized in reference to bottomry, and will not absolve the borrower from his obligation. But if the ship go to pieces, the borrower is freed from all liability under the bottomry contract; and the lender is not entitled to receive any share of the proceeds of such of the ship's stores or materials as may have been saved from the wreck. Money advanced on bottomry is not liable, in this country, for general average losses.

If the ship should deviate from the voyage for which the funds were advanced, her subsequent loss will not discharge the obligation of the borrower under the bottomry contract. If she should not proceed at all on her intended voyage, the lender is not entitled to recover the bottomry premium in addition to his advance, but only the ordinary rate of interest for the temporary loan. As the bottomry premium is presumed, in every case, to cover the risks in-curred by the lender, he is not entitled to charge the borrower with the premium which he may pay for insurance of the sum advanced, in addition to that stipulated in the bond.

The contract of bottomry seems to have arisen from the custom of permitting the master of a ship, when in a foreign country, to pledge the ship in order to raise money for repairs, or other extraordinary expenditures rendered necessary in the course of the voyage. Circumstances often arise, in which, without the exercise of this power on the part of the master, it would be impossible to provide means for accomplishing the voyage; and it is better that the master should have authority to burden the ship, and if necessary the freight and cargo also, in security for the money which has become requisite, than that the adventure should be defeated by inability to proceed. But the right of the master to pledge the ship or goods must always be created by necessity: if exercised without

Bottony

necessity the contract will be void. Accordingly the master of a British ship has no power to grant a bottomry bond at a British Bottrigari. port, or at any foreign port where he might have been able to raise funds on the personal credit of the shipowners. Neither has he any power to pledge the ship or goods for private debts of his own; but only for such supplies as are indispensable for the purposes of the

voyage.
The bottomry lender must use reasonable diligence to ascertain that a real necessity exists for the loan; but he is not bound to see to the application of the money advanced. If the lender have originally advanced the funds on the personal credit of the master or owners, or on any other security than that of bottomry, he is not entitled at a subsequent period to convert his claim into a bottomry obligation; and although the master should grant him such obligation, it would not bind the owners. In every case a bond procured

by compulsion would be void.

The power of the master to pledge the cargo depends upon there being some reasonable prospect of benefit to it by his so doing. He has no such power except in virtue of circumstances which may oblige him to assume the character of agent for the cargo, in the absence of any other party authorized to act on its behalf. Under ordinary circumstances he is not at liberty to pledge the cargo for repairs to the ship. If indeed the goods be of a perishable nature, and if it be impossible to get the ship repaired in sufficient time to obviate serious loss on them by delay, without including them under the bottomry contract, he has power to do so; because it may fairly be assumed, in the case supposed, that the cargo will be benefited by this procedure. But if there be time to communicate with the proprietors of the cargo, it is his duty to give them notice before resorting to this course. The general principle is, that the master must act for the cargo, with a reasonable view to the interests of its proprietors, under the whole circumstances of the case. he does this his proceedings will be sustained; but should he manifestly prejudice the interests of the cargo, by including it under bottomry for the mere purpose of relieving the ship, or of earning the freight, the owners of the cargo will not be bound by the bottomry contract. Any bottomry or respondentia bond may be good in part or bad in part, according as the master may have acted within or beyond the scope of his legitimate authority in granting it.

If two or more bottomry bonds have been granted at different stages of the voyage, and the value of the property be insufficient to discharge them all, the last dated bond has the priority of payment, as having furnished the means of preserving the ship, and thereby preventing the total loss of the security for the previous bonds.

In a recent case in the English Admiralty Court (the Cynthia, 20 L. 7, 54), it was decided that a bond granted by a British consul over a British ship, the master of which had been murdered in a mutiny by the crew, was valid, although the new master, appointed by the consul, had not been required to sign it.

When the sum due under a bottomry bond over ship, freight, and cargo, is not paid at the stipulated time, proceedings may be taken by the bondholder for recovery of the freight and for the sale of the ship; and should the proceeds of these be insufficient to discharge the claim, a judicial sale of the cargo may be resorted to. As a general rule the value of the ship and freight must be exhausted before recourse can be taken against the cargo.

The bottomry premium must be ultimately paid by the parties for whose especial benefit the advances were obtained, as ascertained on the final adjustment of the average expenditures at the port of

For further information on this subject, the reader is referred to the cases of the Gratitudine, 2 Rob. A. R. 240, 272; the Lochiel, 3 Rob. 34; the Alexander, 1 Rob. 346; to Soares v. Rahn, 3 E. F. Moore; Dobson v. Lyall, 8 Jurist 969; and especially to the cases of the Lord Cochrane, 8 Jurist 714, and of Jacobsen v. Reinhardt, 22 Scottish Jurist 309. See also Marshall on Insurance, book 2; Park on Insurance, c. 21; Arnould on Insurance; Lord Tenterden on the Law of Merchant Ships, part 2, c. 3. (J. W-K.)

BOTTONY. A cross bottony, in Heraldry, terminates at each end in three buds, knots, or buttons, resembling in some measure the three-leaved grass; whence, in Segoing's Trésor Heraldique it is termed croix trefflée. It is the

badge of the order of St Maurice.

BOTTRIGARI, ERCOLE, a mathematician eminently skilled in the science of music, was descended of a noble family of Bologna, and born in that city, A.D. 1531. With a strong predilection for the ancient music, he attempted, as Vincentino and others had done, to introduce the ancient scales into practice, but with no better success. He cor-

rected Gogavino's Latin version of Ptolemy in numberless instances, and to so good purpose, that Dr Wallis has in general conformed to it in his translation of that author. He Bouches du translated into Italian Boetius de Musica, with such parts of Plutarch and Macrobius as relate to music. He also made annotations upon Aristoxenus, Franchinus, Spataro, Vincentino, Zarlino, V. Galilei, and, in short, on almost every musical treatise he could obtain, as appears by the copies once belonging to him, which are now deposited in various libraries in Italy. Bottrigari's works contain greater proofs of his learning and skill in music than of his abilities as a writer, his style being remarkably inelegant. Nevertheless he affected the character of a poet, and left a collection of poems, printed in 1557, 8vo. Walther represents him as an able mathematician, and says that he was possessed of a very rich and valuable cabinet of curiosities which the emperor Ferdinand II. had a great desire to purchase. He died in 1612, and not in 1609 as stated by Mazzuchelli. Some of his works have been printed, and others are still

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in manuscript. (Tiraboschi, vii.) BOTZEN, or BOLZANO (the ancient Pons Drusi), the capital of the circle of Etsch in Tyrol, is situated at the confluence of the Talfer and the Eisach, 32 miles N.N.E. of The town is well built in the Italian style, and has a fine old Gothic church, a castle, several churches and convents, and a gymnasium. Being intersected by roads from Italy, Germany, and Switzerland, it has an extensive transit trade, and four large annual fairs. It has also some manufactures of linen, silk, and hosiery goods, leather, &c. It is protected from sudden inundations by a strong dike of masonry nearly 2 miles in length, and in some parts 24 feet

thick. Pop. 9000.

BOUCHE OF COURT, the privilege of having meat and drink at court scot-free. This custom was anciently in use also in the houses of noblemen. Thomas earl of Lancaster retained Sir John de Ewre to serve him with ten men at arms in time of war, allowing them bouche of court, with livery of hay, oats, and horse-shoes. Sir Hugh Merril had the same privilege for life, on condition of serving King Edward II.

BOUCHES DU RHÔNE, a department in the S.E. of France, separated by the Durance from the department of Vaucluse on the north; and by the Rhône from that of Gard on the west: the Mediterranean bounds it on the south, and the department of Var on the east. Area 1,267,674 acres, of which above one-half is covered with wood and water, or is waste. The northern and eastern parts are covered with mountains, spurs of the Esterel and Alpine systems, the highest of which, Ste Victoire, is only 3420 feet above the level of the sea. In the W. and S.W. are the great alluvial plains of Crau and Camargue. The former of these, an immense tract of land lying between the Alps and the sea, is covered with boulders of all sizes, evidently the consequences of diluvial action. The Camargue is comprised within the delta of the Rhône, and is continually gaining upon the sea by the fresh deposits which that river is daily bringing down. Though portions of it are cultivated, the greater part is covered with marshes, ponds, and canals. Some of these ponds or lagoons are of great extent, particularly those of Valcarès and Berre. The first of these covers nearly the half of Camargue, and has no communication with the sea, while the latter extends between the most easterly arm of the Rhône and Marseilles, and discharges itself into the sea by a narrow passage called the canal de Martigues. The only canals in the department now navigable are the canal of Arles, 281 miles in length, extending from the town of that name to the Port de Bouc, and that of Craponne, connecting the Durance and the Rhône. In spring the climate is warm and dry; in summer the heat is intense, and is rarely mitigated by rain. In winter the mistral, a cold north

Boullers. wind from the high country of the Cevennes, sometimes prevails. The inhabitants cultivate with success the olive, vines, figs, almonds, capers, melons, and mulberries; while on the mountains there grow a variety of aromatic plants, such as thyme, lavender, absinthe, rosemary, and hyssop. The principal forest-trees are the oak and pine. A considerable quantity of potatoes is grown, but the supply of corn is quite insufficient to supply the demand. About one-thirteenth of the surface is covered with vineyards, producing annually 17,610,000 gallons of wine, of which a large proportion is exported. But the wealth of the department consists in its horses, cattle, and sheep. Of horses, it maintains about 10,000; of horned cattle, 4000; of sheep, from 400,000 to 500,000. These are distributed among a vast number of proprietors (25,000, according to some authorities), who, on the approach of summer, unite their flocks and drive them to the hilly regions in the north of the department. Another source of wealth is the produce of silk, which amounts annually to about 730,000 lb. The principal articles of manufacture are soap and soda; but there are also a few oil-mills, tanneries, coral-works, sugar-refineries, and silkmills. There are also several marble-quarries in the department; and the tunny, shad, and anchovy fisheries are valuable. Though the manufactures are not very important, the commerce of the department is extensive, as Marseilles has now for many years been the largest and wealthiest seaport in France. The public revenues amount to nearly two millions sterling, of which the customs produce more than a half.

The following is a table of the arrondissements, cantons, communes, and population of the department for 1851:-Arrondissements. Cantons. Communes. Population. Aix..... 10 59 112,026

9

31

16

Arles.....

Marseilles.....

229,214 428,989

87,749

This department has given birth to several distinguished men-Petronius the Latin poet, Tournefort and Adanson the naturalists, Puget the sculptor, Vanloo the painter, Massillon the pulpit orator, and the historians Thiers and

BOUFLERS, Louis François, Duke de, commonly called the Chevalier Bouflers, a peer and marshal of France, and a general of distinguished reputation, was born Jan. 10. 1644. Having early entered the army, he was raised in 1669 to the rank of colonel of dragoons. In the conquest of Lorraine he served under Marshal de Créquy. In Holland he served under Turenne, frequently distinguishing himself by his skill and bravery; and when that celehrated captain was killed by a cannon-shot in 1675, he commanded the rearguard during the retreat of the French army. After performing various military services in Germany, in Flanders, and on the frontiers of Spain, he was created, in 1690, general of the army of the Moselle, and contributed materially to the victory of Fleurus. In the following year he acted as lieutenant-general under the king in person; and whilst investing Mons, he was wounded in an attack on that place. He conducted the bombardment of Liège, although it was defended by an enemy superior in numbers, and afterwards forced the allied generals to abandon Luxembourg. He was intrusted with the command against King William at the siege of Namur; and for this and other important services he was raised, in 1693, to the rank of marshal of France. In 1694 he was appointed governor of French Flanders and of the town of Lisle. By a skilful manœuvre he threw himself into Namur in 1695, and held out with unexampled obstinacy against the army of the allies under King William, sustaining four assaults, and only surrendering the place after four months of open trenches and the loss of 20,000 men to the besiegers.

In the conferences which were held with the Earl of Port- Bougainland, and terminated in the peace of Ryswick, he had a principal share. During the following war, when Lisle was again threatened with a siege by the Duke of Marlborough and Prince Eugene, Bouffers was appointed to the command, and made an obstinate resistance of four months. His mag nanimity was not less remarkable than his military conduct; for when a partizan represented to him that it would not be difficult to kill Prince Eugene, he was told by the marshal that he might expect a great reward for taking him prisoner, but the severest punishment if anything were attempted against his life. He was rewarded and honoured by the king for his defence of Lisle, as if he had been victorious. It was indeed a species of triumph. His generous enemy, appreciating his merits, allowed him to dictate his own terms of capitulation: "Je signerai," said Prince Eugene, "tout ce que vous voudrez;" and he was as good as his word. When the affairs of France were threatened with the most urgent danger, Bouflers, though a senior officer to Villars, made an offer to serve under that general, and was with him at the battle of Malplaquet. Here he again displayed his military skill by conducting the retreat, so that he lost neither cannon nor prisoners. He died at Fontainbleau in 1711, leaving the character of a true patriot and a great commander.

BOUGAINVILLE, Louis Antoine de, a celebrated circumnavigator, was born at Paris in 1729. He was received advocate in the parliament of Paris, but soon abandoned the profession, and entered the army in the corps of musketeers. He associated much with Clairaut and D'Alembert, from whom he derived his knowledge of algebra and fluxions. At the age of twenty-five he published his treatise on the Integral Calculus, as a supplement and continuation of L'Hôpital's treatise Des infiniment petits. He was raised to the rank of major in the Picardy regiment. He went to London as secretary to the French embassy, and was chosen a member of the Royal Society. In 1756 he went to Canada as captain of dragoons, and aid-de-camp to the Marquis of Montcalm, and having distinguished himself in the war against England, was rewarded with the

cross of the order of St Louis.

After the peace, when the French government conceived. the project of colonizing the Malouines or Falkland Islands, Bougainville undertook to begin this establishment at his own expense. He began by landing some families of French Canadians; and the number of settlers was increased afterwards to 150. But this colony having excited the jealousy of the Spaniards, the French government agreed that it should be given up to them, on condition of their indemnifying Bougainville. Bougainville was then appointed to command the frigate La Boudeuse and the transport L'Etoile, on a voyage of discovery round the world. He set sail in November 1766, taking with him Commerçon as naturalist, and Verron as astronomer. This was the first voyage round the world performed by the French. Since the first circumnavigation by Magellan in 1519, and that of Drake in 1577, eleven other circumnavigations had been performed, part of them by the Dutch and part by the English. Having executed his commission of delivering up the Falkland Islands to the Spanish, Bougainville proceeded on his expedition, and touched at Buenos Ayres at the time of the expulsion of the Jesuits from Paraguay. Passing through the Straits of Magellan, he anchored for a week at Taheite, where the English navigator Wallis had touched eight months before. The numerous rocks and other dangers made him turn off to the N.E., and prevented him from continuing a westerly course, so as to pass through the channel which separates New Holland from New Guinea. In his general chart these two islands are laid down as one, although he possessed some information of the existence of the channel. Two years after, in 1770, Captain Cook sailed through thi: channel. The expedition having crossed all the meridians

Bougie.

Bougeant of the Pacific Ocean, and now suffering from scurvy, came to anchor in the Gulf of Cajeli in the island of Borou, one of the Moluccas, where the governor of the Dutch settlement liberally supplied their wants. As it was the beginning of September, the expedition shortened their stay at Borou, in order to take advantage of the latter part of the easterly monsoon, which carried them to Batavia. From thence they proceeded to the Isle of France, where Commercon remained, with the view of proceeding to examine the botany of Madagascar; as also did Verron for the purpose of observing the transit of Venus. In 1769 the expedition arrived at St Malo, after a voyage of two years and four months, with the loss of only seven out of upwards of 200 men.

Bougainville's account of the voyage (Paris 1771, 4to) is written with simplicity, and in a temper which inclined him to view objects on the humorous side. The art of making astronomical observations at sea was then much less perfect than now, and, accordingly, Bougainville's charts are found to be erroneous, particularly in the longitudes. After an interval of several years, he again received a naval command and saw much active service between 1779 and 1782. In the memorable engagement of April 12. 1782, in which Rodney defeated the Count de Grasse, Bougainville, who commanded the Auguste, succeeded in rallying eight ships of his own division, and bringing them safely into St Eustace. After the peace he returned to Paris, and solicited and obtained the place of associate of the Academy. He had a project of making a voyage of discovery towards the north pole. As this did not meet with support from the French government, he sent his plan to Admiral Phipps. Phipps, however, followed a different course, but only reached the 80th degree of north latitude.

Bougainville obtained the rank of vice-admiral in 1791; and in 1792, having escaped almost miraculously from the massacres of Paris, he retired to his estate in Normandy. He was chosen a member of the Institute at its first formation, and, in consequence, returned to Paris. He succeeded Borda as member of the Board of Longitude. In his old age, under the government of Napoleon, he enjoyed the dignity of senator, and was created a count and member of the Legion of Honour.

Retaining his good-humoured liveliness and his mental faculties to the last, he died in 1814, aged eighty-five. He was married, and had three sons who served in the French army. His éloge is written by Delambre, in the Memoirs of the Institute.

BOUGEANT, GUILLAUME HYACINTHE, a famous Jesuit, born at Quimper, Nov. 4.1690. He first taught humanity at Caen and Nevers, and afterwards settled in Paris at the college of Louis le Grand. He is the author of several works, written in his native language. The principal of these are, A Collection of Physical Observations, extracted from the best authors, 1719 and 1721, 4 vols. 12mo; A History of the Wars and Negociations which preceded the treaty of Westphalia, 2 vols. 12mo; A History of the treaty of Westphalia; The Female Doctor, or Distaff Theology, 12mo; Philosophical amusement on the Language of Beasts, Paris, 1739, 12mo; The Marvellous Voyage of Prince Fanferedin, Paris, 1735, 12mo; Exposition of the Christian Doctrine; and Anacreon and Sappho, a dialogue in Greek verse. He died January 7. 1743.

BOUGIAH. See BUGIAH.

BOUGIE (French bougie, a candle), a long cylindrical surgical instruments for dilating the urethra, the rectum, or the esophagus, in cases of stricture. Bougies vary as to their materials, size, and shape, and are solid or hollow, stiff or flexible, according to their particular use. Some bougies are of steel, silver, &c.; others are made of slips of waxed linen rolled cylindrically, or by covering a fine cord of flax or silk with successive coatings of linseed-oil, inspissated by boiling, and rendered drying by litharge; after which, they are

smoothed by rolling on a slab, and then polished. The Bouguer. best elastic bougies are made of caoutchouc dissolved in a mixture of drying linseed-oil and turpentine; or, still better, of caoutchouc dissolved in sulphuric ether. Medicated bougies also are employed in surgery.

BOUGUER, PIERRE, an eminent French mathematician, was born in 1698. His father, one of the best hydrographers of his time, was regius professor of hydrography at Croisic in Lower Brittany, and author of an excellent treatise on navigation. Young Bouguer was bred to mathematics from his infancy, and at an early age was appointed to succeed his father as professor of hydrography. In 1727 he gained the prize given by the Academy of Sciences for his paper "On the best manner of forming and distributing the Masts of Ships;" and two other prizes, one for his dissertation "On the best method of observing the Altitude of Stars at Sea;" the other for his paper "On the best method of observing the Variation of the Compass at Sea." These are published in the Prix de l'Académie des Sciences. In 1729 he published Essai d'Optique sur la Gradation de la Lumière, the object of which is to define the quantity of light lost by passing through a given extent of the atmosphere. He found the light of the sun to be 300 times more intense than that of the moon. He was soon after made professor of hydrography at Havre; and succeeded Maupertius as associate geometer of the Academy of Sciences. He was afterwards promoted in the academy to the place of pensioned astronomer, and went to reside in Paris.

It was resolved to send an expedition to South America for the purpose of measuring a degree of the meridian near the equator. From that measurement, compared with the length of a degree of the meridian in other latitudes, the deviation from sphericity in the figure of the earth might be known. The academy made choice of four of its members to proceed on this voyage. These were Godin, Bouguer, and De la Condamine, for the geodetical operation, and the younger Jussieu as naturalist. They sailed from La Rochelle in 1735, and it was ten years before Bouguer returned to France. The account of his operations during the expedition is given by him in the Memoirs of the Academy of Sciences, 1744, and in a separate work entitled La Figure de la Terre determinée par les Observations de MM. Bouguer et De la Condamine. There is likewise an account of this expedition published by Don George Juan and Don Antonio de Ulloa, two scientific officers of the Spanish navy, who accompanied the expedition. The length of a portion of the meridian was measured on the ground by means of a base and a set of triangles. Then, by observing the altitude of the s of Orion which passed near the zenith simultaneously at the two ends of the meridian line that had been measured, that line was found to contain 3° 7' of latitude. A star near the zenith was employed, that the observation might not be affected by refraction; s of Orion passed the meridian in the zenith near the middle of the line measured, so that the distance of that star south of the zenith of the northern extremity of the line was 1° 25' 46"; and its distance north of the zenith of the southern extremity of the line was 1° 41' 13", the sum of these two numbers making 3° 7′. The altitude was taken by zenith sectors of a long radius. The ground on which these operations were performed was 12,000 feet above the level of the sea, and 4200 feet above the neighbouring city of Quito, and situate in a plain extending from north to south, between the two ridges of the Cordil-The northern extremity of the arc was on the equator. The length of the degree resulting was 56,767 toises; but this was the degree of a curve circumscribed round the earth at the height of 12,000 feet above the level of the sea; and the length of the degree at the level of the sea deduced from this, with some other corrections, is 56,753 toises. This length of the degree of the meridian at the equator was compared with the degree of the meridian measured in France, with the degree measured in Lapland, and with the degree of longitude deduced in the south of France. From this comparison it was concluded that the equatorial diameter of the earth is to the polar diameter as 179 to 178, and that the equatorial radius of the earth was about eight leagues longer than the polar. Since the time of Bouguer, degrees have been measured in different climates with more accurate instruments than he possessed; but the precise proportion of the equatorial and polar diameters of the earth is not yet finally ascertained. Bouguer makes the excess of the equatorial diameter above the polar to be 17; Sir Isaac Newton made it 128; Laplace, calculating from the lunar motion, 312; Melanderhielm and Svanberg, from a degree measured anew in

Bouhours. Lapland in 1783, compared with the degree measured in the province of Quito, 313. Bouguer found the seconds pendulum 36 of a line shorter at the summit of Pichincha than at the level of the sea; that is, the force of gravity was less by a 1200th part at that elevation.

Bouguer also made observations on the limit of perpetual snow, a subject which has been elucidated since his time by the researches of Humboldt. Von Buch, Wahlenberg, and others. Whilst at the of Humboldt, Von Buch, Wahlenberg, and others. equator, he made observations to ascertain the obliquity of the ecliptic, which he found to be 23° 28' 28". He also made some experiments on the deviation of the plumb-line from the vertical, occasioned by the attraction of a neighbouring mountain—a phenomenon afterwards investigated by Dr Maskelyne on the mountain

The number of Bouguer's papers contained in the printed Memoirs of the Academy of Sciences, is a sufficient proof of his great mounts of the Interest of his most valuable inventions, the Heliometer, an instrument for calculating very acute angles with extreme precision, and applied to the determination of the diameters of stars, and their distances from the earth, is described in the Memoirs for 1748. See Heliometer. Some experimenters maintained that the plumbline had a diurnal oscillation; Bouguer showed that it remains at rest. He employed for this purpose a telescope, attached to the end of a chain 187 feet long, suspended within the dome of the Invalides at Paris: the telescope was directed to a distant mark, so that any motion in this long pendulous system might be seen by the deviation of the wires of the telescope from the mark. The particulars of this experiment are to be found in the Mém. de l'Academie des Sciences, 1754. In the volume for 1739 and 1749 there are papers of his on the astronomical refraction in the torrid zone, particularly in cases where the star is seen at more than 90° from the zenith, in consequence of the observer being in a high situation. In the volume for 1747, he proposed a log of a new construction for measuring a ship's way. In the same collection there are papers of his on the length of the pendulum, on the form of the prow which suffers least resistance in passing through the water, and on a variety of other subjects. Bouguer died in 1758, aged sixty. His disposition was naturally mild, and the dissensions that arose between him and his fellow traveller De la Condamine caused him great vexation. By economy he had acquired a moderate fortune, a part of which he bequeathed to the poor.

The following is a list of his principal works:—Traité d'Optique sur la Gradation de la Lumière, 1729 and 1760. Entretiens sur la Cause d'Inclinaison des Orbites des Planètes, 1734. Traité de Navire, &c., 1746, 4to. La Figure de la Terre determinée &c., 1749, 4to. Nouveau Traité de Navigation, contenant la Théorie et la Pratique du Pilotage, 1753. Solution des Principaux Problemes sur la Manœuvre des Vaisseaux, 1757. Opérations jaites pour la Verification du Degré du Méridien entre Paris et Amiens; par Mess. Bou-

guer, Camus, Cassini, et Pingré, 1757.

After his return from South America he was editor of the Journal des Savans. His éloge is contained in the Memoirs of the Academy of Sciences for 1758.

BOUHOURS, DOMINIQUE, a celebrated French critic, born at Paris in 1628. He entered into the society of Jesuits at the age of sixteen, and was appointed to read lectures upon polite literature in the college of Clermont at Paris, and on rhetoric at Tours. He afterwards became preceptor to the two sons of the Duke of Longueville. The duke died in Bouhours' arms; and the "account of the pious and Christian death" of this great personage was his first publication. He was sent to Dunkerque to the Popish refugees from England; and in the midst of his missionary occupations published several books. Among these were Entretiens d'Ariste et d'Eugène, a work of a critical nature on the French language, printed five times at Paris, twice at Grenoble, and afterwards at Lyons, Brussels, Amsterdam, Leyden, &c. It embroiled him in numerous quarrels, particularly with Menage, who, however, lived in friendship with the author before and after. The fame and merit of this piece recommended Bouhours so effectually to the great Colbert, that he intrusted him with the education of his son the Marquis of Seignelay. He afterwards wrote several other works in French, the chief of which are, Remarks and Doubts upon the French Language, 1694; Dialogues upon the art of Thinking Well in works of Genius, 1687; The Life of St Ignatius, 1679; The Art of Pleasing in Conversation; The Life of St Francis Xarier, 1682. It was his practice to publish alternately a

book on literature and a work on some subject of piety, Boulainwhich gave occasion to a wag, in a satirical epitaph, to remark of him, "qu'il servait le monde et le ciel par semestre." His Pensées ingenieuses des Anciens et des Modernes, Boulanger though at once instructive and amusing, exposed him to censure as well as ridicule, on account of some strange misjudgments and omissions. He has classed Boileau with the least esteemed of the Italian satirical versifiers; and what is still more remarkable, he has omitted, in his Thoughts on the Moderns, all mention of Pascal. That a disciple of St Ignatius should wish to forget the author of the Provincial Letters is, however, not to be wondered at. Among the numerous epigrams to which this omission gave rise is the following by Madame Deshoulières:

> Père Bouhours, dans vos Pensées, La plupart fort embarrassées, A moi vous n'avez point pensé. Dans cette liste triomphante Des célèbres auteurs que votre livre chante, Je ne vois point mon nom placé; Mais aussi dans le même rôle Vous avez oublié Pascal, Qui pourtant ne pensait mal: Un tel compagnon me console.

BOULAINVILLIERS, HENRI DE, Lord of St Saire, an eminent French writer, descended from a very ancient and noble family, was born at St Saire in Normandy A.D. 1658. He received his education at the college of Juilli, where he early discovered the uncommon abilities for which he was afterwards distinguished. His historical writings are numerous and important, but deformed by an extravagant admiration of the feudal system, which he regarded as the chef d'æurre of the human mind. He misses no opportunity of regretting those "good old times," when the people were enslaved by a few petty tyrants alike ignorant and barbarous. His principal works are his Histoire de l'Ancien Gouvernment de la France, &c., La Haye, 1727, 3 tom. 8vo ; Etat de la France ; avec des Mémoires sur l'Ancien Gouvernment, &c., Lond. 1727, 3 tom. fol.; Histoire de la Pairie de France, &c., Lond. 1753; La Vie de Mahomet (a Fable of Mahomet, as Mosheim calls it); Histoire des Arabes, Amst. (Paris), 1731, 2 vols. 12mo. All his works were published after his death. His philosophical writings have now lost all their value. His professed refutation of the system of Spinoza is in fact a weak and imperfect exposition of that writer's opinions. He died at Paris in 1722

BOULANGER, JEAN, a French engraver, born at Amiens in 1607. If not the inventor, he had at least the merit of improving the art of stippling. His works are after Raphaël, Lionardo da Vinci, Mignard, &c. Sometimes the naked parts of his figures are not correctly drawn nor in good taste. His best prints, however, are deservedly held in considerable esteem.

Boullanger, Nicolas-Antoine, a man whose name and writings have been much cited by the literary infidels of France, was the son of a tradesman at Paris, where he was born in 1722. He studied in the college of Beauvais, but his progress while there was unusually slow. Having, however, a talent for mathematics, he soon acquired so much knowledge of that science, that he was appointed to accompany the Baron de Thiers to the army in the capacity of engineer. He thus became concerned in various works which brought under his observation a number of geological facts which, he thought, evinced the great antiquity of the earth, and a long series of revolutions which it must have undergone. Proceeding to speculate upon the moral influence of these disastrous phenomena, he found it necessary to apply to the study of ancient literature, and he acquired some knowledge of Hebrew, Syriac, Chaldaic, and Arabic; but his studies were interrupted by his death at the early age of thirty-seven. He was the author of L'Antiquité De-

Boulangerite Boulognesur-Mer.

voilée par ses Usages, a posthumous work, published by the Baron d'Holbach in 1766, and which excited considerable attention about the end of that century. This work, though not devoid of eloquence, and displaying a powerful imagination, exhibits at the same time deficiencies of judgment and critical acuteness. He furnished to the Encyclopédie the articles Déluge, Corvée, Guèbres, Langue Hibrarque, and Économie Politique. His collected works were published at Paris in 1792, 8 vols. 8vo, and at Amsterdam in 1794, 6 vols. 8vo. He is said to have possessed a mild and engaging disposition; but it is difficult to reconcile this statement with the dark and impetuous spirit which animated him as a writer. Latterly he was connected with a class of men, illustrious indeed in point of talent, but who were the professed enemies of religion, and were heated with the delusive idea of effecting its destruction. Boulanger contributed his share to this unworthy enterprise, by arguments which he drew from his studies, and the hypotheses he had conceived. It ought to be observed, however, that several of the irreligious writings which have been ascribed to him are spurious.

BOULANGERITE, a sulphuret of lead and antimony, found at Molières, in the department of the Gard in France. and near Nerlschink in Siberia, &c. It consists of 55.57 lead, 24.60 antimony, and 18.86 sulphur, with accidental quantities of arsenic and iron.

BOULAY, CESAR ÉGASSE DU (in Latin Bulæus), was born at St Ellier (Mayenne), in the beginning of the seventeenth century. He became successively professor of humanity at the college of Navarre, register, rector, and historiographer of the university of Paris. He died in 1678. Of his works the principal are, a History of the University of Paris, in Latin, 6 vols. folio, 1665 and 1673; and the Thesaurus of Roman Antiquities, 1651, folio.

BOULDER, a name given to any rounded mass of stone worn smooth by the action of water. See Geology. Boulder Formation, or Diluvial Formation, consists of sand, clay, gravel, &c., mixed with water-worn stones of different sizes; and in Scotland is called Till.

BOULOGNE-SUR-MER, a town of France, in the department of the Pas de Calais, the capital of a canton and arrondissement of the same name. It is situated on the sea-shore at the mouth of the Liane, in 50. 44. N. Lat. 1. 36. E. Long., 166 miles from Paris by railway. It was known to the Romans under the name of Gessoriacum, and was afterwards called Bononia, from the name of a fort built at the beginning of the Christian era on the opposite bank of the Liane. A bridge was thrown across the river, and Caligula erected on its northern bank a lighthouse which attracted first the fishermen, and ultimately the entire population of Gessoriacum. During the middle ages the town was frequently besieged. In 882 it was taken and sacked by the Norman pirates. In later times it was assailed, but without success, by Henry III. of England. In 1544 it was taken by Henry VIII. after a siege of six weeks; but five years after it was restored to France by Edward VI. for the sum of 40,000 livres. Boulogne consists of two parts, the High or Old Town, and the Low or New Town. The Old Town, situated on the top of the hill, still boasts its ancient ramparts and arched gateways. The citadel, flanked by high towers, and separated from the town by a fosse, has been recently converted into a barrack. In the middle of the old town is the Hôtel de Ville, behind which is the ancient beffroi or belfry. A cathedral has been in course of erection since 1827, and in the immediate neighbourhood are several nunneries. The New Town or basse-ville, extends from the foot of the hill to the harbour and along the shore, and is the chief seat of commerce. The only public building of importance is the museum, which is said to contain one of the best provincial collections in France. tached to it is a public library of 22,000 volumes, and 3000 MSS., many of them very rare and richly illuminated. The Boulter. present entrance to the harbour, in which the tides rise from 17 to 28 feet, was formed in 1829. It is flanked on both sides with wooden piers, which in fine weather are the favourite promenades of the inhabitants. It is calculated that from 100,000 to 150,000 passengers annually land here. On one side of the harbour is the basin formed by Napoleon for the flotilla of flat-bottomed boats, which was intended to convey his troops to the English shores at the time of the projected invasion. On a hill at a short distance from the town is a marble monument, erected by the grande armée in commemoration of this event, 164 feet in height, surmounted by a statue of the emperor, by Bosio, 16 feet high. Boulogne possesses 1300 vessels, all engaged in the fisheries. The fish taken, consisting chiefly of herrings, mackerel, whiting, turbot, cod, and oysters, are transmitted in large quantities to Paris by railway, but there is always an abundant and cheap supply reserved for the town itself. Government makes provision for the widows and families of fishermen accidentally drowned. In 1848, 1158 steamers entered the harbour of Boulogne; and 1149 left it. Pop. in 1821, 16,607; in 1851, 29,488, of whom nearly 7000 are English. Boulogne has two English chapels, and upwards of a hundred boarding schools, many of them managed by Englishmen. The arrondissement of the same name comprises 6 cantons, 100 communes; pop. (1851) 117,615. The house in which Le Sage died is still to be seen at No. 3 Rue de Chateau. John Wilkes lived here for some time in voluntary exile, and the poet Churchill is buried in the cemetery. Thomas Campbell, whose house is still pointed out to the

stranger, died here in 1843.

BÖULTER, HUGH, D.D., an eminent English prelate, was born in or near London, January, 4. 1671. He was educated at Merchant Tailors' School, whence he removed to Christ Church, Oxford; and some time after was elected a demy of Magdalen College at the same time with Addison and Wilcox. In 1700 he was made chaplain to Sir Charles Hodges, secretary of state; and soon afterwards was preferred to the rectory of St Olave, Southwark, and the archdeaconry of Surrey. In 1719 he attended George I. to Hanover as his chaplain. The king appointed him English tutor to Prince Frederick; and rewarded his services by making him dean of Christ Church and bishop of Bristol in the same year. About four years after he was nominated to the archbishopric of Armagh; the alarming discontent existing at the time in Ireland having suggested the wisdom of having in the primacy a man whose judgment and moderation would contribute to the preservation of tranquillity. Boulter at first declined the office, but the urgent command of the king finally overcame his reluctance, and he arrived in Ireland in November 1724. He at once devoted himself with zeal and energy to the promotion of the welfare of that country; and his noble acts of public spirit and beneficence did much to alleviate the national distress. In seasons of great scarcity he was more than once instrumental in preventing an impending famine; and on one of these occasions he distributed vast quantities of corn throughout the kingdom, for which he received the thanks of the House of Commons. At another time 2500 persons were fed at the poor-house in Dublin every morning, and as many every evening, for a considerable time, mostly at his own expense. Every measure of public improvement received his hearty co-operation. He was a true friend to the poor clergy of his diocese, and maintained several of their children in the university. He erected four houses at Drogheda for the reception of clergymen's widows, and purchased an estate to endow them. His charities for augmenting small livings and buying glebes amounted to upwards of L.30,000, besides what he devised by will for similar purposes in England. In short, the instances of his generosity and benevolence, his virtue, piety, and wisdom, are almost innu-

Bounty

Bourbon.

Boultine merable, and the history of his life is his noblest panegyric. This excellent prelate died at London, June 2. 1742, and was interred in Westminster-abbey, where a beautiful monument was erected to his memory.

BOULTINE, a term among workmen for a moulding, the convexity of which is just one-fourth of a circle. It is the member just below the plinth in the Tuscan and Doric capitals.

BOULTON, MATTHEW, a manufacturer and practical engineer of great celebrity, was born at Birmingham on the 14th of September 1728. He was educated at a neighbouring grammar-school, kept by Mr Anstead of Deritend, and was called early into active life upon the death of his father in 1745. The various processes by which the powers of the human mind have given facility to the artist in rendering the different forms of matter obedient to his command, afforded ample scope for the exercise of his inventive faculties, in improving the manufactures of his native place. His first attempt was a new mode of inlaying steel; and he succeeded in obtaining a considerable demand for the products of his manufactory, which were principally exported to the Continent, and not uncommonly re-imported for domestic use as of foreign manufacture.

In 1762, his fortune being already considerable, he purchased a tract of barren heath in the neighbourhood of Birmingham, with a single house on it, and there founded, at the expense of L.9000, the manufactory which has been so flourishing, and so well known under the name of Soho. His workmen were at first principally employed in the imitation of or-moulu, and in copying oil paintings with great accuracy, by means of a mechanical process which was invented by a Mr Eggington who afterwards distinguished himself by various works in stained glass. Boulton finding the force of horses inadequate to the various purposes of his machinery, erected in 1767 a steam-engine, upon the original construction of Savery; which, notwithstanding the inconvenience of a great loss of steam from condensation, by its immediate contact with the water raised, has still some advantages from the simplicity of the apparatus which it requires, and has even lately been found to succeed well upon a small scale. But Boulton's objects required a still more powerful machine, and he had the discernment to perceive that they might be very completely attained by the adoption of the various improvements lately made in the steamengine by James Watt of Glasgow, who had obtained a patent for them in 1769, the privileges of which were extended in 1775, by an act of parliament, to a term of 25 years. Boulton induced this ingenious and scientific inventor to remove to Birmingham. They commenced a partnership in business, and established a manufactory of steam-engines, in which accurate execution kept pace so well with judicious design, that its productions continued to be equally in request with the public after the expiration of the term of that legal privilege which at first gave the proprietors the exclusive right of supplying them, and which had been confirmed in 1792 by a decision of the Court of King's Bench against some encroachments on the right of the patentee. It was principally for the purpose of carrying on this manufactory with greater convenience, that the proprietors established an iron-foundry of their own at Smethwick, in the neighbourhood of Soho.

In 1785 Boulton was made a fellow of the Royal Society, about the same time with Withering, and several others of his scientific neighbours. In 1788 he turned his attention to the subject of coining, and erected machinery for the purpose, so extensive and complete, that the operation was performed with equal economy and precision, and the coins could not be imitated by any single artist for their nominal value; each of the stamps coining, with the attendance of a little boy only, about eighty pieces in a minute. The preparatory operation of laminating and cutting out the metal

is performed in an adjoining room; and all personal communication between the workmen is rendered unnecessary by the mechanical conveyance of the work from one part of the machinery to another. A coinage of silver was executed at this mint for the Sierra Leone Company, and another of copper for the East Indies, besides the pence and half-pence at present in circulation throughout England, and a large quantity of money of all kinds for Russia. In acknowledgment of Boulton's services, and in return for some specimens of his different manufactures, the Emperor Paul made him a present of a valuable collection of medals and minerals.

In 1797 he obtained a patent for a mode of raising water by impulse, the specification of which is published in the ninth volume of the Repertory of Arts, p. 145. It had been demonstrated by Daniel Bernoulli, in the beginning of the last century, that water flowing through a pipe, and arriving at a part in which the pipe is suddenly contracted, would have its velocity at first very greatly increased; but no practical application of the principle appears to have been attempted, until an apparatus was set up in 1792 by Mr Whitehurst, for Mr Egerton of Oulton, in Cheshire, consisting of an air-vessel, communicating with a water-pipe by a valve, which was forced open by the pressure or rather impulse of the water, when its passage through the pipe was suddenly stopped by turning the cock in the ordinary course of domestic economy; and although the pipe through which the water was forced up was of moderate height, the airvessel, which was at first made of lead, was soon burst by the "momentous force," as Mr Whitehurst very properly terms it. The apparatus had excited much attention in France, under the name of Montgolfier's hydraulic ram; and Boulton added to it a number of ingenious modifications, some of which, however, are more calculated to display the vivid imagination of a projector, than the sound judgment of a practical engineer, which had in general so strongly characterized all his productions.

He died, August 17. 1809, after a long illness, in possession of considerable affluence and of universal esteem. (Monthly Magazine, October 1809, p. 368).

BOUNTY, in Commerce, a premium paid by government for the encouragement of any branch of industry. See POLITICAL ECONOMY. It also denotes a premium offered to induce men to enlist in the public service.

BOURBON, the name of one branch of the Capet family, which has given kings to France from 1589 to our own times. This branch succeeded the House of Valois on the throne. It derives its origin from Robert, youngest son of Louis IX. See France.

BOURBON, Charles, Duke of, and constable of France, was born A.D. 1489. He was the son of Gilbert, Count of Montpensier, and of Clara, daughter to Federigo Gonzaga, Marquis of Mantua. As a statesman and a warrior, he eclipsed all the princes of France of his time; and the simplicity and gentleness of his manners made him the idol of the soldiery. By Francis I. he was made constable of France when only twenty-six years of age, and he gave abundant evidence that this honour was not undeserved. As viceroy of the Milanese he made himself universally popular, and his warlike prowess was particularly displayed at the great battle of Marignano, where he fought by the side of the illustrious Bayard. Having become embroiled, however, in a legal suit with the queen-mother respecting some very large estates, part of which he held in right of his deceased wife, Suzanne de Bourbon, by an iniquitous decision his estates were sequestrated. Duchess d'Angoulême is believed to have been instigated to this act of revenge by his coldness in slighting her addresses. Charles of Bourbon, in indignation, entered into the service of Charles V., and made himself master of the whole Milanese. He then led the emperor's troops against Rome; but while in the act of placing a scaling-ladder

History.

Bourbon. against the walls, he was killed by a random shot, May 6, J 1527.

> Bourbon (Borbonius), Nicolas, a Latin poet, born in 1503 at Vandeuvre, near Bar-sur-Aube, was the son of a master blacksmith. Margaret de Valois appointed him preceptor to her daughter, Jeanne d'Albret of Navarre, mother of Henri IV. After residing several years at court he retired to Candé, where he had a benefice. He died about 1550. He wrote eight books of Nuga; a poem on the forge, entitled Ferraria; De Puerorum moribus, &c. Erasmus praises his Nugæ. Scaliger, however, speaks of him with contempt.

> BOURBON, Nicolas, one of the best Latin poets France has produced, grand-nephew to the preceding, was born in 1574. He was professor of eloquence in the Royal College, canon of Langres, and one of the forty of the French Academy. At length he retired to the house of the fathers of the Oratory, where he died in 1644. His poems were printed at Paris in 1651, 12mo. His chef d'œuvre is a poem on the assassination of Henri IV., entitled Diræ in Parricidam. Modern criticism, however, is not very favourable to it.

> Bourbon, Isle of, an island in the Indian Ocean, belonging to France, about 400 miles E. of Madagascar and 90

> miles W.S.W. of Mauritius, in Lat. 21. 30. S. Long. 55. 30.

E. It was discovered in 1545 by Mascarenhas, a Portuguese navigator, whose name it originally bore. It remained uninhabited till 1646, when De Prony, the French commandant of Madagascar, formally took possession of it in the name of his sovereign, and gave it the name of Bourbon. It was at first employed only as a penal settlement; but in 1654 De Hacourt, a director of the French East India Company, established a small settlement, which, however, never prospered, and the colonists, becoming disheartened, embarked for Madras in an English vessel

which happened to touch at the island. It was unvisited save by pirates and buccaneers, till a remnant of the French who had escaped the massacre of their countrymen in Madagascar took refuge in the island, and, with the crew of a privateer, which happened to be wrecked on the shore, formed a colony, which in a short time began to prosper. In 1661 it was made over by Louis XIV. to the East India Company, who sent out small relays of workmen from time to time. In 1710 a regular administration was organized,

and a governor despatched from France. The council by

which he was assisted comprised the principal officials of the government, and was subject in appeal cases to the sovereign council of Pondicherry. Two years after, the new settlement was strong enough to take possession of the Mauritius, which had been abandoned by the Dutch, and in 1732 the seat of government was removed to that island. In 1735 the governor, La Bourdonnais, fortified Bourbon

with such skill that an English fleet under Boscawen attempted in vain to take possession of it. At the outbreak of the French Revolution the home government abolished slavery in all their dominions, but the people of Bourbon, much of whose wealth consisted of slaves, refused to obey

orders, and deposed their governor, though they still acknowledged the authority of the mother country. From 1790 to 1795, the principles of the Revolution continued to gain ground; but at the latter date a reaction took place, and, in 1799, 7108 proprietors, who had countenanced these

principles, were banished to the Séchelles. The ship in which they sailed was attacked by an English frigate, and the whole ship's company was shot or drowned. Till 1803 Bourbon, which under the republic had assumed the title of Ile de la Réunion, was self-governed. In that year

Napoleon sent out a governor, and in 1806 the island once more changed its name, and became the Ile Bonaparte. In 1810, after a gallant resistance, it fell into the hands of the English, who retained it till the general peace of 1814,

when the island resumed its old name of Bourbon. In the Bourbon. following year, before the downfall of Napoleon, it was once more besieged by the English, and along with the Mauritius again fell into their hands. After the general pacification of Europe Bourbon was restored to France, in whose possession it now is, but the adjoining island has since been retained by its English conquerors. In April 1848 a decree of the National Assembly abolished slavery in all the French dominions, and an indemnity of nearly L.5,000,000 sterling was awarded to the slaveholders of Martinique, Guadaloupe, and Bourbon, which in this year once more changed its name for the old one of La Réunion. It was ordained, however, that a year should elapse between the

passing of the act and the manumission of the slaves. In 1852 the last instalment of the indemnity was paid.

Bourbon, which is nearly elliptical in form, measures 40 miles at Physical its greatest length, 27 at its greatest breadth, and, following the aspect.

windings of the shore, 104 miles in circumference. The whole island is, as it were, one mountain, having its highest point in the centre, and sloping thence gradually to the sea. This great mass, however, is split into two systems. In the northern range is the Piton des Neiges, the highest peak in the island, about 10,000 feet above the level of the sea. Of the southern system the highest point is the Piton de Fournaise, an active volcano, 7000 feet high. The northern parts of the island present every indication of having been at one time subject to volcanic action of the most violent kind; but the operation of nature and the industry of man have long since converted these once desert plains into beautiful and fertile fields. In the south-east, however, the state of matters is quite different. The scarcity of water, and the vicinity of the volcano, which is the most active in the world, bursting forth at least twice every year, and sending its lava streams sometimes as far as the sea, combine to make this portion of the island the exact antithesis of the other. One portion of it, known as the Pays Brûlé, comprising 11,543 acres, is a desert waste, untenanted by man or beast. Between the two mountain systems are the Plaine des Cafres and the Plaine des Palmistes. The first of these, sloping to the south, exhibits no signs of vegetation except a few stunted shrubs, while the latter, sloping to the north, is watered by numerous streams and is remarkably fertile. Both are at a considerable elevation above the sea. In the centre of the island is a lake, called the Grand Etang, which, though it derives its waters only from the rain, is half a mile in diameter, and in winter 30 feet deep. It has no outlet, yet in summer the evaporation is so great that it is sometimes nearly dried up. The rocky and mountainous nature of the entire island precludes the existence of deep or navigable streams. Such as it possesses are merely mountain torrents, reaching the sea by a succession of waterfalls. Their waters are supplied entirely by the rains and the melted snows of the high mountain peaks. The chief of these are the St Denis, Sêche, Est, Mat, and Remparts. Of these the Mat is the largest, and has a course of nearly 30 miles. Cultivation is confined almost entirely to those parts of the island that border on the sea-shore. The whole of the interior, except the Basin de Salazie in the Gros-Morne, is uninhabited. According to M. Bory, the island is divided into eleven parishes, St Denis, containing the capital of that name, which is the seat of government—Ste Marie, Ste Susanne, St André, St Benoit, St Rose, St Joseph, St Pierre de la rivière d'Abord, St Louis du Gaul, St Leu, and St Paul—and politically into two arrondissements, six cantons, and eleven communes. There is no good harbour in the island, and no safe anchorage off the coast. The effect of this disadvantage is to throw the trade into the hands of merchants from the Mauritius.

The climate of so mountainous a country as Bourbon is very va- Climate. rious, but on the whole healthy and pleasant, and by no means so hot as might be anticipated from its latitude. The hot season continues from the beginning of December to the end of March. The mean temperature throughout the year is 78° Fahrenheit. The inhabitants are healthy and long-lived, and the average annual mortality is only 1 in 42. They attribute their longevity in part to the periodical recurrence of tornadoes, which last for one or two

days, and have the effect of purifying and cooling the atmosphere.

Coffee, which was introduced from Mocha in 1717, was for a Produclong time the staple article of culture in Bourbon, and was reckoned tions. little inferior to that of Arabia. Cloves were also introduced and carefully cultivated, but never so as to compete successfully with those of the Eastern Archipelago. Cotton was formerly produced in large quantities, but in 1801 hurricanes and a disease which broke out among the trees discouraged the planters, who substituted coffee in its room. Of late years, the quantities of all these articles have greatly diminished, partly from local causes, and partly from

Bourbon-

Bourbon- the effects of competition upon the European markets. Since 1818, the cultivation of the sugar cane has almost entirely superseded that of coffee in the eastern and most fertile part of the island. The tobacco and cereals grown in the island do not supply the demand. Yams, potatoes, beans, and fruits, are found to thrive extremely well; and manioc, the food of the black population, grows in great abundance. Cattle are imported in considerable quantities from Madagascar, as the pasturage of Bourbon is insufficient to maintain the requisite number. The fisheries on the coast are valuable, and afford employment to nearly 500 persons. Coral and ambergris are found in considerable quantities off the shore. The manufactures of Bourbon are as yet in their infancy. The principal articles of manufacture are bricks, iron and tin goods. There are also several lime-kilns and tanneries, and one browery. The annual value of the articles thus manufactured is estimated at about L.50,000. In 1836 the amount and value of goods exported were-

Sugar	.18,173,092 k	ilog L.5	08,846
Coffee	. 990,013	.,	55,440
Cloves	. 566,650		56,140
Saltpetre			
Wood for cabinet work	112,811		1,519
Dye-woods	. 105,303		843

The total value of exports in this year was nearly L.670,000. The total value of imports, which, besides cattle and cereals, included oil, wine, timber, salt, &c., amounted to L.550,780. In 1852 the production of sugar amounted to 25,000,000 kilog., and was in the

Government, &c. fair way of doubling itself within two or three years. The chief magistrate of the island is the governor, who is sent out from the mother country. He is assisted by a council of thirty, elected from those French residents who pay L.8 and upwards of direct taxes. The electors in 1837 amounted to 1145, distributed into eight electoral colleges. They have also two representatives at Paris, with salaries of L 800 a-year each. Justice is administered by an imperial court, which sits at St Denis, two courts of assize, two tribunals of primary jurisdiction, one of which sits at St Paul, the other at St Denis, and by six justices of peace. In 1837 the troops of the line amounted to 814, the national guard to 6600. The revenue of the island in 1837 was L.85,982, the expenditure L.117,297, leaving a deficit of L.31,315. A college has been established in St Denis, and throughout the island there are 29 boys' schools and 24 girls' schools. The total number of pupils was, in 1837, 2316, of whom 1486 were boys and 830 girls. There are two hospitals, one at St Denis, and another at St Paul, in each of which towns there is also an establishment for the relicf of the poor; sixteen churches, two prisons, a chamber of commerce, a public library at St Denis, containing about 4000 volumes, and three private printing establishments. A bank was established in 1852. Four newspapers are printed on the island. In 1841 the population was 106,682, of whom 65,993 were free blacks. In 1850 it was 102,584.

BOURBON-LANCY, a small town of France, in the department of Soane-et-Loire, 27 miles W.N.W. of Charolles. It has numerous mineral springs, known to the Romans as the Aquæ Nisinei. Pop. 2848.

Bourbon-L'Archambault, a town of France, in the department of the Allier, 19 miles W. of Moulins. It was anciently the capital of the dukes of Bourbon, from whom the late royal family of France, and the existing sovereigns of Spain, Naples, and Lucca, are descended. It is now much frequented on account of its mineral waters, which are found to be peculiarly efficacious in nervous and rheumatic diseases. In 1789 it changed its name for that of Burges-les-Bains. It contains some remarkable specimens of Gothic and Byzantine architecture. Pop. 3017.

Bourbon-Vendée (now Napoléon-Vendée), a town of France, capital of the department of La Vendée, on the river Yon, in Lat. 46.41. N. Long. 1. 26. W. It was founded by Napoleon on the site of the ancient La Rochesur-Yon, and was called Napoléon-Vendée, in honour of its founder. At the Restoration its name was changed; but on the accession of Napoleon III. it resumed its original designation. Having neither trade nor manufactures, and situated in the midst of a heathy waste, it is regarded as the dullest town in France. The public buildings, erected by command of Napoleon, were so hastily built that they have already begun to fall into ruins. Pop. (1851) 6186.

BOURBONNAIS, an ancient province in the centre of France, embracing the present department of the Allier, and a portion of that of Cher. In 1527 it was forfeited to Bourbonneles-Bains the French crown. 11

Bour-

daloue.

BOURBONNE-LES-BAINS, a town of France, in the department of Haute Marne, in the arrondissement of Langres, and 21 miles E.N.E. of that town. It is much frequented on account of its hot saline springs, which are found on the site of the old Roman baths. The heat of these springs varies from 120° to 156° Fahrenheit. The number of visitors is about 800 annually. Pop. 3683.

BOURCHIER, John, Lord Berners, grandson and heir of a lord of the same name, who was descended from Thomas of Woodstock, Duke of Gloucester, and had been knight of the Garter and constable of Windsor Castle. Bourchier was created a knight of the Bath on the marriage of the Duke of York, second son of Edward IV., and was first known by quelling an insurrection in Cornwall and Devonshire, raised by Michael Joseph, a blacksmith, in 1495, which service recommended him to the favour of Henry VII. He was a captain of the pioneers at the siege of Theroanne under Henry VIII., by whom he was made chancellor of the exchequer for life, and lieutenant of Calais and the Marches; appointed to conduct the Lady Mary, the king's sister, into France on her marriage with Louis XII.; and had the extraordinary fortune of continuing in favour with Henry VIII. for the space of eighteen years. He died at Calais in 1532, aged 65. By King Henry's command he translated Froissart's Chronicle, which was printed in 1523, by Pynson, the scholar of Caxton. His other works were a whimsical medley of translations from French, Spanish, and Italian novels. These were, the History of the most Noble Valyaunt Knyght, Arthur of Lytell Brytayne; the Famous Exploits of Sir Hugh of Bourdeaux; the Golden Boke of Marcus Aurelius; and the Castle of Lone. He composed also a book on the duties of the inhabitants of Calais; and a comedy entitled Ite in Vineam, which was acted at Calais after vespers.

BOURDALOUE, Louis, a celebrated preacher, and one of the greatest orators that France has ever produced, was born at Bourges, August 20. 1632. At the age of sixteen he entered the Society of Jesus, of which he was destined to become one of the greatest ornaments, and there completed his studies. His able masters, who early discerned his talents, successively confided to him the chairs of humanity, of rhetoric, of philosophy, and of moral theology; and it was only after passing through these different probationary employments that he arrived at the eminent post which was designed for him, and was deemed qualified for mounting the pulpit.

In order to form an idea of the difficulties which he had to surmount, and of the talents which he displayed, it is only necessary, on the one hand, to call to mind the ridiculous manner and inflated style of the preachers of that period; and, on the other, to figure the young Jesuit at issue with the bad taste as well as the bad habits of the time; combating at once the passions, the vices, the weaknesses, and the errors of humanity, and overcoming his enemies, sometimes with the arms of faith, and sometimes with those of reason.

At first he preached for some time in the province, but his superiors afterwards called him to Paris. This took place in 1669, at the most brilliant epoch of the age of Louis XIV. when nothing was talked of but the victories of Turenne, the festivities of Versailles, the masterpieces of Corneille and Racine, the encouragement afforded to the arts, and the general impulse given to the human mind. Bourdaloue suddenly appeared in the midst of these fascinations, and, far from diminishing their effects, the severity of his ministry, and the gravity of his eloquence, served rather to enhance their splendour. His first sermons met with prodigious success, and all voices were raised in loud applause of the preacher. Madame de Sevigné, sharing the universal enthusiasm, wrote to her daughter that "she had never

Bourg.

Bourdaloue. heard anything more beautiful, more noble, more astonishing, than the sermons of Father Bourdaloue." Louis XIV. also wished to hear him, and the new preacher was in consequence sent to court, where he preached the Advent in 1670, and the Lent in 1672; and he was afterwards called for the Lents of 1674, 1675, 1680, and 1682, and for the Advents of 1684, 1689, and 1693. This was a thing unheard of before, the same preacher being rarely called three times to court. Bourdaloue, however, appeared there ten times, and was always received with the same ardour. Louis XIV. said that "he loved better to hear the repetitions of Bourdaloue than the novelties of any one else." After the revocation of the edict of Nantes, he was sent to Languedoc to preach to the Protestants, and confirm the newly-converted in the Catholic faith; and in this delicate mission he managed to reconcile the interests of his ministry with the sacred rights of humanity. He preached at Montpellier in 1686 with prodigious success, Catholics and Protestants being all equally eager to recognise in this eloquent missionary the apostle of truth and of virtue.

In the last years of his life Bourdaloue abandoned the pulpit, and devoted himself to charitable assemblies, hospitals, and prisons, where his pathetic discourses and insinuating manners never failed of their effect. He had the art of adapting his style and his reasonings to the condition and the understanding of those to whom he addressed either counsel or consolation. Simple with the simple, erudite with the learned, and a dialectician with sophists and disputants, he came off with honour in all the contests in which zeal for religion, the duties of his station, and love of mankind, led him to engage. Equally relished by the great and by the commonalty, by men of piety and by people of the world, he exercised till his death a sort of empire over all minds; and this ascendancy he owed as much to the gentleness of his manners as to the force of his reasonings. "His conduct," says one of his contemporaries, "is the best answer that can be made to the Lettres Provinciales." No consideration was ever capable of altering his frankness or cor-

rupting his probity.

Boileau, who detested the Jesuits, loved and often visited Bourdaloue. He may with justice be regarded as the reformer of the pulpit and the founder of Christian eloquence among the French. That which distinguishes him from other preachers is the force of his reasoning, and the solidity of his proofs. Never did Christian orator infuse into his discourses more majesty, dignity, energy, and grandeur. Like Corneille, he has been charged with overlabouring his diction, and accumulating idea upon idea with a needless superfluity of illustration—of speaking more to the understandings than to the hearts of his auditors, and sometimes enervating his eloquence with too frequent a use of divisions and subdivisions. But even in subscribing to these criticisms, which are to a certain extent well founded, it is impossible not to admire the inexhaustible fecundity of his plans—the happy talent velut imperatoria virtus, which he possessed, of disposing his reasonings in the order best calculated to command victory—the exact, constrictive logic with which he excludes sophisms, contradictions, and paradoxes-the art with which he lays the foundations of our duty in our interest-and, finally, the inestimable secret of converting the details of manners and habits into so many proofs of his subject. Parallels have often been drawn between Bourdaloue and Massillon; but the talents of these great pulpit orators lay in different directions, and they may therefore be more fitly contrasted than compared. If Massillon is now read with a more lively interest, he owes this advantage to the charms of his style rather than to the force of his reasonings. Among the critics of the present day, the preference is unhesitatingly given to the rival of Racine, to the painter of the heart, to the author of the discourse on the small number of the elect; but if we consult the

contemporaries of Massillon himself, we shall find that they Bourdelot assign him only the second rank. According to them, Bourdaloue preached to the men of a vigorous and masculine age; Massillon to those of a period remarkable for its effeminacy. Bourdaloue raised himself to the level of the great truths of religion; Massillon conformed himself to the weakness of the men with whom he lived. The bishop of Clermont will always be read; but if the simple Jesuit could raise his commanding voice from the tomb, and again roll forth a majestic stream of divine truth, the courtly accents of his rival would no longer be heard, and the charms of his diction would be forgotten. The first part of his celebrated Passion, in which he proves that the death of the Son of God is the triumph of his power, has generally been considered as the great masterpiece of Christian eloquence. Bossuet has said nothing stronger or more elevated. The second part, however, is inferior to the first, though considered by itself, alike beautiful and convincing.

The discourses of Bourdaloue have been described by a celebrated French critic as embodying in them a complete course of theology. This is perhaps going a little too far; but still their general merit is very great, and for nothing are they more distinguished than their comprehensiveness. The diction of this great preacher is always natural, clear, and correct; sometimes deficient in animation, but without vacuity or languor, and generally relieved by outbreakings

of much force and originality.

Two editions of Bourdaloue's works were published at Paris by Père Bretonneau, a Jesuit; one in 16 vols. 8vo, 1707-34, and the other, from which the editions of Rouen, Toulouse, and Amsterdam were afterwards printed, in 18 vols. 12mo, 1709-34. The works are distributed as follows, viz., 1. Deux Avents, prêché devant le Roi, 1 vol.; 2. Carème, 3 vols. 8vo, or 4 vols. 12mo; 3. Mystères, 2 vols.; 4. Fêtes des Saints, Vetures, Professiones, Oraisons Funèbres, 2 vols.; 5. Dominicales, 3 vols.; 6. Exhortations et Instructions Chrétiennes, 2 vols.; 7. Rétraité Spirituelle, 1 vol.; 8. Pensées, in 2 and in 3 vols. The Versailles edition appeared in 1812-13, in 16 vols. 8vo. It is much inferior to the former. Of recent editions, the best are those of 1822-26, 17 vols. 8vo, of 1833-34, and of 1840, 3 tom, gr. 8vo. The Sermons Inédites de Bourdaloue, published by the Abbé Sicard in 1810, are apocryphal. (Vie de P. Bourdaloue, par Madame de Prigny; Esprit de Bourdaloue, par l'Abbé de la Porte; and Biographie Universelle). (J. B—E.)

BOURDELOT, JEAN, a learned French critic, who distinguished himself by annotations on Lucian, Petronius, and Heliodorus; a Universal History; Commentaries on Juvenal; a Treatise on the Etymology of French words; and several other works which were never published. He died in 1638.

His nephew, the Abbé Bourdelot, changed his name from Pierre Michon to oblige his uncle. He was a celebrated physician in Paris; was much patronized by Christina of Sweden; and gained great reputation by a Treatise on the

Viper, and other works. He died in 1685.

BOURDON, SÉBASTIEN, an eminent painter, born at Montpellier in 1616. He spent seven years in Italy, where he formed an acquaintance with Andrea Sacchi and Claude Lorraine, and acquired so great a reputation, that, on his return to France, he was appointed rector of the academy of painting in Paris, being the first who held that office. He succeeded better in landscapes than in history. His pieces are seldom finished, and those which received his last touches are not always the finest. His chef d'œuvre is the Martyrdom of St Peter in the cathedral of Notre Dame at Paris. His talents as an engraver also were considerable. Bourdon was a Calvinist, and lived much respected, even in a Catholic country, his life and manners being unexceptionable. He died in 1671.

BOURG, or Bourg-en-Bresse, a very ancient town of France (supposed by De Thou to be the Forum Segusianorum of the Romans), capital of the department of Ain, on the Revssouse, in Lat. 46. 12. N. Long. 5. 13. E. It belonged at one time to the dukes of Savoy, but was taken

Bourgelat by the French in 1536, and in 1600 formally ceded to France by the treaty of Lyons. It was an episcopal town Bourgoing from 1515 to 1536. It possesses a civil court of primary jurisdiction, a communal college, and a public library of 19,000 volumes. Several important grain-markets are held in the town, which is in the midst of an agricultural district. There is also a considerable trade in wines, skins, poultry, horses, and cattle. The chief manufactures are linen, cotton, hosiery, and basket-work. In the neighbour-hood is the church of Notre Dame de Brou, built in 1511 by order of Margaret of Austria, aunt of Charles V., and considered one of the finest architectural monuments of that age. Vaugelas the grammarian, and Lalande the astronomer,

were born here. Pop. (1851) 9698.

BOURGELAT, CLAUDE, who may be called the father of veterinary science, was born at Lyons in 1712, and died in 1799. He entered the law, but abandoned that profession in disgust at having gained an unjust suit for a client. Embracing the military profession, he served in the cavalry, and thus had ample opportunity of studying the diseases of animals. In 1772 he opened at Lyons a veterinary school, which soon became celebrated over Europe. His great success induced the government to establish several similar institutions; and Bourgelat was appointed to superintend the school established at Alfort, which became, and continues to be, the chief seat of veterinary science in France. Bourgelat was a member of the Academy of Sciences of Paris and of Berlin, and corresponded with some of the most eminent men of science of his time. His works on veterinary subjects are numerous and valuable.

BOURGES, a town of France, capital of the department of Cher, is situated at the confluence of the Auron and Evre, in Lat. 47. 6. N. Long. 2. 25. E., 100 miles S. of Paris. It is the Avaricum of Cæsar, by whom it was burnt down B.C. 52. Under Augustus it became the capital of Aguitania, which it continued to be for nearly 500 years. After this it was more than once destroyed, but was always rebuilt; and under Philip Augustus it became the capital of Berri. Bourges has been long celebrated for its cathedral, which is reckoned one of the finest in France. It is the see of an archbishop, and possesses a royal college, a diocesan seminary, and a public library of 25,000 volumes, with some rare manuscripts. The principal manufactures are cutlery, and linen and woollen goods. There are also several breweries and tan-works. The trade is confined to corn, wool, hemp, hides. The nurseries in the neighbourhood are famous. Louis XI. was a native of Bourges, and, in compliment to his birth-place, founded a university there, long celebrated; which, however, was suppressed at the Revolution. Cujas the famous jurist was one of the professors. Louis likewise gave patents of nobility to the mayor and magistrates of the town. Bourdaloue, the pulpitorator, was a native of Bourges, as was also Jacques Cœur, the unfortunate minister of Charles VII. Pop. in 1851, 22,465.

BOURGET, JEAN, a learned French antiquary, born near Falaise in 1724. He was educated at Caen, and in 1745 he became a Benedictine monk of the abbey of St Martin de Seèz. His merit and learning procured his translation to the abbey of Bec, where he resided till 1764. He was elected an honorary member of the Society of Antiquaries of London in 1765; and the same year returned to the abbey of St Stephen at Caen, where he continued till his death in 1775. He left behind him, in manuscript, large and accurate accounts of some of the principal Norman abbeys. The History of the Royal Abbey of Bec, which he presented to Dr Ducarel in 1764, is only an abstract of his larger work.

BOURGOING, JEAN FRANÇOIS, a distinguished French diplomatist, was born at Nevers in 1748, and died at Carlsbad in 1811. Most of his life was spent in the discharge

of various diplomatic offices, at the courts of Spain, Denmark, Sweden, and Saxony. His principal work is his Tableau guignons de l'Espagne Moderne (1789, 3 vols. 8vo), which has been Bouterwek translated into English, German, and Danish.

BOURGUIGNONS, or Burgundians. See Bur-

GUNDIONES.

BOURIGNON, ANTOINETTE, a noted Flemish fanatic, born at Lisle in 1616. Setting up as a reformer, she maintained that reason and common sense ought to give place to the illumination of divine faith. Of her pretended visions and revelations many absurdities have been published. Her manners and appearance were repulsive, her temper was morose and peevish, her cupidity excessive, and her character as a woman questionable. Dressed like a hermit, she travelled through France, Holland, England, and Scotland, and made some thousand converts, known by the name of Bourignonists. Her works were published in 1686 at Amsterdam, in 21 vols. 8vo. One of these, entitled The Light of the World, was published in English in 1696; and her tenets were for a while popular in Scotland. Their aim was to guide her followers to an imaginary perfection, and to make them renounce all forms in favour of an interior and mystic worship. Though she inherited a considerable fortune, she never gave anything to the poor, on the pretence that they might make a bad use of her liberality Yet at her death, which took place at Francker in 1680, she left all her property to a hospital.

BOURNE, a market-town of England, in the county of Lincoln and wapentake of Aveland, 97 miles from London. It has four principal streets diverging from the market-place, in the centre of which is the new town-hall, erected in 1822. The church is a fine old Gothic edifice: of its two towers only one is now standing. It has an endowed grammar-school, national school, mechanics' library, hospital, almshouse, and a union poor-house. Pop. (1851) 2789, principally engaged in the leather, wool, and malt trade. Market-day Saturday. A tesselated pavement and some Roman coins have been found in the neighbourhood. Cecil, Lord Burleigh, was born here in 1520, and the un-

fortunate Dr Dodd in 1729.

BOURNONITE, a mineral consisting of sulphuret of lead, antimony, and copper, first found in Cornwall, and

afterwards in Hanover, Mexico, and Peru.

BOURRIENNE, FAUVELET DE, the early friend and the biographer of Napoleon, was born at Sens in 1769, and died at Caen in a lunatic asylum in 1834. He accompanied Bonaparte to Egypt as his secretary, and continued in that situation under the consulship; went in 1804 as ambassador to Hamburg; and after the fall of his old master, held office under Louis XVIII. The revolution of 1830, and the loss of his fortune, unhinged his reason. His Mémoires, in 10 vols. 8vo, 1829-31, contain much interesting information regarding Napoleon. Their defects were exposed in a work, entitled Bourrienne et ses erreurs volontaires et involontaires, Paris, 1830, 2 vols. 8vo.

BOUSSA, a large town of Central Africa, capital of a province of the same name, in the kingdom of Borgoo. It is situated on an island of the Niger, in Lat. 10. 14. N. Long. 5. 20. E., and is a place of considerable strength, being inclosed by a well-built wall. Pop. variously estimated from 10,000 to 18,000. It was here that the enterprising traveller Park met his untimely death.

BOUSTROPHEDON (from β oûs, and $\sigma\tau\rho$ o ϕ $\dot{\eta}$), a term descriptive of the early Greek manner of writing, in which the lines ran from left to right and from right to left alternately. It was so named from its resemblance to the path of oxen in ploughing a field. In this manner Solon's laws were written, and also the Sigeian Inscription, ap. Böckh

BOUTERWEK, FRIEDRICH, a German author, chiefly distinguished for his elaborate work on modern literature.

Bowles.

Bouts-Rimés Bow.

entitled Geschichte der Neuern Poesie und Beredsamheit, in 12 vols. 8vo, 1801-19. He was born at Ocken, near Goslar, in 1766, filled the chair of mental philosophy at Göttingen from 1797, and died at Göttingen in 1828. In philosophy he at first adopted the system of Kant, but afterwards forsook it for that of Jacobi. His great work has been translated into various languages. It bears the stamp of a refined taste, and an intimate acquaintance with the literature of Europe. The volume on Spanish literature, and Ticknor's later work, are the best on the subject.

BOUTS-RIMES, in French poetry, a set of rhymes, disposed in order, and given together with a subject, to be filled up with verses. The invention is ascribed to one Ducot, in the year 1649. In fixing the bouts, it was usual to choose such as seemed to have the least connection. The academy of Lanternists at Toulouse contributed towards keeping in countenance the bouts-rimés, by proposing annually a set of fourteen, to be filled up on the glories of the Grand Monarque, and by offering a medal as the prize. The following, filled up by Commire, is a specimen of these conceits:-

> Tout est grand dans le roi, l'aspect seul de son buste Rend nos fiers ennemis plus froids que des Et Guillaume n'attend que le tems des Pour se voir succomber sous un bras si Qu'on ne nous vante plus les miracles d' Louis de lien regner lui feroit des Horace en vain l'égale aux dieux dans ses Moins que mon héros il étoit sage et

glaçons; moissons, robuste. Auguste. leçons; chansons; juste.

BOVINO (the ancient Vibinum), a fortified town of Naples, province of Capitanata, 18 miles S.S.W. of Foggia. It is the seat of a bishopric, of a court of primary jurisdiction, and has a cathedral, and several churches and convents. Pop. 5200. Here the Imperialists defeated the Spaniards in 1734.

BOW (arcus), a weapon of offence, made of wood, or other elastic matter, which, being strongly bent by means of a string fastened to its two ends, throws an arrow with great force in suddenly recovering its natural state. It is also called the long-bow, by way of distinction from the cross-bow or arbalest.

The bow is the most ancient and the most universal of all weapons, and is found amongst the most barbarous and remote tribes in every part of the world.

The use of the bow was first abolished in France under Louis XI., and in its place were introduced the halberd, pike, and broadsword. The long-bow was formerly greatly used in England: most of our victories in France were acquired by it, and many laws were made to regulate and encourage its use. See Archery.

The Laplanders construct their bow of two pieces of tough wood of the same size, and flattened on each side, the two pieces being united very firmly together by means of a strong glue. A bow thus constructed possesses a much greater propulsive power than another of the same dimensions formed of a single piece.

Among the ancients, the bow-string was of horse hair; though Homer's bow-strings were frequently made of hide cut into small thongs. The tip of the bow, to which the string was fastened, was called κορώνη, and was frequently made of gold. The Grecian bows were frequently beautified with gold or silver; whence the epithet of 'Αργυρότοξος bestowed on Apollo. But the matter of which they were ordinarily composed seems to have been wood, although they were anciently, Scythian-like, made of horn, as appears from the description of the bow of Pandarus in Homer.

The invention of the bow is usually ascribed to Apollo, and it was communicated to the primitive inhabitants of Crete, who are said to have been the first of mortals that understood the use of bows and arrows. Accordingly, even in later ages, the Cretan bows were famous, and preferred

by the Greeks to all others. The Scythians and the Parthians were especially celebrated for their skill in archery.

The Scythian bow was distinguished from the bows of Greece and other nations by its incurvation, which was so great as to form a half moon or semicircle; and hence the shepherd in Athenæus, describing the letters in Theseus's name, and expressing each of them by some apposite resemblance, compares the third to the Scythian bow, meaning not the more modern character 2, but the ancient C, which is semicircular, and bears the third place in the name of the hero, @HCEVC, as spelt in ancient Greek.

Cross-Bow (also called arbalest or arbalet, from arbalista, or rather arcubalista, "a bow with a sling"), a steel bow set in a shaft of wood, furnished with a string and a trigger. It is bent with a piece of iron fitted for that purpose, and serves to project bullets, darts, and other missiles. See also Ballista.

Bow, in Ship-Building. See Ship-Building.

Bow-Net, an instrument for catching fish, chiefly lobsters. It consists of two round wicker baskets, pointed at the end, one of which is thrust into the other; and at the mouth there is a little rim, four or five inches broad, bent somewhat inwards.

BOWDICH, THOMAS EDWARD, born at Bristol in 1790, was brought up by his father to mercantile affairs. and in 1814 obtained an appointment on the western coast of Africa. Two years afterwards, on his return home, he was sent out by the African Company as their agent to the king of the Ashantees. In 1819 he published a quarto volume giving an account of that remarkable people. He then seems to have spent a considerable time at Paris in the study of the natural sciences. During his stay in Europe he edited several works on Africa, and published an excellent pamphlet on the British settlements on the western coast of Africa. In 1822 he set out for Africa once more, with a firm resolution of devoting himself to the exploration of its interior; but he was attacked with the country fever on the Gambia, and died January 10th 1824. His widow, who had accompanied him, edited several posthumous productions of his pen.

BOWDITCH, NATHANIEL, a self-taught American mathematician, born in 1773, of humble parents, at Salem in Massachusetts. He was bred to his father's business as a cooper, and afterwards was apprenticed to a ship-chandler. His taste for mathematics early developed itself; and he acquired Latin that he might study Newton's Principia. In 1795 he sailed as supercargo, in which capacity he made four long voyages; and, being an excellent navigator, he afterwards commanded a vessel, instructing his crews in taking lunar and other observations. He edited three editions of Hamilton Moore's Navigation. In 1804 he became actuary to a Boston insurance company; and in the midst of his active and useful career published a translation of the Mécanique Celeste of Laplace, with annotations ;—a work which will better prove the great acquirements of this selftaught philosopher than any laboured panegyric. He died in 1838, at Boston.

BOWER (Saxon bur, a chamber, a hut), a place under covert of trees, differing only from an arbour in being round or square, with a kind of dome or ceiling at top, whereas the arbour is properly long and arched.

Bower Anchor. See Anchor.

BOWIE-KNIFE, the name given to a large clasp-knife used by hunters and others in America, especially in the western States.

BOWLES, REV. WILLIAM LISLE, author of sonnets and other poems, was born at King's Sutton in Northamptonshire in 1762. He was educated at Winchester and at Trinity College, Oxford; and, having entered into holy orders, he received various preferments in the church. He is represented as having been an accomplished perBowline Bowyer.

son, and possessed of an agreeable and playful disposition. By an edition which he published of the works of Pope he became involved in a controversy with Lord Byron; to which circumstance he was perhaps not a little indebted for the reputation he enjoyed. He died in 1850.

BOWLINE, a rope leading forward from the leech (side border) of a square sail, to keep it tightly out. When a vessel is sailing close-hauled she is then said to be sailing on a bowline or on a taut bowline. Bowline bridles are the spans of cord by which the bowline is fastened to the leech.

BOWLING, a game played in the open air with wooden bowls (generally made of lignum vitæ) on a smooth greensward or in a close bowling alley. A small ball, called a block or jack, is rolled to a convenient distance, and forms the mark towards which the player aims. Each player is provided with two bowls, and the party who counts the greatest number of best bowls, i.e., nearest the block, wins the game, which is usually thirteen casts or best bowls. Four or five persons to a side is the largest number that can conveniently join in the game. The bowl is constructed with a bias to one side, so that its direction towards the mark forms a gentle curve. When a bowl strikes the jack and removes it from its original position, the aspect of the game is generally altered, the relation of the bowls to the mark at the final throw being that which decides their respective value.

Bowling-Green, a level piece of ground kept smooth for bowling. In Gardening it signifies a parterre in a grove, laid with fine turf, smoothly shaven, and laid out in compartments of divers figures, with dwarf trees and other decorations. Bowling-greens are of English origin, but have been adopted by the French and Italians for ornament.

BOWSPRIT, or BOLTSPRIT, a large spar which projects over the stem of a ship, resting slopewise on the head of the main stem, and having its lower end fastened to the partners of the fore-mast, and further supported by the forestay. It carries the sprit-sail, sprit-top-sail, and jack-staff; and its length is usually the same as that of the fore-mast.

BOWYER, an artificer whose business is to make bows; in which sense bowyers were distinguished from fletchers, who made arrows.

Bowyer, William, the most learned printer of his age, was born at Whitefriars, London, in December 1699. His father, whose name was also William, had been eminent in the same profession; and his maternal grandfather, Icabod Dawks, was employed in printing the celebrated Polyglot Bible of Bishop Walton. He received his early education under Mr Ambrose Bonwicke, a nonjuring clergyman at Headly, near Leatherhead, in Surrey; and in 1716 was admitted a sizar at St John's College, Cambridge. After leaving the university he entered into business with his father, who was an eminent printer. The attainments which Bowyer brought into the printing office had long been unusual in such establishments; and he was thus enabled to issue many important works in a style that elicited universal commendation, and placed his name in the foremost ranks

One of his most valuable contributions to literature was an excellent edition of the Greek Testament, published in 1763, in 2 vols. 12mo, entitled Novum Testamentum Græcum; ad fidem Græcorum solum Codicum MSS. nunc primum impressum, adstipulante Joanne Jacobo Wetstenio, juxta Sectiones Jo. Alberti Bengelii divisum; et nova interpretatione sæpius illustratum : Accessere in altero volumine, Emendationes Conjecturales virorum doctorum undecunque collectæ. New editions of these conjectural emendations appeared in 1772, 1782, and 1812.

In 1774 he corrected a new edition of Schrevelius's Greek Lexicon; to which he added a number of words, which he himself had collected in the course of his studies. Considerable manuscript additions were also made by him to the lexicons of Hederic and Buxtorf, the Latin ones of Faber and Littleton, and the English dictionary of Bailey; and he left behind him many other proofs of his critical skill Box-Wood, in the learned languages. In 1774 was published The Origin of Printing, in two Essays. The original idea of this valuable tract was Bowyer's, but it was completed by Nichols.

His death took place in November 1777, when he had nearly completed his seventy-eighth year. For more than half a century he was unrivalled as a learned printer, and many of the most masterly productions of this kingdom issued from his press. To his literary and professional abilities he added an excellent moral character, inflexible probity, and an uncommon alacrity in relieving the necessitous. (Nichols' Anecdotes Literary and Biographical of William

BOX, a chest or coffer, of wood or metal, &c.

 D_{ICE} -Box, a channelled cylindrical box used in gaming for shaking and throwing the dice. It answers to the Roman fritillus.

BOX-HAUL, in Navigation, to bring a ship, when close hauled, round upon the other tack, when she refuses to stay and there is not room to wear.

BOXHORN, MARK ZUER, a learned Dutch critic, was born at Bergen-op-Zoom in 1612. Before he was of age he was appointed to the chair of eloquence at Leyden, having already published editions of the Scriptores historia Augustæ, the Poetæ Satyrici Minores, and some other Latin works. He refused the invitations of Queen Christina to remove to Sweden; and on the death of the learned Daniel Heinsius succeeded him as professor of jurisprudence and history. He died in 1653, from the effects, it is said, of immoderate indulgence in tobacco. His principal works are Poemata, 1629, 12mo; Theatrum, seu Comitatus Hollandiæ nova descriptio, Amst. 1632, 4to; Originum Gallicarum liber, Amst. 1654, 4to, &c.

BOXING, called pugilatus by the Romans, the exercise of fighting with the fists, either naked or with a stone or leaden ball grasped in them. In the pugna cæstuum the combatants had leathern thongs on their hands, which in later times were loaded with lead or iron, to add greater force to the blows. Three species of boxing may be distinguished, namely, where both the head and hands were naked; where the hands were armed and the head naked; and where the ears were defended with a kind of covers, called amphotides, and the hands also furnished with the cæstus.

The ancient pugilists battled with extraordinary fury, and frequently received such disfigurements that they could not be recognised by their acquaintances. They were thus rendered the subject of many railleries, of which some humorous specimens are to be found in the Greek Anthology.

Boxing was practised in the heroic ages; and hence even gods, as well as several of the earliest heroes, are represented as distinguished pugilists; as, for example, Apollo, Hercules, Tydeus, &c. The invention of the art, says the scholiast on Pindar (Nem. v. 89) was ascribed to Theseus.

Boxing the Compass, denotes the rehearing the points in their proper order.

BOXING also signifies the tapping of a tree, to make it

yield its juice.

BOX-WOOD, the wood of Buxus sempervirens, a native of most parts of Europe. The tree grows well in England, as at Boxhill, &c., but that from the Levant is most esteemed. Turkey box is yielded by Buxus balearica, a species which is found in Minorca, Sardinia, and Corsica, as well as in European and Asiatic Turkey. This is the most valuable kind, selling in the English market at from L.4, 10s. to L.8, 15s. a ton. Box is also found on Mount Caucasus, and a species extends even to the Himalaya mountains. It is called shumshad by the Arabs. Boxwood is of a yellowish

Boyaca || Boyce. colour, very hard, close-grained, and durable, and susceptible of a high polish. It is greatly used by the wood-engraver, the turner, carver, mathematical-instrument and flute maker, &c. This tree was much cultivated by the Romans, as described by Pliny; and it appears also to have been the *teashur* mentioned in Scripture as one of the woods used in adorning the temple of Solomon. The specific gravity of Dutch boxwood is given by Muschenbroek as 1.3280.

BOYACA, one of the seven departments into which the republic of New Grenada is divided, comprises the four provinces of Pamplona, Casanare, Tunja, and Socorro. Pop. about 600,000. The capital is Tunja. The town of Boyaca is five miles south of Tunja, and is celebrated for the victory gained by Bolivar over the Spaniards on 7th August 1819.

BOYAR, or Boiar, a title of nobility in the Russian em-

pire, corresponding to the English baron.

BOYAU, in Fortification, a ditch covered with a parapet, which serves as a communication between two princi-

pal trenches.

BOY-BISHOP. From a remote period, in the cathedrals and greater churches of Christendom, it was the custom on St Nicholas day (Dec. 6) to select a child, usually one of the choir, and to invest him with the robes and other insignia of the episcopal office; and from the time of his election until the feast of the Holy Innocents (Dec. 28), the boy-bishop continued to practise a kind of mimicry of the ceremonies of the church, for the amusement of the people. This custom, which was countenanced by the great ecclesiastics themselves, continued to exist till the year 1542, when it was finally suppressed by royal proclamation. (See Ellis's edition of Brand's *Popular Antiquities*, vol. i.)

BOYCE, HECTOR, a distinguished historian, was born at Dundee about the year 1465, being descended of a family which for several generations had possessed the barony of Panbride or Balbride. The orthography of his surname is extremely fluctuating: it is to be found under the various modifications of Boece, Boeth, Boeis, Boys, Boyse, Boyes, Boyis, Boiss, and Boyce. The first of these, we strongly suspect, was never a name belonging to any living man in Scotland: it was formed by the French from the name of the latest Roman classic, and on that account appears to have been adopted by Bellenden in his translation of the history. The real Scottish name is a monosyllable; and we adhere to the orthography of Boyce, as being most common in our own time. He received the first rudiments of learning at Dundee, and completed his course of study in the university of Paris, where he took the degree of B.D. He was appointed a professor of philosophy in the College of Montaigu; and in this seminary he became intimately acquainted with Erasmus, who in two epistles has testified his esteem for Boyce's character.1 In his academical station he had already distinguished himself by his talents and attainments, when King's College was founded at Aberdeen by the munificence of William Elphinstone, bishop of the diocese. The papal bull for the erection of a university had been obtained in the year 1494, but the buildings were not sufficiently advanced, nor did the lectures commence, till about the year 1500. It was not without some degree of hesitation that he consented to

quit the lettered society of Paris, and to become principal of this new college; but having at length accepted the conditions, he proceeded to Aberdeen, and experienced a kind reception from the canons of the cathedral, several of whom he has commemorated as men of learning. It was a part of his duty as principal to read lectures on divinity. The sub-principal was his friend William Hay, a native of the same county, who had been his fellow-student at Dundee and at Paris, and who at length succeeded him as head of the college.2 The principal's brother, Arthur Boyce, doctor of the canon and licentiate of the civil law, was appointed professor of the canon law, and afterwards became a judge of the court of session.3 The common branches of science and literature were taught with zeal and success; and the prosperity of the institution was greatly promoted by the talents and by the reputation of Boyce.

The emoluments of his office were not such as appear very dazzling to modern eyes. "Boethius, as president of the university," says Dr Johnson, "enjoyed a revenue of forty Scottish marks, about two pounds four shillings and sixpence of sterling money. In the present age of trade and taxes, it is difficult even for the imagination so to raise the value of money, or so to diminish the demands of life, as to suppose four and forty shillings a-year an honourable stipend; yet it was probably equal not only to the needs but to the rank of Boethius. The wealth of England was undoubtedly to that of Scotland more than five to one, and it is known that Henry the Eighth, among whose faults avarice was never reckoned, granted to Roger Ascham, as a reward of his learning, a pension of ten pounds a year." But it is necessary to recollect that this was not the only preferment which Boyce enjoyed: he was not only principal of King's College, but was likewise a canon of Aberdeen, and rector of Tyrie in the same Under the date of July 14. 1527, we find a "grant to Maister Hector" of an annual pension of fifty pounds, to be paid by the sheriff of Aberdeen out of the king's casualties: and on the 26th of July 1529 was issued a "precept for a lettre to Mr Hector Boys, professor of theology, of a pension of L.50 Scots yearly, until the king promote him to a benefice of 100 marks Scots of yearly value; the said pension to be paid him by the customers of Aberdeen." In 1533 and 1534, one-half of his pension was, however, paid by the king's treasurer, and the other half by the comptroller; and as no payment subsequent to that of Whitsuntide 1534 has been traced in the treasurer's accompts, he is supposed to have obtained his benefice soon after that period.

His earliest publication, the lives of the bishops of Aberdeen, appeared under the subsequent title: "Episcoporum Murthlacensium et Aberdonensium per Hectorem Boetium Vitæ." Impressa sunt hæc prelo Ascensiano, ad Idus Maias anno Salutis M.D.XXII., 4to. This little volume, which is of great rarity, has been reprinted for the members of the Bannatyne Club—"Hectoris Boetii Murthlacensium et Aberdonensium Episcoporum Vitæ, iterum in lucem editæ." Edinb. 1825, 4to. Of the bishops of this diocese the seat was originally at Murthlack, in the county of Banff, but it was afterwards transferred to Aberdeen. His notices of the early prelates are necessarily brief and unsa-

4 Johnson's Journey to the Western Islands of Scotland, p. 29. Lond. 1775, 8vo.

¹ Erasmi Opera, tom. i. tom. iii. col. 1784, edit. Clerici.—The first of these epistles introduces a catalogue of his own writings. Here his learned correspondent is named Hector Bootius, nor has Dr Jortin subjoined his more common appellation. (Life of Erasmus, vol. ii. p. 725.)

p. 725.)

2 In Orem's Description of King's College, Aberdeen, p. 154-7, he is erroneously called William Gray.

2 In Orem's Description of King's College, Aberdeen, p. 154-7, he is erroneously called William Gray.

3 Boyce has mentioned his brother in very favourable terms: "Arthurus Boetius mihi germanus, in pontificio jure doctor, in civico (ut dicunt) licentiatus, vir multæ doctrinæ, plus literarum indies consecuturus, quod studium ei permanet animo indefesso, nobiscum jura pie et scite profitetur. Est in eo vis et gravitas eloquendi, a vulgari genere plurimum abhorrens. (Aberdonensium Episcoporum Vitæ, p. 63, edit. Edinb. 1825, 4to.)

Maitland's Biographical Introduction to Bellenden, p. xxiii.

that which relates to his liberal patron Bishop Elphinstone; of whose private history and public services he has given a circumstantial detail, which occupies nearly one-third of the volume. Here we likewise find an account of the foundation and constitution of the college, together with some notices of its earliest members.

His more famous work, the history of Scotland, was published after an interval of five years: "Scotorum Historiæ a prima gentis origine cum aliarum et rerum et gentium illustratione non vulgari: præmissa epistola nuncupatoria, tabellisque amplissimis, et non pænitenda Isagoge, quæ ab hujus tergo explicabitur diffusius. Quæ omni impressa quidem sunt Iodoci Badii Ascensii typis et opera; impensis autem nobilis et prædocti viri Hectoris Boethii Deidonani, a quo sunt et condita et edita." Fol. The title and colophon have no date, but the commendatory epistle by Alexander Lyon, precentor of the cathedral of Elgin, bears the fifteenth of March 1527. This edition contains seventeen books. Another edition, containing the eighteenth book and a fragment of the nineteenth, was published by Ferrerius, who has added an appendix of thirty-five pages. Paris, 1574, fol. Though published at Paris, the latter edition appears from the colophon to have been printed at Lausanne.

The composition of Boyce's history displays much talent; and if the style does not always reach the standard of ancient purity, it displays a certain vein of elegance which generally renders it attractive. The author's love of his native country, and his anxiety to emblazon the heroic deeds of his countrymen, are conspicuous in every part of the work; nor must we leave unnoticed those aspirations after political freedom, by which he was honourably distinguished at a period when the human mind was so generally chained to the earth by the most slavish maxims of submission. It may be recorded as commendation, instead of reproach, that his principles of polity have been represented as no better than those of Buchanan. Boyce's imagination was, however, stronger than his judgment : of the extent of the historian's credulity, his narrative exhibits many unequivocal proofs; and if this circumstance admits of a sufficient excuse from the common propensity of the age in which he lived, his work presents strong indications of another fault, for which it is not so easy to find an apology. According to Bishop Lloyd, he put Fordun's tales "into the form of an history, and pieced them out with a very good invention, that part in which he chiefly excelled." He professes to

tisfactory, and the most interesting portion of the book is have obtained from the monastery of Icolmkill, through the Boyce. good offices of the Earl of Argyle and his brother the treasurer, certain original historians of Scotland, and among the rest Veremundus and Campbell, of whose writings not a single vestige is now to be found. In his dedication to the king, he is pleased to state that Veremundus, a Spaniard by birth, was archdeacon of St Andrews, and that he wrote in Latin a history of Scotland from the origin of the nation to the reign of Malcolm the Third, to whom he inscribed his work. According to Bishop Stillingfleet, whose opinion has been adopted by many other writers, these historians never existed except in Boyce's fertile imagination.3 From the charge of downright fabrication he has very recently been vindicated by Mr Maitland; but notwithstanding the ingenuity of the defence, we find it extremely difficult to divest ourselves of a strong impression, that the historian's account of his original materials, if not destitute of truth, is at least destitute of verisimilitude. His propensity to the marvellous4 was at an early period exposed in the following tetrastich of Leland, which Dempster has erroneously ascribed to Humphrey Lhuyd:5

> Hectoris historici tot quot mendacia scripsit, Si vis ut numerem, lector amice, tibi, Me jubeas etiam fluctus numerare marinos, Et liquidi stellas connumerare poli.6

Lhuyd, who attacked him in different works, spoke of his fabrications without management or scruple;7 nor did he experience much better treatment from Stanihurst, an Irish writer of considerable reputation.8 Of his merits as an historian, a very unfavourable estimate has more recently been formed by Lord Hailes and Mr Pinkerton. But in the opinion of Mr Wallace, a learned lawyer, his "elegant style and correct composition, not to add beautiful genius and fine fancy, are conclusive proofs that his understanding could not be inaccurate." And, as Mr Maitland has remarked, "in forming a final estimate of the literary character of Boece, we must bear in mind, that when scholar-craft in this country at least was rare, he was a scholar, and contributed, by reviving ancient learning, to dispel the gloom of the middle ages; and that, while the history of his country existed only in the rude page of the chroniclers who preceded him, or in the fading records of oral tradition, he embodied it in narrative so interesting, and language so beautiful, as to be worthy of a more refined age."10

Boyce's History of Scotland was translated into the Scottish language by John Bellenden, archdeacon of Moray and

¹ Joannes Ferrerius, a native of Picdmont, resided for several years in Scotland under the patronage of Robert Reid, abbot of Kinloss, and afterwards bishop of Orkney. In the dedication of one of his works to this prelate, he mentions Hector and Arthur Boyce, together with several other scholars of Aberdeen. "Aberdoniis rector a Kynkell, homo studiosus et politicus, me semper complexus est humanissime. Idem fecit Hector ille Boethius, historiarum vestrarum scriptor nunquam satis laudatus; ut interim omittam Arthurum Boethii fratrem germanum, utriusque juris peritissimum, Gulielmum Haye, theologum syncerum, ac Jacobum Vane, cum doctore medico peritissimo Roberto Gray. Adde his Joannem Vaus, virum cum literis tum moribus ornatissimum, et de juventute Scotica bene meri-(Auditum Visu præstare, contra vulgatum Aristotelis Placitum, academica Johannis Ferrerii Pedemontani Dissertatio. Paris, 1539, 4tc.) With respect to his literary character, see Lord Hailes's Examination of some of the Arguments for the high Antiquity of Regiam Majestatem, p. 20. Edinb. 1769, 4to. Among various other works, he wrote a history of the abbots of Kinloss, which is printed, though not without abbreviation, in Martene and Durand's Veterum Scriptorum et Monumentorum Collectio, tom. vi.

² Lloyd's Historical Account of Church Government in Great Britain and Ireland, pref. 3 Stillingfleet's Antiquities of the British Churches, p. 255.

⁴ One of the letters of Joseph Scaliger contains the subsequent passage relative to Boyce's story of the barnacles or soland-geese; "Nam de conchis anatiferis fabula prorsus est. Nullæ enim anates ex conchis producuntur, sed ex putredine vetustorum navigiorum, quibus conchæ adhærent, anates quasdam nasci certum est. Etiam arbores anatiferas esse in ultima Scotia, ubi nullæ prorsus arbores sunt, hactenus mentita est scriptorum vernilitas." (Scaligeri Epistolæ, p. 729. Lugd. Bat. 1627, 8vo.) See likewise Nicolai Nancelii Analogia Microcosmi ad Macrocosmon, col. 835. Lutetiæ Paris. 1611, fol. It is just as easy to believe that birds grow upon trees as that they are produced from rotten wood, so that the publicandre of Scaligory seems to heave conducted him but a little was havoud that that they are produced from rotten wood; so that the philosophy of Scaliger seems to have conducted him but a little way beyond the region of absolute credulity.

Dempsteri Historia Ecclesiastica Gentis Scotorum, p. 98. Bononiæ, 1627, 4to.

Dempsteri Autoria Accienazia Genus Acciorum, p. 30. Bononiæ, 1021, 200.

Elelandi de Rebus Britannicis Collectanea, vol. v. p. 126.

"Ut hominem impurissimum suis depingam coloribus," says Lhuyd, "fucusque et præstigia quibus omnium oculos perstringere conatur, aperiantur, aliquas ejus vanissimas nugas, et omnibus cordatis pro mendaciis cognitas, leviter attingamus." (Commentarioli Britannica Descriptionis Fragmentum, f. 32, a. Col. Agrip. 1572, 8vo.) In another work, De Mona Druidum Insula, Erricala he socaks in a similar strain: "Ut Hectoris Boethii numera mendacia hinc facilius dignoscantur."

S Stanibureti de Rebus in Elizacia Cartichia autoria p. 12. Antworpin 1584. 440.

Stanihursti de Rebus in Hibernia gestis libri quatuor, p. 18. Antverpiæ, 1584, 4to. Wallace's Nature and descent of Ancient Peerages, p. 451. edit. Edinb. 1785, 8vo. 10 Biographical Introduction to Mr Maitland's edition of Bellenden's Translation, p. xxxv.

Boyd.

Boyce.

canon of Ross, of whom we have already presented our readers with a copious notice. While the learned archdeacon was engaged in translating the work into prose, another individual was engaged in the more formidable task of translating it into verse. A copy of this metrical version, containing about 70,000 lines, is preserved in the library of the university of Cambridge: a leaf seems to be wanting at the beginning, and the manuscript has suffered some other mutilations. The name of the versifier does not appear, nor has it been ascertained from any other document; but we learn from the prologue, that his labours, like those of Bellenden, were intended for the benefit of the young monarch. From the concluding lines, it is ascertained that he began his task in April 1531, and concluded it in September 1535. His verses are not distinguished by any considerable degree of energy or elegance, and the writer is chiefly to be commended for his perseverance. The prologue, which is unfortunately mutilated, contains an account of his motives for engaging in this laborious undertaking: it is conducted in the form of a dialogue between the translator and a certain lady, who is probably some allegorical personage. The following is perhaps the most curious passage which it contains:-

> Bot yit, scho said, I dreid in my intent That to his grace it be ovir eloquent; For quhy the termis poleist ar perfyte Of eloquence, in rycht plesand indyte, In Latene toung sententiouslie and schort, Quhilk for to heir is plesand and confort. Madame, I said, quha wes it drew that storie? Ane man, scho said, of sic hie laud and glorie, In Albione sen stories wes begun, Wes nevir nane sic amang our poetis fun. Madame, I said, quhat is that mannis name? Ane Hector Boyis, said scho, of nobill fame, Maister in art, doctor in theologie, In all science ane profound clerk is he. Madame, I said, now tell me or ye ga, Quhat is the caus that ye commend it sua? That sall I do, quoth scho, and yow wald heir. Our old storeis befoir thir mony yeir, Tha war distroyit all with Inglismen In Wallace weir, as it is eith to ken: Syne efterwart quhen that the wreit the storie, Ald eldaris deidis to put into memorie Tha maid tha bukis, thair tractatis, and thair tabilis, Part be ges, and part be fenzeit fabillis, Part tha fand in ald bladis of bukis, Part in lous quairis, liand wer in nukis: Tha tuke sic cuir sic thingis to considder, Syne in ane volume pat thame altogidder, Without ordour, fassoun, or effect; Mikill wantit, and all the lave suspect. Madame, said I, now gar me vnderstand Into quhat place that he tha stories fand. That sall I do, than said scho, with gud will. Intill ane place callit Ecolumkill, Ane abbai sumtyme of authoritie, In Iona yle, within the occident se, Quhilk oft syis had of kingis corps the cuir; Lang of the ald thair wes thair sepultuir: And thair wes keipit thair storeis and bukis, As in this libell yow sall see quhen yow luikis: And in that place thair wes thir stories fand, Sum in lows quairis, and uther sum weill band, As Beid, Turgot, and Weremund alsua, Corneill Campbell, and mony uther ma, All tell and fynd ane fassoun and effect, In ornat spech, and nothing to suspect. And for this caus I haif socht to ye heir; Hartlie as now thairof, I ye requeir, Translait this libell in our mother toung, And preis ye nocht my purpois to impugn.

The kingis grace I knaw is nocht perfyte In Latyn toung, and namelie in sic dyte; It will be tedious, that dar I tak on hand, To reid the thing he can not vnderstand: War it translatid in our vulgar toung, Out throw that realme the rumor [sould be roung.]

In the year 1528, soon after the publication of his history, Boyce took the degree of D.D. at Aberdeen; and on this occasion the magistrates voted him a present of a tun of wine when the new wines should arrive, or, according to his option, the sum of twenty pounds to purchase a new bonnet. He appears to have survived till the year 1536; for on the 22d of November in that year, the king presented John Garden to the rectory of Tyrie, vacant by the death of "Mr Hector Boiss." He died at Aberdeen, and, according to the most probable conjecture, he had then attained or at least approached the age of seventy.

(D. I.)

BOYD, MARK ALEXANDER, a remarkable scholar and soldier, son of Robert Boyd of Pinkell in Ayrshire, and grandson of Robert Boyd, great chamberlain of Scotland, was born 13th January 1562. He lost his father in early life, and was educated by his uncle the learned James Boyd of Trochrig, "Tulchan," archbishop of Glasgow. His temper, however, was so violent that he soon quarrelled with his teachers, and abandoning his studies altogether, sought preferment at the court. Among the wildest spirits of that stormy period, the intolerable fierceness of his temper made it convenient for him to retire from Scotland and seek his fortune in France. He reached Paris with a small stock of money, which he soon lost in gaming. From Paris he went to Orleans, where he studied civil law under Robertus. The fame of Cujas next attracted him to Bourges. From Bourges he was driven by the plague to Lyons, and thence to Italy. On returning to France he was engaged to instruct a young nobleman, with whom, when the wars of the League broke out, he joined the Catholic party, though himself a Protestant. When the campaign terminated in 1588, he went to Toulouse and resumed his legal studies, which were speedily interrupted by an outbreak of bigotry on the part of the inhabitants, who, taking him for a Protestant, seized and threw him into prison. On his release he withdrew to Bordeaux. Till 1595 he led an unsettled life, sometimes studying, more frequently engaged in war. He found time, however, in 1592 to publish at Antwerp a volume of Latin poems, which he dedicated in a fulsome preface to James VI. He ultimately retired to his birthplace, where he died April 10. 1601. The best of his writings are the Epistolæ Heroidum, and the Hymni, which are to be found in the Deliciæ Poetarum Scotorum, Amsterdam, 1637, tom. i. p. 142. The diction of his poems, though copious, is far from being classical, and his sentiments, sometimes lofty and noble, are more frequently coarse and impure. The finest of his poetical pieces is that entitled The Tears of Venus on the Death of Adonis. The MSS. of his unpublished works are preserved in the Advocates' Library at Edinburgh.

Boxo, Zachary, a learned and pious clergyman of the Scottish Church, was born towards the end of the sixteenth century, and died in 1653 or 1654. He was for many years regent in the college of Saumur in France, but returned to his native country in 1621, to escape the persecution of the Protestants. In 1623 he was appointed minister of the Barony church in Glasgow, and held the office of rector of the university in the years 1634, 1635, and 1645. To his munificence the university is mainly indebted for the erection of its present buildings. Besides his library and MSS., he bequeathed to it the half of his fortune, a sum amounting to L.20,000 Scots. His bust over the gateway within the

¹ This line, which is scarcely intelligible, ought perhaps to have stood thus:—
All hail and fyne in fassoun and effect.

² Kennedy's Annals of Aberdeen, vol. ii. p. 367.

³ Hailes's Sketch of the Life of Mark Alexander Boyd, 4to. M'Crie's Life of Melville vol. i. p. 85.

Boyer.

court commemorates his important benefactions. The number of his published works was considerable, and 86 of his MSS. are said to be preserved in the library of Glasgow College. His best known works are The Last Battel of the Soule in Death, 1629, of which a new edition, with a biography by Mr Neil, was published at Glasgow in 1831; Zion's Flowers, 1644. the English Academie, and Songs of Zion. His poetical compositions are not without some merit, though the remarkable eccentricity of some of them has generally made them a source of amusement rather than of edification. The common statement that he made the printing of his metrical version of the Bible a condition of the reception of his grant to the university, is a mistake.

BOYER, a kind of Flemish sloop.

BOYER, Abel, a well-known lexicographer and historiographer, born at Castres in France in 1664. Upon the revocation of the edict of Nantes, he went first to Geneva, and then to Francker, where he finished his studies. Finally he came to England, where he soon acquired such a proficiency in the English language, that he became an author of considerable note, and was employed in writing several periodical and political works. He had for many years the principal management of a newspaper called the Postboy; and he likewise published a monthly work entitled the Political State of Great Britain. He wrote a Life of Queen Anne in folio; a History of William III. in 3 vols. 8vo; and Annals of the Reign of Queen Anne, in 11 vols. 8vo But he is best known by his Dictionary and Grammar of the French Language, which are still reckoned good in their kind. He died at Chelsea in 1729.

BOYER, Alexis, a distinguished French surgeon, was born on the 1st of March 1757, at Uzerches in the Limousin. His father was in the humble station of a tailor; and the son received the elements of a medical education in the shop of a barber-surgeon in a provincial town. His early talents induced his friends to procure his removal to Paris, where he had the good fortune to attract the notice of his two distinguished masters Louis and Desault; and his unwearied perseverance, his anatomical skill, and finally his dexterity as an operator, became so conspicuous, that at the age of thirty-seven he obtained the appointment of second surgeon to the Hôtel Dieu of Paris, and was elected professor of operatic surgery in L'École de Santé. This latter appointment he soon exchanged for the chair of clinical surgery; a department in which his manual dexterity and his admirable lectures on surgical diseases gained him the highest reputation, and introduced him to extensive practice. Perhaps no French surgeon of his time thought or wrote with greater clearness and good sense than Boyer; and while his natural modesty made him distrustful of innovation, and somewhat tenacious of established modes of treatment, he was as judicious in his diagnosis, as cool and skilful in manipulating, as he was cautious in forming his judgment on individual cases.

In 1805 Napoleon nominated him imperial family surgeon; and, after the brilliant campaigns of 1806-7, made him a member of the legion of honour, and conferred on him the title of Baron of the Empire, with a salary of 25,000 francs (L.1042). On the fall of Napoleon, the modest merits of Boyer secured him the favour of the succeeding sovereigns of France, and he was consulting-surgeon to Louis XVIII., to Charles X., and to Louis Philippe. In 1835 he succeeded Deschamps as surgeon-in-chief to the Hôpital de la Charité, and was chosen a member of the Royal Academy of Sciences of the Institute of France; while various scientific, national, and foreign societies enrolled him in their lists. But honours and emoluments could not consoie Boyer for the loss of a beloved wife. From the period of her death his health began visibly to decline; and he terminated his mortal career on November 23. 1833, at the age of seventy-six.

Boyer was of a cheerful temper, unassuming and simple in his manners, and studied a genteel economy which enabled him to exhibit many traits of generosity to others. His two great works are, Traité complet de l'Anatomie, in 4 vols. 8vo, published in 1797-99; of which a fourth edition appeared in 1815; and Traité des Maladies Chirurgicales, et des operations qui leur conviennent, in 11 vols. 8vo, 1814-26. Of this work a new edition called the 5th, with additions by M. Ph. Boyer, in 7 vols., was published in 1844-53. (T. S. T.)

BOYER, Jean Baptiste, an eminent French physician, born at Marseilles in 1693. He devoted a long life to the special investigation and treatment of contagious epidemics with a courage and success which have rarely been surpassed. On the last appearance of the plague in western Europe in 1720, he was one of the physicians sent from Paris by the government to succour the inhabitants of his native city, then visited by this great calamity. The fearless zeal and ability which he displayed on that occasion, procured him a pension and the title of physician in ordinary to the king. Much of his subsequent life was spent in similar expeditions, devoted to philanthropy, wherever pestilential epidemics prevailed: and the value of the services of Boyer were fully acknowledged at Paris, Trêves, Beauvais, Montagne, Brest, and at several places in the Spanish peninsula.

He died in 1768. His writings are not numerous: the best known are his good Account of the Plague at Marseilles in 1720, and his Observations on the Epidemic that prevailed at Beauvais, published at Paris in 1750. (T.S.I.)

BOYLE, CHARLES, Earl of Orrery in Ireland, and Baron of Marston, in the county of Somerset, second son of Roger second Earl of Orrery, was born at Chelsea in 1676. He was educated at Christ Church, Oxford, and soon distinguished himself by his learning and abilities. Like the first Earl of Orrery, he was an author, a soldier, and a statesman. He translated Plutarch's life of Lysander; and published an edition of the epistles of Phalaris, which engaged him in the famous controversy with Bentley. See ATTER-BURY. He was three times member for the town of Huntingdon; and on the death of his brother, Lionel Earl of Orrery, in 1703, he succeeded to that title. He entered the army, and in 1709 was raised to the rank of major-general, and sworn one of her Majesty's privy-council. At the battle of the Wood he acted with distinguished bravery. He was appointed the queen's envoy to the states of Brahant and Flanders; and having discharged this trust with ability, he was created an English peer, as Baron of Marston, in Somersetshire. He received several additional honours in the reign of king George I.; but having had the misfortune to fall under the suspicion of the government he was committed to the Tower, where he remained six months, and was then admitted to bail. On a subsequent inquiry, it was found impossible to criminate him, and he was discharged. He died, after a slight illness, on the 28th of August 1731. his tutor, Atterbury, he probably owed in some degree his relish for the writings of the ancients. Medicine likewise was one of his favourite studies. This peer also wrote a comedy, entitled As you find it; and after him was named the orrery, an astronomical instrument invented by Graham.

BOYLE, John, Earl of Cork and Orrery, a nobleman distinguished for his literary attainments, was the only son of Charles Earl of Orrery, and was born January 2.1707. He was educated at Christ Church College, Oxford; and was led by indifferent health, and many untoward accidents, to cultivate in retirement his talents for literature and poetry. Of these he has left several favourable specimens. He translated the Letters of Pliny the Younger, with various notes, for the use of his eldest son, published in 1751, 2 vols. 4to. He also published a Life of Swift, in several letters addressed to his second son; and Memoirs of Robert Cary, Earl of Monmouth, from a manuscript presented to him by

Boyle.

Boyle. a relation. He died November 16. 1762. His letters from Italy did not appear until 1774, when they were edited, with his life prefixed, by the Rev. J. Duncombe.

BOYLE, Richard, one of the greatest statesmen of the seventeenth century, generally styled the Great Earl of Cork, was the youngest son of Mr Roger Boyle, and was born at Canterbury, October 3.1566. He studied at Benet College, Cambridge, and afterwards became a student in the Middle Temple. Having lost his parents, and being unable to support himself in the prosecution of his studies, he became clerk to Sir Richard Manwood, chief baron of the exchequer; but finding this employment little likely to improve his fortune, he went to Ireland. He was then about twenty-two years of age, graceful in person, and possessing many accomplishments, which enabled him to render himself useful to some of the principal persons employed in the government. In 1595 he married one of the daughters and co-heiresses of William Apsley. This lady died four years afterwards, leaving him a landed estate of L.500 a-year. In consequence of various services, and the great ability he displayed, he gradually rose to the highest offices; and in 1616 he was created by King James I. Lord Boyle, Baron of Youghall in the county of Cork. Four years later he was created Viscount Dungarvan and Earl of Cork; and in 1631 he was appointed lord-treasurer of Ireland, an honour that was made hereditary in his family. He particularly distinguished himself by the noble stand he made when the great rebellion broke out in Ireland in the reign of Charles I., acting with as much bravery and military skill as if he had been trained from his infancy to the profession of arms. Having turned the castle of Lismore, his principal seat, into a fortress, he immediately armed and disciplined his servants and Protestant tenants; and, with their assistance, and a small army, raised and maintained at his own expense, which he put under the command of his four sons, he defended the province of Munster, and took several strong castles. During this time he paid his forces regularly; and when all his money was exhausted, he converted his plate into coin. He died on the 15th of September 1644.

BOYLE, Richard, Earl of Burlington and Cork, son of the former, was born at Youghall in October 1612. He greatly distinguished himself by his loyalty to Charles I., whom during his troubles he supplied both with money and troops; but at last he was obliged to compound for his estate. He contributed all in his power to the Restoration; and by Charles II. he was created Earl of Burlington or Bridlington in 1663. He died in January 1697-8, aged eighty-six.

BOYLE, Robert, one of the greatest and best of modern philosophers, was the seventh son and fourteenth child of Richard Earl of Cork, and was born at Lismore castle in the province of Munster, Ireland, January 25. 1626-7. He acquired the first rudiments of learning in his father's house, being taught to speak Latin by one of the earl's chaplains, and French by a native of the country residing in the In 1635 his father sent him to be educated at Eton school, where Sir Henry Wotton, the earl's friend, was then provost. Whilst at Eton several extraordinary accidents befel him, of which he has given us an account. One was the fall of his chamber while he was in bed; when he must infallibly have been suffocated by the dust as he lay beneath the rubbish, but for his presence of mind in covering his head with the sheet, which enabled him to breath without difficulty. Soon afterwards, when he was riding, his horse suddenly reared and fell backwards, when he would certainly have been crushed but for his timely dexterity in disengaging himself from the animal.

He remained at Eton between three and four years; and then was placed as a private pupil with Mr Douch, rector of Stalbridge in Dorsetshire, a property recently purchased by the earl. In 1638 he attended his father to London, and remained with him at the Savoy, till the marriage of his brother Francis

with Mrs Elizabeth Killigrew; and immediately afterwards, the two brothers proceeded to the Continent, accompanied by M. Marcomb, a Frenchman, who was tutor to Mr Boyle. Landing at Dieppe, they passed by Rouen to Paris, and thence to Lyons; and then continued their journey to Geneva, where the family of their travelling companion resided. Here young Boyle resumed his studies in the mathematics, of which he had previously acquired some knowledge.

After residing a year at Geneva, in September 1641 he travelled through Switzerland and the country of the Grisons; then passing by Bergamo, Brescia, and Verona, he arrived at Venice, where he made a short stay. He spent the winter at Florence, employing his spare hours in reading the modern history of Italy, and in studying the works of Galileo, who died near Florence during Mr Boyle's residence there. He also acquired the Italian language, though he never spoke it so fluently as French, of which he was a perfect master.

About the end of March 1642 he went to Rome; and after visiting several of the principal cities of Italy, he arrived at Marseilles. Here he received intelligence of the Irish rebellion; and after experiencing considerable pecuniary difficulties through the loss of a remittance, in consequence of which the party were obliged to retrace their way to Geneva, he at length reached England in 1644. His father was then dead, but he had left him the manor of Stalbridge, as well as considerable property in Ireland; though during that period of public agitation he derived little benefit from them. He procured, however, from the powers in being, protection for his estates in the two kingdoms.

In March 1646 he retired to his manor at Stalbridge, where he chiefly resided till May 1650. He made occasional excursions to London and to Oxford; and in February 1647 he paid a short visit to Holland. During his retirement at Stalbridge he engaged diligently in study, devoting his attention more particularly to natural philosophy and chemistry. He omitted no opportunity of making the acquaintance of persons distinguished by their talents and learning, and to such he was always a ready and generous assistant, and maintained with them a constant correspondence. Boyle was also one of the first members of that small society of learned men, who, in consequence of the unsettled state of the times, held their meetings with great privacy, first at London, and afterwards at Oxford, for the purpose of discussing and investigating experimental philosophy, and other subjects of liberal inquiry, exclusive of re-ligion and politics. They styled themselves the Philosophic College; and after the Restoration, they were incorporated under the name of the Royal Society.

In the summer of 1654 Boyle took up his residence at Oxford, in order that he might pursue his studies to greater advantage; and here he found himself surrounded by many learned friends, such as Wilkins, Wallis, Ward, Willis, Wren, and others, who had resorted thither for the same reasons as himself. It was here that he made his improvements on the air-pump, and by numerous experiments with this instrument he was enabled to discover several qualities of air, and to lay the foundation of a satisfactory theory of its nature. He declared against the philosophy of Aristotle, as being conversant more with words than with things, and as giving the inventions of men for indubitable proofs, instead of building upon observation and experiment. zealous for the experimental method of investigation, that although the Cartesian philosophy was become the subject of general attention, he could not for many years be persuaded to read the works of Descartes, lest he should be diverted by ingenious theories from carrying out the Baconian system of experimental inquires to which he had devoted himself. But philosophy, and inquiries into nature, though they engaged his attention deeply, did not occupy it entirely. He still continued his critical and theological studies; and

Boyle. in these he had the assistance of several eminent scholars, such as Pococke, Hyde, and Clarke, all distinguished orientalists. He was also intimate with Dr Thomas Barlow, the Bodleian librarian, and subsequently Bishop of Lincoln, a man of various and extensive learning. In 1659 Boyle came to know the distressed circumstances of Sanderson, afterwards bishop of Lincoln, who lost all his preferments on account of his attachment to the royal party, and he conferred upon him a pension of L.50 a-year, to encourage him in writing his "Cases of Conscience."

On the Restoration, Boyle was very favourably received at court. He was solicited by the Lord Chancellor Clarendon to enter into holy orders, but shrunk from the responsibility; believing, moreover, that whatever he wrote in the service of religion would have greater weight as coming from a layman. He chose, therefore, to pursue his philosophical studies in such a manner as might conduce to the support of religion, and began to communicate to the world the fruits of these studies. The first of these were printed at Oxford in 1660, in 8vo, under the title of New Experiments, Physico-mechanical, touching the Spring of Air and its Effects; and Seraphic Love, or some Motives and Incentives to the Love of God. Certain physiological essays and other tracts, in 4to, appeared in 1661; and in 1662, the Sceptical Chemist, which was reprinted about 1679, in 8vo, with additional experiments and notes.

In 1663 the Royal Society was incorporated by letters patent, and Boyle was appointed one of the council. had been principally concerned in the foundation of that learned society, and through life he continued one of the most useful and industrious of its members. In 1663 he published Considerations touching the usefulness of Experimental Natural Philosophy, 4to, and Experiments and Considerations upon Colours; with Observations on a Diamond that shines in the Dark, 8vo. This treatise, which is full of curious and useful remarks on the hitherto unexplained doctrine of light and colours, may be said to have led the way to that more full and ample development of the subject which was reserved for the genius of Newton. In the same year appeared his Considerations on the Style of the Holy Scriptures, 8vo, being an extract from a larger work, entitled An Essay on Scripture, afterwards published by his friend Sir Peter Pett. In 1664 he was elected into the company of the royal mines, and all this year he was engaged in the prosecution of various good designs, which prevented his publishing anything. The year following appeared Occasional Reflections upon several Subjects, 8vo, addressed to Sophronia (his sister the Viscountess Ranelagh). In ridicule of these discourses, Dean Swift wrote A Pious Meditation upon a Broomstick, in the style of the Honourable Mr Boyle. "To what a height," said Lord Orrery, "must the spirit of sarcasm arise in an author, who could prevail on himself to ridicule so good a man as Mr Boyle?" The same year he published an important work, entitled New Experiments and Observations upon Cold, 1665, 8vo; and in 1666, Hydrostatical Paradoxes made out by new Experiments, 8vo; and also the Origin of Forms and Qualities, according to the Corpuscular Philosophy. Besides these, both in this and the former year, he communicated to the Royal Society several curious and excellent short treatises, which are preserved in the Philosophical Transactions.

In 1668 Boyle settled in London, in the house of his sister, Lady Ranelagh, in Pall-Mall. In the following year he published A Continuation of New Experiments, touching the Weight and Spring of the Air; to which is added, A Discourse of the Atmospheres of Consistent Bodies. He also revised and made additions to several of his former works, some of which were now translated into Latin. About the same time he published his Tracts about the Cosmical

Begions, and the Bottom of the Sea; to which is prefixed, Boyle. an Introduction to the History of Particular Qualities. This book occasioned much speculation, as it contained a vast treasure of knowledge, founded upon actual experiments, or arguments justly drawn from them, instead of that conjectural philosophy which in the beginning of the seventeenth century had been so much in fashion. In 1671 he published Considerations on the Usefulness of Experimental and Natural Philosophy, (part second), 4to; and, A Collection of Tracts upon several useful and important points of Practical Philosophy, 4to; which were received as new and valuable gifts to the learned world. An essay concerning the Origin and Virtues of Gems, 8vo, appeared in 1672; also, A collection of tracts upon the relation between flame and air, and several other useful and curious subjects; besides which he furnished, in this and the former year, a great number of short dissertations upon a variety of topics, addressed to the Royal Society, and inserted in their Transactions. Essays on the Subtility and determinate Nature of Effluvia, to which were added a variety of Experiments on other Subjects, came out in 1673, 8vo. A collection of tracts upon the Saltness of the Sea, the Moisture of the Air, the Natural and Preternatural State of Bodies, to which is prefixed a dialogue concerning Cold, was published in 1674, 8vo. The Excellency of Theology, compared with Philosophy, appeared in 1673. This discourse was written in 1665, when the Great Plague which then raged in London obliged the author to wander from place to place in the country, where he had little opportunity of consulting books. A Collection of Tracts, containing Suspicions respecting Hidden Qualities of the Air, with an appendix, touching Celestial Magnets, Animadversions upon Hobbes's Problem about a Vacuum, and a Discourse of the Cause of Attraction and Suction, was published in 1674. Some Considerations about the Reconcileableness of Reason and Religion, by a Layman, to which is annexed a discourse about the Possibility of the Resurrection, appeared in 1655. Amongst the papers which he communicated to the Royal Society this year, one was entitled An Experimental Discourse of Quicksilver growing hot with Gold; and another relating to the same subject; each of which contained important discoveries.

In 1676 he published Experiments and Notes about the mechanical origin or production of Particular Qualities, in several discourses on a great variety of subjects, and among the rest on electricity. In 1678 he communicated to Dr Hooke a short memorial of some observations made upon an artificial substance that shines without any preceding illustration; which that philosopher published in his Lectiones Cutlerianæ. His historical account of a degradation of gold produced by an anti-elixir, is looked upon as one of the most remarkable pieces that ever fell from his pen. The regard which Sir Isaac Newton entertained for Boyle may be seen in a letter which he wrote to him, towards the close of this year, stating his sentiments of that ethereal medium which he afterwards considered in his Optics as the cause of gravitation. This letter is given in the Life of Boyle by Dr Birch.

In 1680 he published the Aerial Noctiluca, or some new phenomena, and a process of a factitious self-shining substance, 8vo. This year the Royal Society, as a proof of their sense of his great worth, and of the services which he had rendered the society, elected him their president; but being extremely sensitive in regard to oaths, he declined the honour. He published a discourse of Things above Reason, inquiring, whether a philosopher should admit any such, 1681, 8vo; New Experiments and Observations upon the icy Noctiluca, to which is added a chemical paradox, grounded upon new Experiments, 1682, 8vo; and a continuation of New Experiments, Physico-mechanical, touching the Spring and Weight of the Air, 1682, 8vo. In 1683 he

Boyle.

Boyle.

tion to the making of fresh water out of salt; but in 1684 he published Memoirs for the natural history of Human Blood, especially the spirit of that liquor, 8vo; and Experiments and Considerations about the Porosity of Bodies. In 1685 he published Short Memoirs for the natural experimental history of Mineral Waters, with directions as to the several methods of trying them; an Essayon the great Effects of even languid and unheeded motion, which was received with great and general applause; a Treatise of the Reconcileableness of specific Medicines to the Corpuscular Philosophy, to which is annexed a Discourse about the Advantages of the use of Simple Medicines, 8vo; and a theological tract of the high veneration Man's intellect owes to God, peculiarly for his wisdom and power, 8vo. In the beginning of the succeeding year came out his Free Inquiry into the vulgarly received notion of Nature; and in 1687 he published the martyrdom of Theodora and Didymia, a juvenile performance. His Disquisition about the final causes of natural things, in 8vo, appeared in 1688.

He now began to find that his health and strength, not-withstanding every care, gradually declined. He no longer communicated particular discourses or new discoveries to the Royal Society, because it could not be done without withdrawing his thoughts from occupations which he thought of still greater importance. In order the more steadily to attend to these, he resigned his post of governor of the corporation for propagating the gospel in New England; and even went so far as to signify to the world, by public advertisement, that he could no longer receive visits as usual. Among the other works which by this means he gained time to finish, was a collection of elaborate processes in chemistry, which, as he stated in a letter to a friend, he left "as a kind of hermetic legacy to the studious disciples of that art." Besides these papers, he left behind him many relating to chemistry.

He published some other works, as Medicina Hydrostatica, or, Hydrostatics applied to the Materia Medica, 1690, 8vo; The Christian Virtuoso, to which is subjoined, A Discourse about the Distinction that represents some Things as above Reason, but not contrary to Reason; and the first chapters of a discourse entitled Greatness of mind promoted by Christianity. Lastly, he published in the spring of 1691, Experimenta et Observationes Physica, treating of several subjects relating to natural philosophy, in an experimental way, 8vo.

About the beginning of summer he began to feel such an alteration in his health as induced him to think of settling his affairs; and on the 30th December 1691 he departed this life, in the sixty-fifth year of his age. He was buried in St Martin's in the Fields, Westminster; and his funeral sermon was preached by Dr Gilbert Burnet, bishop of Salishury.

The edition of the New Testament in the Malayan tongue was undertaken at Boyle's expense, and sent over all the East. He munificently rewarded the person who translated Grotius's book De Veritate into Arabic; and he was at the charge of a whole impression, which he took care to have distributed in all the countries where that language was understood. It was his intention to have printed an impression of the New Testament in Turkish; but the design was carried out by the Levant Company. Boyle, however, contributed largely towards it. He expended L.700 on an edition of the Scriptures in Irish, and contributed liberally to the impression of the Welsh Bible. He gave, during his life, L.300 to advance the design of propagating the Christian religion in America; and as soon as he heard that the East India Company were entertaining propositions for a similar design in the East, he sent a donation of L.100. His various charities amounted altogether to upwards of L.1000 a-year.

Of his merits as an inquirer into nature, Boerhaave re-

marks, that "Boyle, the ornament of his age and country, succeeded to the genius and inquiries of the great Chancellor Verulam;" to which he adds—"To him we owe the secrets of fire, air, water, animals, vegetables, fossils; so that from his works may be deduced the whole system of natural knowledge." This may now appear extravagant; but at the time it was considered a just tribute to his extraordinary merit and indefatigable perseverance.

In his person Robert Boyle was tall, slender, and of a pale countenance. His constitution was extremely delicate; and he was so apprehensive of the effects of cold, that he was guided by the thermometer in fixing upon one of his numerous cloaks to wear abroad. Though labouring for nearly forty years of his life under every disadvantage of bodily weakness and depression of spirits, his ardour in the cause of science suffered no abatement, as amply testified by the extent and importance of his various productions. He had likewise a weakness in his eyes, which rendered him extremely apprehensive of such distempers as might affect them. As to life itself, he set that just value on it which became a philosopher and a Christian. He was never married, although he had at least one opportunity of making an advantageous connection, since we find from a letter of Dr John Wallis to him, dated Oxford, 17th July 1669, that an overture had been made to him in regard to the Lady Mary Hastings, sister to the Earl of Huntingdon.

The following is a list of his posthumous works:—1. The General History of the Air designed and begun; 2. General Heads for the Natural History of a Country, for the use of Travellers and Navigators; 3. A paper of the Hon. Robert Boyle's, deposited with the secretaries of the Royal Society, being an account of his making the Phosphorus, September 30, 1680; 4. An account of a way of examining Waters as to Freshness or Saltness; 5. A free Discourse against customary Swearing, and a Dissuasive from Cursing, 1695, 8vo; and 6. Medicinal Experiments, or a Collection of choice Remedies, &c., 1698, 12mo. Editions of all his works have been printed at London, in five volumes folio, and six volumes 4to.

BOYLE, Roger, Earl of Orrery, fifth son of the great Earl of Cork, was born in April 1621. He distinguished himself while a student at Dublin College, and afterwards made the tour of France and Italy. On his return he was created Lord Broghill, through the interest of the Earl of Strafford. Shortly afterwards he married Margaret Howard, sister to the Earl of Suffolk; and passing over to Ireland with his bride, he found the country in a state of rebellion, and assisted his father in opposing the insurgents. Upon the execution of the king, he retired to his seat at Marston in Somersetshire; but his spirit could ill brook this state of inactivity, and he therefore resolved to cross the seas, and apply to Charles II. for a commission to raise forces to restore the monarchy and recover his own estate. Under the pretence of visiting Spa for his health, he proceeded as far as London, when he received a message from Cromwell, then general of the parliamentary forces and a member of the committee of state, intimating his intention to wait upon him. Presently Cromwell himself entered the room, and after the exchange of a few civilities, told Lord Broghill that the committee were apprised of his design; and when his lordship assured him that the intelligence was false, Cromwell produced copies of several of his confidential letters, which reduced him to the necessity of asking Cromwell's pardon, and requesting his advice in such a conjuncture. Cromwell told him, that though he had hitherto been a stranger to his person, he was not so to his merit and character; that he had heard how gallantly his lordship had behaved in the Irish wars; and he concluded by offering him the command of a general officer, exempt from all oaths and engagements; adding that he should not be obliged to draw his sword against any but the Irish rebels. Lord Broghill, greatly surprised at so unexpected an offer, requested some time for deliberation. But Cromwell briskly told him that he must determine instantly; that he himself

Boyle

Boyse.

Boyle's was about to return to the committee, who were still sitting; Lectures. and that if his lordship rejected their offer, they had determined to send him to the Tower. Broghill, finding that his liberty and life were in the utmost danger, pledged his honour that he would faithfully serve against the Irish rebels; and accordingly, by Cromwell's instructions, he passed over into Ireland, where by many important services he fully justified the opinion which Cromwell had conceived of him. Having raised a troop of horse, it was soon increased to a regiment of 1500 men, and these he led into the field against the rebels. He was speedily joined by Cromwell, who placed the highest confidence in his new ally, and found him of the greatest value to the interest of the commonwealth.

When Cromwell became Protector, Lord Broghill was made one of his privy council, and admitted to great intimacy and confidence. It is said that the latter formed a project for engaging Cromwell to restore the old constitution, by a match between Charles II. and the Protector's daughter. Cromwell, who at first seemed to think it not unfeasible, soon perceived the difficulties which it involved, and told Broghill that he thought his project impracticable: "For," said he, " Charles can never forgive me the death of

his father.'

On the death of Cromwell, Lord Broghill continued attached to his son Richard, till, seeing that the weak nature of that amiable man would infallibly bring on his fall, he deemed it imprudent still to cling to one whom he could not save, and accordingly retired to his command in Ireland, where affairs shortly after took a turn extremely favourable to the design of the king's restoration. Lord Broghill was not a little instrumental in bringing about that event; and, in consideration of his eminent services, Charles created him. Earl of Orrery, September 5. 1660. He was soon after made one of the lords justices of Ireland; and his conduct, whilst at the head of affairs in that kingdom, was such as to add greatly to the general esteem in which his character was previously held.

His active and toilsome course of life at length brought on disease and infirmity; but, notwithstanding, he went over to England in 1665, at the king's desire, and mediated with success in a serious misunderstanding which existed

between the king and the Duke of York.

On his return to Ireland, Lord Orrery, by his prudent and skilful measures, rendered abortive the scheme of a descent upon Ireland by the Dutch and French, planned by the Duke de Beaufort, admiral of France.

About this time a quarrel with his old friend the Duke of Ormond, arising from mutual jealousies, became so serious that the disputants resorted to England to defend their respective interests. This quarrel, though of a private beginning, became at last of a public nature. Lord Orrery was impeached, but defended himself so well that the prosecution failed. He lost, however, his public employments; but, retaining the king's favour, still came frequently to court, and was often consulted on affairs of importance. His last voyage to England was for the purpose of obtaining medical advice; but his disease, which was gout, proved mortal, and he expired on the 16th of October 1679, in the fifty-ninth year of his age. Lord Orrery was the author of several works, chiefly dramas and poems, now forgotten. Walpole remarks "that he never made a bad figure but as a poet." As a soldier, his valour was distinguished, his stratagems and tact were remarkable; as a statesman, it is sufficient to say that he possessed the confidence of Cromwell; and his credit ever stood high for integrity, and for generous fidelity as a friend.

BoxLe's Lectures, a course of eight sermons or lectures preached annually, and founded by the Honourable Robert Boyle, whose design, as expressed in a codicil annexed to his will in 1691, was to prove the truth of the Christian religion against infidels, without descending to any controversies among Christians, and to answer new difficulties or

scruples that might from time to time arise. For the support of this lecture, he assigned the rent of his house in Crooked Lane to some learned divine within the bills of mortality, to be elected for a time not exceeding three years, by Archbishop Tennison and others. But the fund proving precarious, the salary was ill paid; and to remedy this inconvenience, the archbishop procured a yearly stipend of L.50 for ever, to be paid quarterly, charged on a farm in the parish of Brill in the county of Bucks. To this appointment we are indebted for many elaborate defences both of natural and revealed religion.

BOYLE, or ABBEY BOYLE, a town and parish of Ireland, in the county of Roscommon and barony of the same name, on the river Boyle, an affluent of the Shannon, 94 miles W.N.W. of Dublin. It has a church, four chapels, barracks, market-house, bridewell, union-poorhouse, dispensary, and savings-bank. Previous to the Union it returned two members to the Irish parliament. It has some trade in grain, butter, and flax. Considerable remains of the abbey, an edifice of the latter part of the twelfth century, are still to

be seen. Pop. (1851) 3463.

BOYNE, a river of Ireland, rising in the Bog of Allen, near Carbery in Kildare, and flowing in a N.E. direction, passes Trim, Navan, and Drogheda, and enters the Irish Sea about four miles below the last-mentioned town. It is navigable for barges of 70 tons to Navan, 19 miles from its mouth. About three miles west of Drogheda, an obelisk, 150 feet in height, marks the spot where the forces of William III. gained the celebrated victory over those of James II. on 1st July 1690, known as the "battle of the Boyne."

BOYSE, Boys, or Bois, John, one of the translators of the English Bible, was born at Nettlestead in Suffolk, January 3. 1560. He received the rudiments of learning from his father; and so precocious were his talents, that it is said he could read Hebrew at the age of five. At fourteen he was admitted of St John's College, Cambridge, where he was during ten years principal Greek lecturer. He also delivered a Greek lecture for some years at four in the morning, in his own chamber, which was frequented by many of the fellows. On the death of his father, he succeeded to the rectory of West Stowe. At the age of thirty-six he married the daughter of Mr Holt, whom he succeeded as rector of Boxworth, in Cambridgeshire, in 1596. On his quitting the university, the college gave him L.100; but his wife being a bad economist, he soon became so much involved in debt that he was obliged to sell his choice collection of books, consisting of every Greek author then extant. When James I. directed a new translation to be made of the Bible, Bois was chosen as one of the translators; and he not only executed his own portion, which was the Apocrypha, but also the part assigned to another. He was also one of the six who had met at Stationers' Hall to revise the whole; which task they performed in nine months, having each, from the company of stationers during that time, thirty shillings a-week. He afterwards assisted Sir Henry Savile in publishing the works of St Chrysostom. In 1615 Dr Lancelot Andrews, bishop of Ely, bestowed on him unasked a prebendal stall in his cathedral. He died 14th January 1643, and left a great mass of manuscripts behind him. A work of his on the text of the Evangelists and Acts was published in 1655. When a student, Boyse received from the learned Dr Whitaker three rules for avoiding those diseases which are often engendered by sedentary pursuits, viz., to read standing, not to study at a window, and never to go to bed with cold feet. By attention to these simple precepts he is said to have preserved to the last an unwrinkled brow, with a freshness of complexion and vigour of constitution very rarely to be found in advanced age.

Boyse, Samuel, an English writer of considerable ability, but scandalous character, was born in 1708, and died in great wretchedness in 1749. His poetical compositions Bozrah Bracciolini.

were numerous, and one of them, entitled The Deity, received the praises of Hervey and Fielding; but none of them have survived the test of time.

BOZRAH, a chief city of the Edomites, 80 miles N.E. of Jerusalem, and known to the Greeks and Romans under the name of Bostra. It was 24 miles to the south of Edrei, one of the capitals of Bashan. Under Alexander Severus it became the seat of a Roman colony. Till the seventeenth century it was much frequented by caravans of pilgrims on their way to Mecca, who found in it abundant supplies of water. In the town itself, which is now little more than a heap of ruins, there is still in good preservation a reservoir, 190 paces in length, 153 in breadth, and 20 feet in depth, with walls 7 feet in thickness. Immediately beyond the walls of the city is a strong castle, built by the Saracens, which is still found of use to defend the few remaining inhabitants from the incursions of Bedouin marauders.

BRA, a town of Sardinia, province of Alba, on the river Stura, 25 miles N.E. of Cuneo. It has three parish churches, a gymnasium, hospital, manufactures of silk and linen goods, and a considerable trade in corn, cattle, and wine. Pop. 11,500.

BRABANCIONES, in historians of the middle age, a kind of soldiery or commissioned banditti, who would fight for any one who could pay them. Brabant was the chief nursery of these troops—whence the name. They are frequently confounded with the Routiers, Roturiers, Ruptarii, Ruterarii, Corteraux, and others.

BRABANT, North and South, two provinces, the former in Holland and the latter in Belgium, which see.

BRABEUTES (βραβευτής). See AGONOTHETA. BRACCIOLINI, FRANCESCO, an Italian poet, born at Pistoja, of a noble family, A.D. 1566. Removing to Florence, he was admitted into the academy there, and devoted himself to literature. At Rome he entered into the service of Cardinal Maffeo Barberini, with whom he afterwards went to France. After the death of Clement VIII. he returned to his own country; and when his patron Barberini was elected pope under the name of Urban VIII., Bracciolini repaired to Rome, and was made secretary to the pope's brother, Cardinal Antonio. He had also the honour conferred on him of taking a surname from the arms of the Barberini family, which were bees; whence he was afterwards known by the name of Bracciolini dell' Api. During Urbane's pontificate the poet lived at Rome in considerable reputation, though, at the same time, he was censured for his sordid avarice. On the death of this pontiff he returned to Pistoja, where he died in 1645. There is scarcely any species of poetry, epic, dramatic, pastoral, lyric, or burlesque, which Bracciolini did not attempt; but he is principally noted for his mock-heroic poem entitled Lo Scherno degli Dei, which was published in 1618, four years before Tassoni's Secchia Rapita; yet, though the author wished to claim the merit of priority, it should be observed that Tassoni's poem was completed in 1615, and freely circulated in MS. The inferiority of Bracciolini's performance, indeed, is acknowledged, yet it obtained considerable applause. his serious heroic poems, the most celebrated is La Croce Racquistata, which by some is placed next to the works of Ariosto and Tasso, sed magno intervallo.

Bracciolini, Poggio. This eminent scholar and contributor to the restoration of classical learning, was born at Terra-Nuova, a small town near Arezzo, Feb. 11. 1380. His father (a notary) had once been possessed of considerable property, but was ruined by circumstances which have not been recorded; and Poggio, after receiving a capital education in the usual branches then taught at the university of Florence (where he studied Latin under Gio. Malpaghino, commonly called John of Ravenna), was at an early age thrown on his own resources. The inaccuracy of the commonly received opinion that he studied Greek under

the celebrated Manuel Chrysoloras, is proved by a letter Braccioof his, in which he states that he commenced his Greek studies at Rome in 1424, i.e., some years after the death of Chrysoloras.

Poggio set out for Rome in 1403, and was soon received by Pope Boniface IX. as apostolical secretary, an office of high trust; in which his talents and integrity must have been conspicuous, as he held the same situation under eight successive pontiffs. In the following year, under Innocent VII., he was able to introduce his excellent friend Leonardo Bruni of Arezzo into the office of apostolic scribe. On the death of Innocent, Italy was convulsed by the claims of rival popes; and Poggio embraced that opportunity of visiting his native country, where he received the patronage of Niccolo Niccoli of Florence, a munificent encourager of learned men, and where he remained until recalled to the apostolic secretaryship on the election of John XXII. In that capacity he accompanied the pope to the council of Constance in October 1414; and saw his master first suspended and finally deposed by the general council of the church, after they had brought to trial and executed—in defiance of the safe-conduct granted him by the emperor-the celebrated Bohemian reformer, John Huss. The deposition of the pope caused the dispersion of his officers; and though the affairs of Poggio were not in a very prosperous condition, he remained at Constance and its vicinity for a considerable time. He was a witness to the trials and execution of another martyr to the cause of reformation, Jerome of Prague; who, undeterred by the fate of Huss, presented himself before the council, and was twice tried by that body. Poggio has left us a vivid narrative of the genius and intrepidity of the martyr in his eloquent defence and terrible punishment. His admiration of the man has evidently converted the apostolical secretary into a powerful panegyrist of a condemned heretic. In a letter to his friend, Leonardo Aretino, he says:—" His voice was sweet, clear, and sonorous; his action dignified, and well adapted to express indignation, or to excite compassion-which, however, he neither asked nor wished for. He stood undaunted and intrepid; not merely contemning, but, like another Cato, longing for death. He was a man worthy to be had in everlasting remembrance."

This part of the life of Poggio is that on which his chief claim to the gratitude of posterity rests. He now devoted his leisure and his resources to rescuing from the destruction with which the barbarism of Europe had well nigh consigned them, the precious remains of classic authors; and his diligent search for ancient MSS. in the mouldering archives of religious houses in several parts of Germany, Italy, and France, which he visited for this purpose, are creditable to his industry and his taste. A great number of MSS. were collected by his own hands, sometimes transcribed by him, or were procured by his means, and deposited in the libraries of Italy, then the only part of Europe where their value was truly estimated. To Poggio's zeal we owe the recovery of seven orations of Cicero, which we shall indicate in the order in which they appear in the Barbou edition of his works. 1. Pro Roscio Comædo; 2. De Lege Agraria, ad Senatum; 3. De Lege Agr., ad Populum; 4. De Lege Ágr., ad Populum; 5. Pro C. Rabirio Perduellonis Reo; 6. In Lucium Pisonem; 7. Pro C. Rabirio Postumo. He also recovered the poem of Silius Italicus on the second Punic War; Vegetius de Re Militari; Lactantius de Ira Dei et Opificio Hominum; Tertullian; Nonius Marcellus; Ammiani Marcellini Historia; Lucretius; Columella; Julius Frontinus de Aquæductis; the eight books of Firmicus on Mathematics; Calpurnii Bucolica; Petronius Arbiter; and to the same indefatigable explorer we are indebted for bringing to light the astronomical poem of Manilius, the lyrics of Lucius Septimius, with the treatises of Caper, Eutychius, and Probus. It was also through Poggio that

Brace

Bracton.

Braccio- Nicolas of Treves recovered twelve of the comedies of Plautus, and a fragment of Aulus Gellius.

These discoveries appear from a letter of F. Barbaro to have taken place before June 14. 1417; and it may easily be conceived that these researches were a heavy drawback upon the finances of Poggio. His difficulties were increased by the unexpected death of his friend and patron Zarabella, the Cardinal of Florence, which occurred in 1417. In this dilemma he accepted an invitation to come to England from Cardinal Beaufort, Bishop of Winchester; but on arriving in London the magnificent promises of the cardinal vanished in air; and Poggio experienced the mortification of neglect among a people rude and illiterate, and utterly untinctured with the spirit of refinement that had been kindled in Italy. After spending four years in vain in England, in which a very paltry piece of preferment was all he could obtain, he returned to Italy in 1421, and again became apostolical secretary to Martin V.; and, on the death of that pontiff in 1431, to his successor Eugenius IV., who was obliged to retire to Florence, whither he was willingly followed by Poggio; but on the election of the able and excellent Nicolas V. in 1447, Poggio resumed his office of secretary at Rome. The cruelties of Pope Eugenius drew down on him the vengeance of his subjects, and he was ignominiously driven from his capital in 1433, and narrowly escaped with his life. His friends were arrested; and Poggio had the misfortune to fall into the hands of a noted condottiero, Piccinino, who compelled him to pay a large ransom for his freedom, which the narrowness of his finances rendered it very difficult for him to pay.

In 1436, Poggio, who had always steadily refused to enter into holy orders as a means of obtaining promotion, married Vaggia de Bondelmonti, daughter of a wealthy and honourable Tuscan family, with whom he lived very happily. Soon after his marriage he gave vent to his satisfaction in an elegant Latin dialogue, An seni sit uxor ducenda, in which'he maintains the wisdom of the step which he had taken. By this lady he had five sons—Pietro Paulo, Giovanni Battista, Jacopo, Giovanni Francesco, and Filippo-and a daughter, Lucretia, who married into the family of the Bondelmonti.

On the appearance of the plague at Rome in 1450, the court left the city, and Poggio withdrew to Florence, at which time he wrote his Facetiæ; a collection of stories, in the taste of that age, more remarkable for their humour than their delicacy. In 1453 he was chosen chancellor of Florence, which finally fixed his residence in his native country. He now turned his attention to the history of Florence, and composed his history of that republic; an elaborate and very eloquent work, in which he imitated Livy and other ancient historians, by explaining the secret springs of action in the characters he delineates, by speeches which he puts into their mouths. His statements are clear and well defined; and he is particularly happy in his delineation of character. It was translated into Italian by his unfortunate son Jacopo.

The works of Poggio Bracciolini have never yet been wholly published. This is to be regretted, especially with respect to his letters, which give interesting details of what he saw and heard. Many of these, from which much light might be expected on the contemporaneous state of Italy, Germany, France, and England, exist in the Ricardi Library at Florence, and other Continental collections, as we are informed by Tonelli, in the preface to his excellent translation of the life of Bracciolini by the Rev. William Shepherd, LL.D. an elegant English work, which has gone through two editions in Britain, and has been also well translated into French and German.

Poggio Bracciolini died at Florence on the 30th of October 1459, and was buried with public honours in the church of Sta Croce, next his accomplished friend Leonardo Aretino. A fine statue of him, by Donatello, exists in the cathedral of Florence.

The following is a list of his published works:—1. Dialogue on Avarice, 1431-32; 2. An Seni Sit Uxor Ducenda, 1436; 3. Oration on the Death of Niccolo Niccoli, 1437; 4. Dialogue on Nobility, 1440; 5. Oration on the Death of Lorenzo de Medici, 1440; 6. Dialogue on the Unhappiness of Princes, 1440; 7. Oration on the Death of Cardinal di Sta Croce, 1443; 8. Eulogy of Leonardo Arctino, 1444; 9. Eulogy of Cardinal Julian di Sn Angelo, 1444; 10. Inaugural Address to Pope Nicolas V., 1447; 11. On the Vicissitudes of Fortune, 1447; 12. On Hypocrisy (in which he lashes the clergy), 1447; 13. Latin Translation of Xenophon's Cyropædia which he declared a romance, not a history), 1445; 14. Latin Translation of Diodorus Siculus, 1448; 15. Liber Facetiarum, 1451; 16. Historia Deceptiva Convivialis, 1451; 17. De Miseria Humana Conditionis, 1452; 18. Translation of the Golden Ass of Apuleius (which he shows to be derived from Lucian), 1452; 19. Historia Florentina,

BRACE, that which holds anything firm, as a bandage, or a cross timber in building. In printing, it denotes a crooked line connecting two or more lines. It is also used by sportsmen for a couple or pair; as a brace of bucks, of hares, of grouse, &c. Brace literally means "arm."

Braces, in sea language, are ropes reeved through blocks at the ends of the yard-arms, for the purpose of

squaring or traversing the yards.

BRACELET, an ornament worn on the wrist. It was much used among the ancients, and was made of different materials, according to the fashion of the age and the rank of the wearer. The word is French, bracelet; which Menage derives from braceletum, a diminutive of bracile, all formed from the Latin brachium, an arm. This kind of ornament was called by the Romans armilla, brachiale occabus; and in the middle ages boga, bauga, armispatha.

Bracelets have at all times been much in use among Eastern nations; and the women frequently wear many on the same arm. Among the higher classes these are of mother of pearl, fine gold, or silver; while poorer persons use plated steel, horn, brass, copper, beads, &c.

BRACHIOPODA, Cuvier's fifth class of Mollusca.

See Mollusca.

BRACHMINS, or Brachmans. See Brahmins.

BRACHYGNATHUS, a genus of fossil fishes—the only known species of which, B. Tenuiceps, occurs in the London clay of Sheppy

BRACHYGRAPHY (βραχύς and γραφή), the art of short-hand writing. See STENOGRAPHY.

BRACKET, a kind of stay against a wall to support a shelf or the like.

Brackets, in a ship, are small crooked timbers resembling knees, fixed in the frame of the ship's head, to support the gratings. They also serve to support the gallery.

Brackets, in Gunnery, the cheeks of the carriage of a mortar. See Gunnery.

BRACKETS, in Printing. See CROTCHETS.

BRACKLEY, a market-town of Northamptonshire, sixty-three miles from London. It is situated on a slope on the north bank of the Ouse. The houses are mostly built of stone, ranged in one street, extending from the bridge up the hill. It has two churches, a handsome markethouse, an endowed free school, a hospital, and manufactures shoes and laces. Previous to the Reform Act it returned two members to parliament. Pop. in 1851, 2147.

BRACTON, HENRY, lord chief justice of England in the reign of Henry III., was probably a native of Devonshire. He was educated at Oxford, where he took the degree of doctor of laws; and about the year 1244 was made one of the itinerant judges. Ten years later he became chief justice, and had the Earl of Derby's house in London assigned him for his town residence during the minority of that nobleman. He is said to have filled this important office with singular reputation during twenty years. The time of his death is not known; but it probably occurred about the year 1273. He wrote De Le-

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Bradford. gibus et Consuetudinibus Angliæ, which is one of the most ancient and most methodical treatises on the laws of Eng-This work is after the model of Justinian. It was printed at London in 1569, folio; and in 1640, in 4to.

BRADFORD, a parliamentary borough and markettown of England, in the west-riding of Yorkshire and wapentake of Morley, on an affluent of the Aire, 219 miles from London by rail, 30 miles W.S.W. of York, and 8 west of Leeds. In the older parts of the town the streets are generally narrow, but otherwise they are of sufficient width, and well paved and lighted. The parish church of St Peter is a structure in the perpendicular style, erected in the reign of Henry VI. There are six other churches and numerous places of worship of Presbyterians, Independents, Baptists, Methodists, Quakers, Roman Catholics, &c. The free grammar-school, founded in the reign of Edward IV., rebuilt in 1830, has a good library, and exhibitions at Queen's College, Oxford. There are many national, British, industrial, infant, and Sunday schools. There is a Baptist and an Independent theological college in the vicinity; the Methodists have also a seminary for educating the sons of their clergy. Among the public buildings are the new infirmary, erected in 1844, the Exchange of Piece Hall (a market for woollen goods), court-house, and jail. There are also a mechanics' institute, Odd Fellows' Literary institution, with a good library and news room, a savings-bank, dispensary, and numerous other charities. The first Temperance Society in England was established here. The staple manufactures of Bradford are worsted and woollen stuffs, which are in a very flourishing condition, and give employment to a great part of its population. The iron trade is also considerable, and in the neighbourhood is a plentiful supply of iron and coal. By means of the Liverpool and Leeds canal, with which it is connected by a branch, it communicates with the ports on the east and west coasts of the kingdom, and lines of railway connect it with all parts of the country. The borough is governed by a mayor, 14 aldermen, and 42 councillors, and returns two members to parliament since the passing of the Reform Act. Pop. (1851) 52,493. Market-day Thursday. The parliamentary borough includes the townships of Bradford, Manningham, Bowling, and Horton; pop. (1851) 103,778. Electors (1852) 2683. A festival is celebrated here every seventh year in honour of Bishop Blaise, said to be the inventor of wool-combing.

BRADFORD, Great, a market-town in the hundred of the same name, county of Wilts, on the Avon, 100 miles from London. It is pleasantly situated on both sides of the river, here crossed by two bridges, the old one of nine arches; the houses are built of stone, but the streets are mostly narrow. The town has a fine old church, three other churches, nine chapels, a gaol, bank, savings-bank, free and national schools, alms-house, and several charities. It has long been celebrated for the manufacture of fine broadcloths and kerseymeres. The Avon and Kennet canal facilitates its communication with Bath, Bristol, Devizes, and other towns. Pop. (1851) 4240.

BRADFORD, John, an eminent English martyr, born at Manchester in the early part of the reign of Henry VIII. Being a good penman and accountant, he became secretary to Sir John Harrington, who was paymaster of the English forces in France. Bradford at this time was gay and thoughtless, and to support his extravagance he appropriated some of the king's money; but being unable to endure the reflection of his guilt, he made restitution of the money, and relinquished his employment. About 1547, he took chambers in the Inner Temple, and began to study the law; but finding divinity more congenial to his taste, he removed the following year to Catherine-hall, Cambridge, where he applied to study with such assiduity, that in little more than a year he was admitted to the degree of master of

arts, and soon after made fellow of Pembroke-hall. Bishop Ridley, who in 1550 was translated to the see of London. now sent for him to the metropolis, and appointed him his chaplain. In 1553 he was also made chaplain to Edward VI., and became one of the most popular preachers in the kingdom. Such a reformer, however, was too dangerous to be tolerated in the succeeding reign. Accordingly he was among the earliest victims of Mary's intolerant reign. On a charge of sedition he was confined in the Tower, where he continued a year and a half. During this time he wrote several epistles, which were dispersed in various parts of the kingdom. He was afterwards removed to Southwark, and at last brought to trial before that court of inquisition in which Gardiner sat as chief, where he defended his principles to the last, in defiance of their at-tempts to effect his conversion. They condemned him to the flames, and he suffered accordingly in Smithfield, July 1. 1555. His writings, which consist chiefly of sermons, meditations, tracts, letters, and prayers, have recently been published in 12mo by the Religious Tract Society.

BRADING, a town and parish on the eastern side of the Isle of Wight, in the county of Hants, E.S.E. of Newport. The town is paved and lighted, and has a capacious but shallow harbour, which is dry at low water. It has little trade, depending chiefly on the rural inhabitants in its vicinity. It has a church, said to have been built in 1704, two dissenting chapels, a national school, and town-hall. Pop. of parish in 1851, 3046.

BRADLEY, DR JAMES, a celebrated English astronomer, was born at Sherborne in Dorsetshire in March 1692. He was educated at a school at North Leach, and at Balliol College, Oxford. As soon as he was of age to receive holy orders, the Bishop of Hereford gave him the vicarage of Bridstow; and he obtained soon afterwards the rectory of Llandewy-Welfrie in Pembrokeshire. Both these livings, however, and the hopes of further advancement in the church, he at length resigned, that he might devote himself entirely to mathematics and astronomy.

For a while he was curate of Wanstead in Essex, of which parish his uncle, Mr Pound, favourably known to the learned world for his astronomical observations, was rector. It may be imagined that the example and conversation of Mr Pound did not render Bradley fonder of his profession than before. He still continued, however, to fulfil its duties, though at this time he had made such observations as laid the foundation of those discoveries which afterwards distinguished him as one of the greatest astronomers of his age. These observations, made as it were by stealth, soon gained him the notice and friendship of the Lord Chancellor Macclesfield, Newton, Halley, and other members of the Royal Society, into which he was soon elected a member. On the death of Dr Keil in 1721, Bradley was appointed to succeed him as Savilian professor of astronomy; and for his colleague he had Halley, who was professor of geometry on the same foundation. Bradley now resigned his two livings, quitting with joy a situation in which his duty was directly at variance with his inclination. From this time he devoted himself wholly to the study of his favourite science; and in 1727 he established his reputation by publishing a Theory of the Aberration of the Fixed Stars, which is allowed to be one of the most useful and ingenious discoveries of modern astronomy. Three years afterwards he was appointed lecturer in astronomy and physics in the university of Oxford. In the course of his observations, he discovered that the inclination of the earth's axis upon the plane of the ecliptic was not always the same, but that it varied backwards and forwards some seconds, and that the period of these variations was nine years. This period seemed altogether unaccountable, as it could not be supposed to have anything in common with the revolution of the earth, which

is performed in one year. Bradley, however, discovered

Brady.

Bradninch the cause of this phenomenon in the Newtonian system of attraction, and published his discovery in 1737; so that in the space of about ten years he communicated to the world two of the finest discoveries in modern astronomy, which will for ever form an epoch in the history of that science.

In 1742 he had the honour of succeeding Dr Halley as astronomer-royal. That great man, now worn out with age and infirmities, had intended to resign in favour of Bradley; but while occupied with this friendly project, he died. As soon as Bradley's appointment became known, the university of Oxford created him doctor of divinity. Bradley was now in his proper element, and pursued his observations with unwearied diligence. In 1748 he availed himself of the annual visit made by the Royal Society to the observatory, to represent the necessity of repairing the old instruments and purchasing new ones; and in consequence, a grant of L.1000 was made by the king for that This sum enabled the astronomer-royal to furnish the observatory with as complete a collection of astronomical instruments as this most skilful and diligent obsever could then procure.

In 1751 Bradley received an offer of the vacant vicarage of Greenwich, a very considerable living, and conveniently situated for the performance of its duties; but this offer he declined on conscientious grounds. The king, on hearing of the refusal, granted him a pension of L.250 a-year, in consideration of his great abilities and knowledge in astronomy and other branches of the mathematics, which had proved so advantageous to the commerce and navigation of Great Britain, as is particularly mentioned in the grant, dated the 15th of February 1752. About the same time he was admitted into the council of the Royal Society, and in 1748 he was elected a member of the Royal Academy of Berlin. In 1752 he was made a member of the Imperial Academy at Petersburg; and in 1757, of that instituted at Bologna.

Till within two years of his death, Bradley continued to be indefatigable in his observations, and every honour he received became an excitement to fresh exertion; and when at last his strength gave way, the vigour of his intellect suffered no abatement. He died, after a painful illness, on the 13th of July 1762. He had married in 1744 Susannah Peach, a lady of Gloucestershire, by whom he had one daughter.

Dr Bradley possessed an amiable disposition and great equanimity of temper. Though a good and clear speaker, he was remarkably silent, never speaking except when he thought he could communicate some useful knowledge. He was not more inclined to write than to speak, and published very little, having had a diffident aversion to attract public notice. Two volumes of his observations were published at Oxford in 1798 and 1805.

BRADNINCH, or BRAINES, a decayed borough in the hundred of Hayridge, Devonshire, 9 miles N.N.E. of Exeter. It is pleasantly situated on an eminence surrounded by higher hills, except on the south, and consists for the most part of neat thatched cottages. It has a fine old church, guildhall, gaol, court-house, and national school; two papermills, and a small woollen factory. Pop. (1851) 1834. It is governed by a mayor, 12 masters, and 24 burgesses, and before the time of Henry VII. returned two members to parliament.

BRADS, a kind of nails made without spreading heads. They are distinguished as joiners'-brads, flooring-brads, battan-brads, bill-brads, quarter-heads, &c.; and are used for floors and other work in which it is required that the nails be sunk entirely in the wood.

BRADSHAW, HENRY, an English poet, born at Chester about the middle of the fifteenth century. Early displaying a taste for religion and literature, he was received while a boy into the Benedictine monastery of St Werberg

in that city; and he was afterwards sent to Gloucester (now Bradshaw Worcester) College, Oxford. After studying there for a time with the novices of his order, he returned to his convent, where, in the latter part of his life, he applied himself chiefly to the study of history. He died in 1513. His poetry in some respects is not inferior to that of any of his contemporaries. His works are, 1. De antiquitate et magnificentia Urbis Cestriæ; 2. Chronicon; 3. The Life of the glorious virgin St Werberg, printed at London, 1521, 4to, in verse, and now extremely rare. The life of St Werberg forms only part of this work, which contains also a description of the kingdom of Mercia, a life of St Etheldred, a life of St Sexburg, the foundation and history of Chester, and the chronicles of some kings.

Bradshaw, John, president of the court which condemned Charles I., was descended of an ancient Lancashire family, but the branch to which he belonged was seated either in Cheshire or Derbyshire. Being appointed speaker or president of the parliament under Cromwell, a guard was assigned him for the safety of his person, together with apartments in Westminster, a sum of L.5000 sterling, and considerable territorial domains. But he was not destined long to enjoy the recompense of the judicial service he had rendered; for, according to the pamphlets of the time preserved in the British Museum, he withdrew from parliament, and died in obscurity in 1659. At the Restoration his body, with those of Cromwell and Ireton, was disinterred, suspended on the gallows at Tyburn, and burned. Yet several collectors of anecdotes have circulated an idle story that Bradshaw passed into the colonies (Barbadoes or Jamaica) under a feigned name, and signalized himself in various contests with the native tribes. (Gentleman's Ma-

gazine, vol. liv. p. 834.) Bradshaw, William, an eminent English Puritan, born in 1571 at Market-Bosworth, in Leicestershire. His chief claim to notice as an author rests on a small treatise, entitled English Puritanism, published in 1605, which is valuable as a record of the main opinions of the most rigid Puritans of his time. He died in 1618.

BRADWARDIN, THOMAS, archbishop of Canterbury, surnamed the Profound Doctor, was born at Hartfield in Sussex towards the close of the 13th century. He was educated at Merton College, Oxford, where he took the degree of doctor of divinity, and acquired the reputation of a profound scholar, a skilful mathematician, and an able divine. He was afterwards raised to the high offices of chancellor of the university and professor of divinity. From being chancellor of the diocese of London, he became chaplain and confessor to Edward III., whom he attended during his wars in France, assisting that victorious prince with his advice, animating the troops, and aiding them with his prayers. After his return from the war he was made prebendary of Lincoln, and subsequently archbishop of Canterbury. He died of the plague, at Lambeth, in the year 1349, forty days after his consecration. Chaucer, in his Nun's Priest's Tale, ranks Bradwardin with St Augustine. His great work is a treatise against the Pelagians, entitled De causa Dei, printed at London, 1618, folio, by Sir Henry Savile. He wrote also De Geometria speculativa, Paris, 1495, 1512, 1530; De Arithmetica practica, Paris, 1502, 1512; De Proportionibus, Paris, 1495, Venice, 1505, folio; De Quadratura Circuli, Paris, 1495, folio.

BRADY, ROBERT, a physician and historian of the seventeenth century, was born in Norfolkshire, and studied at Caius College, Cambridge, where he took his degree of M.D. in 1660. About 1670 he was appointed keeper of the records in the Tower; and was afterwards made regius professor of physic in the university of Cambridge. He wrote a letter to Sydenham on the influence of air, which was published at the head of that learned physician's Epistolæ Responsoriæ. His principal work is A complete HisBrady Braga.

tory of England from the first entrance of the Romans unto the end of the reign of King Richard II., with an Introduction to the old English History, &c., in three vols. fol., 1685 -1700. In his Introduction he maintains, that the representatives of the Commons in parliament, knights, citizens, and burgesses, were not introduced until the forty-ninth of Henry III.; that William of Normandy made an absolute conquest of the nation; and that the succession to the crowu of England is hereditary and not elective; -- principles which were afterwards adopted by Hume as the basis of his History. His other productions were, An Answer to Mr Petyt's Book on Parliaments, London, 1681, 8vo; and An Historical Treatise of Cities and Burghs, 1690, folio, both contained in the volumes of his history. Brady sat in parliament for the university of Cambridge in 1681; and again in 1685, under James II., to whom he afterwards became physician in ordinary. He died in August 1700.

BRADY, Nicholas, D.D., whose name is familiar as the translator, in conjunction with Tate, of a new metrical version of the Psalms, was born at Bandon, in the county of Cork, in October 1659. He received his early education at Westminster School, and then studied at Christ Church, Oxford; but he graduated at Trinity College, Dublin. He was in due time made a prebend of Cork. He was a zealous promoter of the Revolution, and suffered in consequence. the troubles broke out in Ireland in 1690, Brady by his influence thrice prevented the burning of the town of Bandon, after James II. had given orders for its destruction; and the same year he was employed by the people of Bandon to lay their grievances before the English parliament. He soon afterwards settled in London, where he obtained various preferments. At the time of his death, in 1726, he held the livings of Clapham and Richmond. Besides his version of the Psalms, which was licensed in 1696, he translated Virgil's Æneid, and wrote a tragedy entitled The Rape, or the Innocent Imposture, both very indifferent performances. His prose works consist of Sermons.

BRAEMAR, a district of Scotland, in the county of Aberdeen. See Aberdeenshire.

BRAG, a game at cards, played by any number of persons; the dealer giving three cards to each person at one time, and turning up the last card all round. This being done, each player puts down three stakes, one for each card. The first stake is won by the best card turned up in the deal, beginning with the ace, and so on. When cards of the same value are turned up to two or more, the eldest hand gains; but the ace of diamonds wins, to whatever hand it be turned up. The second stake is won by what is called the brag, which consists in one of the players challenging the rest to turn up cards equal to his. A pair of aces is the best brag, a pair of kings the next, and so on; and a pair of any sort wins the stake from the most valuable single card. In this consists the great diversion of the game; for by plausible management, a pair of fives, trois, or even deuces, in the hands of a clever player, may outbrag a much higher pair, and even some pairs royal. The knave of clubs is here a principal favourite, making a pair with any other card in hand, and with any other two cards a pair royal. The third stake is won by the person who first makes up the cards in his hand one and thirty; each court card going for ten, and drawing from the pack, as usual in this game.

BRAGA (the ancient Augusta Bracara), the capital of the province of Entre Douro-e-Minho, in Portugal, is situated on an elevated plain near the river Savado. It is fortified, and defended by a citadel. The streets are irregular and ill paved, and the houses large, but of an antique fashion. It has an archbishop, and, besides the cathedral, numerous churches and monasteries, an archiepiscopal palace, and several hospitals. It has many fountains, and some Roman remains. Its chief manufactures are fire-arms, cutlery,

jewellery, and hats. Pop. 16,000. Long. 8. 16. W. Lat. 41. Bragança 43. N.

BRAGANÇA, a town of Portugal, province of Tras-os-Montes, on the Ferrenza, 26 miles N.W. of Miranda. It is partially fortified, is the seat of a bishopric, and has a citadel, a college, and some manufactures of silk and velvet. Pop. 5000. The reigning houses of Portugal and Brazil are descendants of the old Dukes of Bragança.

BRAHE, Tycho, an illustrious astronomer, descended of a noble family, originally of Sweden but settled in Denmark, was born on the 14th December 1546, at Knudstorp, in the county of Schonen. He learned Latin at the age of seven, and studied five years under private tutors. On the death of his father his uncle sent him, in April 1559, to study philosophy and rhetoric at Copenhagen. The great eclipse of the sun, on the 21st of August 1560, happening at the precise time foretold by astronomers, he began to look upon astronomy as something divine; and having purchased the Ephemerides of Stadius, he gained some notion of the theory of the planets. In 1562 he was sent by his uncle to Leipzig to study law; but astronomy wholly engrossed his thoughts, and he employed all his pocket-money in purchasing books on that science. Having procured a small celestial globe, he used to wait till his tutor went to bed, in order to examine the constellations and learn their names; and when the sky was clear, he spent whole nights in viewing the stars. In 1565, his choleric disposition involved him in a duel with a Danish nobleman, in which he had the misfortune to lose part of his nose; yet this defect he so skilfully supplied by means of gold, silver, and wax, that it was scarcely perceptible. It was about this time that he began to apply to chemistry, proposing nothing less than the discovery of the philosopher's stone. In 1571 he returned to Denmark, and was favoured by his maternal uncle Steno Belle with a convenient place at his castle of Herritzvad, near Knudstorp, for making his observations, and building a laboratory. But his marrying a peasant girl occasioned a violent quarrel between him and his relations, and the king was obliged to interpose in order to reconcile them. In 1574, byroyal command, he read lectures upon the theory of comets at Copenhagen; and the year following he began his travels through Germany, and proceeded as far as Venice. He then resolved to remove his family, and settle at Basle; but Frederick II., unwilling that Denmark should lose the honour of his residence, bestowed upon him for life the island of Huen in the Sound, to erect an observatory and laboratory there, and conferred on him a pension of two thousand crowns out of the treasury, a fee in Norway, and the canonry of Roschild, which brought him in a thousand more. The first stone of the observatory was laid on the 8th of August 1576. James VI. of Scotland, afterwards James I. of England, on his visit to Denmark to marry the Princess Anne, went to see Tycho Brahe in his retirement at Uranienburg, made him several presents, and wrote a copy of verses in his praise. But soon after the death of King Frederick he was deprived of his pension, fee, and canonry. Finding himself incapable of bearing the expenses of his observatory, he went to Copenhagen, whither he carried some of his instruments, and continued his astronomical observations in that city, till by the order of Christian IV., he was obliged to discontinue them. He then removed his family to Rostock, and afterwards to Holstein, in order to solicit Henry Ranzou to introduce him to the emperor; and accordingly he was received by Rodolph II. at Prague with the most gratifying marks of respect. That prince gave him a magnificent, house till he could procure. for him one better fitted for astronomical observations; assigned him a pension of three thousand crowns; and promised, upon the first opportunity, a fee for him and his descendants. But he did not long enjoy his good fortune; for, on the 24th of October 1601, he died of a strangury, in the

Brahmins.

Brahilow fifty-fifth year of his age. He was interred in a very magnificent manner in the principal church at Prague, where a noble monument was erected to his memory.

Tycho Brahe, though an accurate observer, and possessed of a powerful understanding, refused to admit the truth of the Copernican system, choosing rather to frame a complicated system of his own, but which, indeed, was adopted by few. The Tychonian system, as it is called, is essentially that of Ptolemv. with certain modifications. This great that of Ptolemy, with certain modifications. astronomer was extremely credulous with regard to judicial astrology and presages. If on leaving his house, he met an old woman or a hare upon the road in a journey, he would immediately turn back, persuaded that it was a bad omen. At Uranienburg, he had in his house a madman, whom he placed at his feet at table, and fed with his own hands, superstitiously regarding as prophetic whatever he uttered. Tycho was a man of very violent temper, easily excited to resentment, and though fond of rallying others, was highly provoked if the same liberty were taken with himself. His life has been written by Gassendi. His principal works are, 1. Progymnasmata Astronomica, Uranienburg, 1588 and 1589, 2 vols. 4to; 2. De Mundi Ætherei recentioribus phænomenis, 1588, 4to; 3. Epistolarum Astronomicarum libri duo, Frankfort, 1610, 4to; 4. Calendarium Naturale Magicum, 1582; 5. Oratio de Disciplinis Mathematicis, Copenhagen, 1610, 8vo. His observations were collected by his disciples, and published in 1666 in Historiæ Cælestis xx. libris.

It was the friendship of Tycho which formed Kepler, and directed him in the career of astronomy. The numerous observations of Tycho, of which Kepler found himself the depositary after the death of his master, doubtless contributed greatly to the discovery of those great laws of the system of the world which are known as Kepler's laws, and which, combined with the theory of central forces discovered by Huygens, conducted Newton to the grandest discovery which has ever been made in the sciences, namely, that of

universal gravitation.

BRAHILOW, BRAILOFF or IBRAILA, a town of European Turkey, in the province of Wallachia, on the left bank of the Danube, 100 miles N.E. of Bucharest, and about the same distance from the Black Sea. As the channel of the river is deep between Brahilow and the sea, vessels of considerable burthen can sail up to the town. Its harbour, protected by a small island from the ice that drifts down the river in large quantities in winter, affords complete security to the shipping. In 1770 the town was taken by the Russians, and almost razed to the ground, but it has been rebuilt, and many streets and edifices added, which its increasing trade and importance rendered indispensable. Its trade, which consists principally in the produce of the surrounding country, such as wheat, barley, maize, hides, tallow, timber, and tobacco, has of late years increased with surprising rapidity. The exports of grain, from 200,000 qrs. in 1838. had increased in 1849 to more than a million qrs., of the value of about £450,000. The quality of the grain used to be considerably impaired by the damp of the pits in which it was kept, but of late years spacious warehouses have been erected, and the quality of the grain has greatly improved. The trade is managed chiefly by Greeks, but many English and other merchants are now engaged in it. Pop. about 8000.

BRAHMA, the supreme god of the Indians. In Hun- Brahma dustani, the word is a neuter noun, derived by grammamans from the verb brih to grow, and the suffix man, and thus means that which grows, or the Supreme Being regarded under the aspect of development, and revealed by the creation of worlds. The word is used, however, in a secondary sense also, and means the Supreme Absolute Spirit, not regarded as a creative force, but shut up in himself, without external manifestations of any kind.

BRAHMAPOOTRA, or Burrampooter, one of the largest rivers in India, deriving its origin from the unexplored region at the eastern termination of the Himalaya mountains, in Lat. 28. 30. Long. 97. 20. Commencing with a westerly course it enters the province of Assam, and shortly after receives the tributary waters of the Dihong, a river of greater magnitude at the point of junction than itself; and which, rising under the name of the Sanpoo in the vicinity of the sources of the Sutlej and the Indus, winds eastward through the territory of Thibet for a thousand miles before its confluence with the Brahmapootra. In Long. 94. 30. the united streams divide into two great branches

which inclose an island of sixty miles in length.

Continuing its course westward it enters Bengal near to the town of Goalpara, after which it makes a circuit round the Garrow Mountains; and then altering its course to the south it is joined by the Megna in Lat. 24° in the district of Dacca. From this point the river loses its previous appellation of the Brahmapootra and assumes that of the Megna, the waters of which disembogue into the Bay of Bengal through three separate branches, one of these being the channel of the Ganges, with which the Megna communicates at the distance of about 40 miles from the sea. This great river, including its windings, has a course of about 930 miles, a length which would be doubled if the continuous streams of its remotest feeder, the Dihong, be included. Until 1765 the Brahmapootra was unknown in Europe as a great river, and Major Rennell, on exploring it, was surprised to find it larger than the Ganges. During a course of 400 miles through Bengal, the Brahmapootra resembles the Ganges in all respects, except that during the last 60 miles before its junction with that river, it forms a stream which is regularly from four to five miles wide, and but for its freshness might be considered an arm of the sea. The junction of the two mighty streams of the Brahmapootra and the Ganges produces an immense body of fresh water, such as is only exceeded by some of the great rivers in Africa which lie entirely within the limits of the tropical rains, or the Amazons and Orinoco in South America. The bore, which is known to be occasioned by the sudden influence of the tide into a river or narrow strait, prevails in all the passages between the islands and sands situated in the gulf formed by the confluence of the Brahmapootra and the Ganges, in a greater degree than in other (D. B-N.) (E. T.)

BRAHMINS, BRAMINS, BRAHMANS, OF BRACHMANS, called Bpaxuavai by the Greek writers, the name employed to designate that body or order of priests who have always been the sole guardians, preceptors, and ministers of the Hindu religion. It is formed, by a slight modification, from that of Brahma, which is itself a derivative from Brahm, the Supreme Being, indicating the first of the

¹ This order is of extreme antiquity, and they and their followers are universally acknowledged as a tribe sprung from the Caucasian variety of the human species. According to Major-General Briggs, in a memoir published in 1851, their sacred books or *Vedas* represent them as invading India from the N.W., i.e., through Afghanistan and the Punjaub at a very early period, where they seem to have made more considerable progress in literature, philosophy, mathematics, and medicine, than their contemporaries in other regions of the world. It is asserted that their Vedas date from fourteen centuries before our era; and it is alleged that their codes of criminal and civil law extend as far back as twenty-seven centuries from the present time. The progress of the Hindus southward was slow. For long they seem not to have penetrated farther south than Lat. 22° N.; and it was as late as in the ninth and tenth centuries of our era, that they encountered a kindred tribe, the followers of Buddah, who appear to have then possessed Southern India for a long period on the banks of the Kisma and Godavery. The Buddists were gradually overpowered, but were dominant in Ceylon, and still powerful at Bombay, in the fourteenth century.—En.

Brahmins, three divine hypostases of the Hindu mythology, the in number, for each of which there is a separate class or Brahmins. creator of the world under Brahm, and the author of the sacred books called Vedas.

The Brahmins constitute the first or highest of the four tchadi or castes into which the Hindu nation continues to be divided, as it has been from a very remote antiquity. The origin of this singular division or classification, which prevailed in ancient Egypt as it still does in the peninsula of India, and which was based upon nearly the same principles in both, is hid in the obscurity of ages. Each caste has its peculiar privileges, duties, and laws, all of which are incommunicable and unalienable. The more honourable the caste is, the more numerous are the restrictions to which its members are subjected, and the higher the prerogatives they enjoy. The fourth caste has the fewest observances to follow, but it has also the least portion of respect, and is the most limited in its rights and privileges. Every individual remains invariably in the caste in which he is born; practises its duties as prescribed in the laws relative thereto; and is precluded from ever aspiring to a higher, whatever may be his genius, his virtue, his patriotism, or his courage. The law which determines every man's position in society is immutable; and dreadful are the penalties which await him who ventures to dispense with even the most absurd rules laid down in it. To this point of honour the Hindu patiently sacrifices not only health, but life itself; degradation and infamy await him who transgresses its dictates; yet, although the code of which this constitutes part has been in force for a long series of ages, the people have never (perhaps for this very reason) thought of moderating its rigour or mitigating its oppression.

The leading castes among the Hindus are, as we have already observed, four. These are, first, the Brahmins; secondly, the Kshatriyas, or soldiers, including the princes and sovereigns, and hence sometimes called the caste of Rajahs or Rajeputras; thirdly, the Vaisyas, consisting of agriculturists and shepherds; and, fourthly, the Sudras or labourers. It is with the first of these, however, namely the Brahmins, that we are at present exclusively concerned. This is the sacred or sacerdotal caste, the members of which have maintained an authority more exalted, comprehensive, and absolute, than the priests of any other people, excepting perhaps those of ancient Egypt before the Persian invasion under Cambyses. According to the received Brahminical tradition, that priesthood originally proceeded from the mouth of Brahma, which is the seat of wisdom, and thus, by the mere fact of their genesis, became invested with an undoubted superiority over the other castes, which sprung from inferior organs or members of the hypostatical creator; as the Kshatriyas from his heart, the Vaisyas from his belly, and the Sudras from his feet. Of the Brahmins there are seven subdivisions, which derive their origin from the seven Rishis or Penitents, the most sacred personages acknowledged by the Hin-The Rishis are of high antiquity, being mentioned in the Vedas; and they are believed to have occasionally exercised a salutary superintendence over the gods themselves, visiting with their holy displeasure such of the divine impersonations as had been guilty of any irregularity. Their residence was fixed in the remote and elevated regions of, the north; and hence the Brahmins of the north are esteemed as the noblest, from their proximity to the great fountain. The Gymnosophists, or Brahmins of antiquity, lived much more secluded than those of modern times, who mingle to a considerable extent in secular concerns. But the latter have made almost no change in their rules of abstinence, their ablutions, and multiplied ceremonies. Their great prerogative consists in being the sole depositaries and expounders of the Vedas or sacred books, four first commences at the age of from seven to nine, when

branch of the Brahmins. This prerogative they guard 's with the most jealous care, affirming, that if a Sudra or other profane person were to attempt to read even the title of these books, his head would instantly cleave asunder; and a Brahmin bold enough to exhibit the sacred volumes to profane eyes would incur the penalty of irretrievable expulsion from his caste. Yet, with much judgment, they make an exception as to the miracle in favour of Europeans; nor has it been found expedient to enforce the law of caste against such Brahmins as may have indulged them with a perusal or even with copies of the Vedas.

The great body of the Brahmins profess to pay equal veneration to the three hypostases of the godhead, Brahma, Vishnu, and Siva. But some attach themselves exclusively to one of these impersonations; while others, admitting the divine emanation of three, exhibit only a preference in their homage, founded on certain fanciful distinctions. Thus Vishnu and Siva, though nominally co-ordinate with Brahma, have long been objects of partiality with individuals who, in virtue of such preference, are formed into sects, distinguished by the name of the hypostasis to which their chief homage is paid. The worshippers of Vishnu are denominated Namadhari, from bearing in their foreheads the mark called Nama, consisting of three perpendicular lines, crossed at the lower extremity by a horizontal one, so as to form a sort of trident; and their dress is of a deep orange colour. The devotees of Siva are denominated Lingamhari, from wearing the Lingam stuck in their hair, or attached to the arm in a tube of gold or silver. The former are notorious for intemperance, and on that account disliked by the people; the latter, for the most part, observe great moderation both in eating and drinking. The devotees of Vishnu account as sacred the monkey, the garuda, and the cobra capella; and any of their number who inadvertently kills one of these animals is obliged to expiate his supposed crime by a farcical sacrifice, in which it is pretended that a human victim is immolated and brought to life again. The mummery of this mock expiation is abundantly ridiculous. A little blood is drawn from a superficial wound in the thigh, inflicted with a knife; the victim is then supposed to be slain, and remains motionless until the farce of resuscitation is performed, when he of course comes to life again. This is performed with immense ceremony, in the presence of a great concourse of spectators, who are commonly feasted on the fine levied from the culprit; and a similar punishment is sometimes inflicted for other offences. The worshippers of Vishnu and Siva, though separated by a very thin wall of partition, are continually at variance, each sect not only striving to exalt their own divinity, but to revile that of their adversaries. The former consider the wearing of the Lingam as the most heinous of all sins; the latter, on the other hand, maintain that all who bear the Nama will, after death, be tormented in hell with a three-pronged fork, resembling that tridental mark. But these sectarian notions are less prevalent among the Brahmins than the other castes. Brahmins of the Vishnu faith are only to be found in the provinces situated to the south of the Krishna, and they are regarded with contempt by their more tolerant brethren, who, in consequence, refuse to admit them to their tables or to their ceremonies, and anxiously exclude them from any public employments which happen to be at their disposal. The sects of the Nama and the Lingam are further split into subdivisions, which dispute warmly on the subjects of their differences, but are ever ready to unite when the general interests of the order are concerned.

There are four stages in the life of a Brahmin. The

efficacious forms of prayer called the Mantras; and in acquiring other knowledge. It is his duty to abstain from the use of betel, to put no ornaments in his hair, to bathe daily, and to offer the sacrifice called Homam twice a day; but subjects so young seldom observe the rules strictly. A certain proficiency, indeed, is enjoined in committing to memory the sacred books; but neither in this nor in the acquisitions which are deemed scientific is there much emulation. They are not slack, however, in learning to understand the privileges belonging to their caste, which are great and various. One of these is a right to ask alms, which they do not in the style of mendicants, but in that of confident yet not insolent claimants; another is, an exemption from taxes of all kinds, whether general or local; and a third consists in an immunity from capital, and generally from corporal punishment, however heinous the crimes they may commit, imprisonment being the only penalty to which they are liable. At this stage also they learn the different points of bodily purity which, as good Brahmins, it is necessary for them to observe through life. These are so numerous as to be excessively burdensome, and to impose on them the duty of constant and jealous vigilance. Not only are they defiled by touching a dead body, but even by attending a funeral. Childbirth and constitutional changes render females impure; and certain ablutions and forms of prayer are necessary to remove the stain. An earthen vessel, if it has been used by a profane person, or applied to certain specified purposes, becomes so polluted that it cannot be used again, and must be broken; but metallic vessels may be purified by washing. Leather and all kinds of skins, except those of the tiger and antelope, are held to be excessively impure; and the boots and gloves of Europeans are to them the most disagreeable of all articles of dress. Brahmins, in walking or sitting, must take care they do not touch a bone, a broken pot, a rag, or a leaf from which any one has eaten; in drinking, they must pour the liquid from above, without touching the vessel with their lips; and they are forbidden to touch the greater part of animals, particularly the dog, which is accounted the most polluting. The water which they drink must be carefully drawn, though never by a Sudra; and if two Brahmins draw water together, their pitchers must not come in contact, otherwise one or both must be broken. Animal food of all kinds is strictly prohibited; and among the Lingam branch of the order the prohibition is most rigidly observed, notwithstanding which this class or sect has always been remarkable for great slovenliness in their external habits. The Brahmins are also taught to entertain a horror of spiritual defilement, resulting from perversity of will, or the actual commission of sin; and although the different modes in which it is contracted are but obscurely indicated, the rules for purification by means of ablutions, penances, and ceremonies, are very fully and distinctly laid down.

The second stage of a Brahmin's life is the state of Grihastha, which takes place when he is married, and has children; both these circumstances being essential to its constitution. Marriage is an important object to a Brahmin, inasmuch as it insures him consideration and respectability in society. Hence, when he becomes a widower, he falls from his station, and is consequently under a moral necessity of re-entering the married state. But the case is quite different with widowed females, who are not

Brahmins. he is invested with the triple cord, which is suspended ever, probably in imitation of the ancient Rishis, lead lives Brahmins. from the left shoulder, and forms the badge of his order. of celibacy; and the acting priests, called Gurus, also live The youth thus initiated is denominated Brahmachari. At in a state of single blessedness, although their morality this stage he is occupied in learning to read and write; in this particular is sufficiently relaxed. When a Brahin committing to memory portions of the Vedas, and the min, therefore, takes his wife home and has children by her, he enters his second state, or that of Grihastha. His daily duties and ceremonies now become more multiplied and imperative; and every act of his life must be performed according to certain rules, some of them sufficiently repugnant to European notions of propriety. These observances, which from their number and incessant recurrence would seem burdensome and oppressive, become so habitual from daily practice that they are not felt as galling or irksome. On the contrary, the Brahmins perform all of them cheerfully, and no innovation is ever proposed. Some Hindu writers, indeed, have turned them into ridicule, and joked at the expense of a ritual which they nevertheless continued in practice to observe. But, from all that we can learn, the authors who have indulged in this license were never Brahmins, but generally Sudras, or men of the lowest caste, who had been contaminated by association with Europeans. Vemana, Agastya, Patanatupulai, and Tiruvaluven, a Pariah, the principal scoffers, answer to this description; they are all modern, and either Sudras or men of no caste whatever. If any ancient authors wrote in the same strain, their names and their works have equally perished. At the same time, although speculative scepticism be but rarely avowed, practical transgressions are secretly indulged in, especially in large towns, where concealment is easy and temptation strong.

Nor is this all. Many Brahmins habitually engage in transactions and employments which appear altogether at variance with their professions and pretensions. They are commonly the political functionaries or agents of the native princes, and of the Mahommedan governments, which find it convenient to employ these hereditary ministers of religion, from the influence they possess over the minds of the people. Some of them, particularly in Gujerat, cmbark in commercial speculations, and become merchants, bankers, or general agents. Others, again, carry messages between distant places, or are sent as vakeels on difficult and important missions; the veneration in which they are universally held securing them from molestation in the discharge of such tasks. A third class act as coolies or porters, in which character they alone are exempt from the demands of the tax-gatherer. Many of them enter the Company's native army, and often rise to the rank of subadhar. In a word, they are as much alive to selfish considerations and interests as any other tribe or caste, and ready, on all occasions, to avail themselves to the uttermost of the privileges and immunities belonging to their order. Their rapacity, in fact, is only exceeded by their cunning; nor is there to be found in any country a set of more artful impostors. The Hindus are all expert in disguising the truth; but the Brahmins, in this respect, possess an unquestioned superiority. They are supple, insinuating, false; acute in discerning, and skilful in taking advantage of the foibles of others; naturally vindictive and proud, yet, from habit and cunning, patient and submissive; evincing on all occasions the most perfect self-command, and ever ready to profit by the indiscretion, weakness, or simplicity of those with whom they may have to do. One of their prime resources is flattery, which they lavish with unbounded profusion on any person whom they wish to cozen or hope to conciliate; experience having convinced them, that even those who pretend to repudiate their adulation nevertheless lay a portion, at least, of the grateful unction to their souls. In matters of religious opinion they are upon the whole tolerant; they almost never anathematize permitted to marry a second time. The Sunnyassis, how- Moslemins, Christians, and others of different creeds; nor

Brahmins do they seem to be at all actuated by the fierce spirit of for the severe discipline of the order; but in the end the Brahmins the objects of their own worship; for, undoubtedly, they sometimes treat the latter with an indifference bordering on contempt, and in their adorations are influenced by their secular interests rather than by the spirit of devotion, flattering those divinities whose functions they connect with their worldly affairs, and giving themselves no concern about the others.

The distance at which they keep themselves from Europeans, and the unwillingness they evince to admit the latter to their temples or their ceremonies, may seem inconsistent with what has just been advanced. But their conduct in this respect arises solely from the uncleanness which they attach to our habits; and were Europeans to conform a little more to their manners and practical prejudices, there can be no doubt that the consequence would be a closer intimacy and unbounded toleration. This was fully experienced by the Abbé Dubois, who having carefully studied the manners of the Hindus, and uniformly treated their habits with respect and tenderness, was often invited by the Brahmins of his acquaintance to enter their temples and join in their ceremonies. Among the sacerdotal order of India it is a prevalent sentiment that different religions are formed for different nations, and that each serves every necessary purpose to the souls of its believers and professors. But in their attachment to their civil institutions the Brahmins are less liberal and conciliating, considering every thing different from these or opposed to them as the product of absolute barbarism. The Moors they hate for their arrogance, and despise for their ignorance of some branches of mathematical science known to themselves, such as those connected with the construction and explanation of the almanack. In the European masters of India, they admire their humanity in war, the moderation and impartiality of their government, the general uprightness of their conduct in the intercourse of life, and the benevolent generosity of their dispositions; but these favourable impressions are apt to be forgotten when they think of the grossness and hatefulness of their prevailing habits, such as eating animal food, and admitting the detested Pariahs into their domestic service. Such things are pre-eminently odious to Hindus, and both, we think, might have easily been avoided. No extraordinary effort of self-denial would have been necessary to enable Europeans to abstain from the use of beef, which is an insipid food in India; and, with regard to the Pariahs, although it would undoubtedly be wrong to countenance the Brahmins in their barbarous treatment of the inferior castes, and of those who are considered as of no caste, yet regulations might have been adopted by which men of high caste would have been spared the gross insults they are at present exposed to, and every humane purpose at the same time attained.

The third state of a Brahmin is denominated Vanaprastha, or that of inhabitants of the desert. The order of Brahminical anchorites prevailed at a former period, but it is now scarcely to be found, and appears to be very nearly, if not altogether, extinct. The members of it were usually styled Rishis, or Penitents. They were honoured by kings, and respected by the gods, who, on account of the odour of their sanctity, seem to have considered them as in some degree their superiors. They performed peculiar sacrifices and religious observances. Their pious acts and intentions were often thwarted by giants, and even by gods, who seem to have had no relish sons; the Panduris, who carry about small figures of the

proselytism and persecution. But this forbearance may Penitents always prevailed, and sometimes took the gods perhaps be the consequence, not of any virtue in the roundly to task for their misdeeds. They were the depo-Brahmins, but of the low estimation in which they hold sitaries of the more sublime doctrines of theology, and practised magical incantations.

The fourth state of a Brahmin is called Sunnyassi, and is reckoned so pre-eminently holy that, in a single generation, it imparts a greater stock of merit than could be accumulated during ten thousand in any other sphere of life. As a natural consequence, when a Sunnyassi dies, he is believed to pass at once into the region of Brahma or Vishnu, exempt from the penalty of being re-born on earth, or animating in succession different bodies, conformably to the metempsychosis of the Hindu mythology. In preparation for this state, a Brahmin performs all the rites of the Vanaprastha, and in addition renounces every worldly connection, takes up the profession of mendicity, and lives solely by alms. He must previously, however, have devoted several years to the married and paternal state, and thus discharged the debt which he owed to his forefathers. When duly qualified and disposed for entering the holy state of Sunnyassi, he is installed as such with many Mantras and other ceremonies. His duties now increase in number and severity. He must every morning rub his whole body over with ashes, restrict himself to one meal a day, give up the use of betel, avoid looking at women, shave his beard and head every month, and wear wooden clogs on his feet; in travelling, he must carry his seven-knotted bamboo staff in the one hand, his gourd in the other, and the antelope skin under his arm, in other words, display the three badges of his order; and he must erect a hermitage on the bank of a river or a lake. Contemplation, and a supposed communion with the Deity, amounting in its highest form to a participation of the divine essence, constitute the ulterior duties of this class of devotees. Need we wonder that, being thus privileged to indulge in all manner of extravagances, and to give full swing to an excited imagination, their practices should be in the highest degree preposterous, and their fantasies equally wild and ridiculous? In fact, the tricks which they perform are endless. The highest act of merit among them is "to subdue all sensation, and retain the breath with such determined perseverance, that the soul, quitting the body, bursts through the crown of the head, and flies to re-unite itself with the Great Being, or Para-Brahma." Accordingly, one of their fantastical exercises consists in suppressing their breath as long as possible, till they almost swoon away, and bring on most profuse perspiration. Another consists in putting themselves in the most irksome and ridiculous postures, and remaining so for a considerable length of time, indeed till exhaustion or decrepitude ensue. To stand on one leg till it swells and ulcerates; to stand on the head till the brain becomes disordered, and delirium ensues; to keep one arm extended aloft in the air till the muscles become rigid, and the power of withdrawing it is lost for ever; such are among the most approved practices of the Sunnyassis. But still the most extravagant and fatal efforts of these extraordinary devotees seem to have been confined to former times. We may add, that the Sunnyassis are not, like the Vanaprasthas, burned when they die, but interred. the case with the Lingamhari, or worshippers of Siva; but a Sunnyassi, even although he had, during life, attached himself to the worship of Vishnu, is interred when dead, and the ceremony is both pompous and expensive.

From the classes of Vanaprastha and Sunnyassi have practised self-denial according to certain rigid rules, and sprung numerous sects of fanatics, such as the Djogis, who seek to propitiate the Deity by mutilating their bodies, or braving the force of fire and the inclemency of the sea-

and the Vairagis, who form a kind of mixed order of monks and nuns, consecrated to the god Krishna and his mistress Rada, whose history they celebrate in songs, accompanied with the tinkling of cymbals. It is also said that some of the Brahmins, under the denominations of Pashandia and Sarwagina, maintain libertine and atheistical opinions; and it is probable that the number of those who secretly cherish such sentiments is much greater than that of the class or sect which openly avows them. Superstition, when sustained neither by fanaticism nor enthusiasm, is the natural parent of that infidelity by which it is ultimately undermined.

From what has been stated in the course of this exposition, some idea may be formed of the general character of the sacerdotal caste in India. According to the best authorities on the subject, the number of Brahmins who are respectable for their knowledge and their virtue is exceedingly small; whilst the great majority of these hereditary priests is completely devoted to ambition, intrigue, and voluptuousness, and disgraced by an avarice, a meanness, and a cruelty, which inspire strangers with no sentiments towards them but those of contempt and aversion. The charity which they place so high in the scale of duties and virtues, being equally confined by the law of caste, and the operation of that intense selfishness by which the whole tribe is characterised, has no human beings except Brahmins for its objects. Towards the other castes they cherish no feeling of humanity, and cautiously abstain from any reciprocation of kindness; they exact every thing in virtue of their rank, functions, and pretended sanctity, but take care to give nothing in return. Instead of the retired and contemplative life which appears to have been observed by the order in ancient times, and to which they still profess to devote themselves, they are immersed, as we have already seen, in pursuits the most foreign to and inconsistent with the duties and character of a priesthood; and, accordingly, they have declined alike in dignity, in reputation, and in knowledge. Yet their influence as a body still remains unshaken; neither the violence of conquest, nor the shock of revolution, nor even the power of time itself, appears to have sensibly impaired their dominion over the minds of the other castes. The institutions to which they owe their ascendancy, and by which it will in all probability be maintained for ages yet to come, have struck their roots so deeply, and become so intimately identified with the genius, character, habits, sentiments, feelings, prejudices, and daily usages of the people, as to resist the operation of all those natural, moral, and political causes which bring about changes in other countries, and, amidst all the evils incident to convulsions and innovations, ultimately contribute to the general advancement. In India, society appears to have been arrested at a particular stage of its natural progress, and re-constituted so as never to exceed the limit which it had attained before its onward tendencies were paralyzed, and the characteristic of immutability firmly established. Hence it may be considered as forming what the schoolmen would probably have denominated a political nunc stans; as standing to other communities of men in nearly the same relation that eternity bears to time: and hence, also, the permanency of an influence which the possessors of it take no means to extend or improve, in the conviction that it can never be materially abridged.

The authenticity as well as the antiquity of the sacred books of the Brahmins has been alternately asserted and denied, with equal zeal and pertinacity. Without entering into this question, however, it may be satisfactory to show of what materials these writings really consist; for if they are utterly worthless and contemp-

Brahmins most indecent description, as provocatives to devotion; tible in themselves, as indeed seems to be the case, it Brahmins. matters but little to inquire whether they be genuine ' or spurious, of ancient or comparatively modern origin. And, on this subject, we prefer citing authorities to delivering any opinion of our own. "The sacred writings of the Brahmins," says an able writer in the Quarterly Review, "have been long mentioned with those phrases of solemn wonder, which would still have misled the public, if the translations and extracts of them which have successively appeared had not discovered their puerility and imposture. It is therefore important that the Sanscrit books, which have been held up as so sacred and so ancient, and which some of our learned Orientalists obviously prefer to the Jewish historian, should be given to Europe in the languages familiar to every one; that we may not be blinded by the erroneous admiration of credulous and misjudging enthusiasts, but be enabled to criticise fairly, and judge impartially for ourselves." (Vol. ii. p. 68.) Mr Mill, speaking of Sanscrit poetry generally, pronounces a judgment still stronger than that delivered by the Reviewer. "These fictions," says he, "are not only more extravagant and unnatural, less correspondent with the physical and moral laws of the universe, but are less ingenious, more monstrous, and have less of any thing that can engage the affection, awaken sympathy, or excite admiration, reverence, or terror, than the poems of any other, even the rudest people, with whom our knowledge of the globe has yet brought us acquainted. They are excessively prolix and insipid. They are often, through long passages, trifling and childish to a degree which those acquainted with only European poetry can hardly conceive. Of the style in which they are composed, it is far from too much to say, that all the vices which characterise the style of rude nations, and particularly those of Asia, they exhibit in perfection. Inflation, metaphors perpetual, and those the most violent and strained, often the most unnatural and ridiculous, obscurity, tautology, repetition, verbosity, confusion, incoherence, distinguish the Mahabharat and Ramayan.' (History of British India, vol. ii. p. 46.) The following passage, extracted from a most masterly article which appeared in the Edinburgh Review (vol. xv. p. 175), is, if possible, still more to our present purpose. "It may be said," the Reviewer observes, "that in a country of which the actual condition is so imperfectly known, investigation should first be directed to the existing state of society, which admits of being accurately ascertained, and may lead to practical conclusions highly beneficial to the community, before we attempt to explore the obscure paths of remote antiquity, by the feeble lights afforded by a few mutilated or suspicious documents. The Indian nations, it may be contended, have no claim to any extraordinary attention, either from the philosopher or the historian: their boasted civilization has rather been asserted than proved; neither their literature nor their arts indicate any considerable progress in the pursuits which refine and adorn mankind; and some of their customs betray a ferocity scarcely to be found amongst the most savage nations. But, even admitting that it would be desirable to trace the remote revolutions which this people have undergone, the little probability of attaining any deductions which may be relied on with confidence ought to induce us to relinquish so hopeless a task. The Puranas appear to be extravagant romances, which, however amusing as poetical compositions, can furnish no additions to authentic history, whatever portion of it they may be supposed incidentally to contain. When we find gods and heroes mingling in doubtful fight; events natural and supernatural succeeding each other indifferently; a fact probably historical, followed by another evidently allegorical; the only rational conclusion is to consider the whole of these poems

Brahmins as works of imagination, and to appreciate their merits by the rules applicable to similar compositions amongst other nations. But if such be the judgment we must pass on the Puranas, the Hindu compositions of a later date are not better entitled to attention, unless with respect to poetical excellence: and it probably may be affirmed that the Hindus cannot produce a single historical composition; whilst the Mahommedans of the same country have amply, and even ably, illustrated all the events subsequent to their entrance into Hindustan."

Such are the judgments which have been pronounced by some of the ablest writers of our time, respecting the sacred writings of the Brahmins, and the impossibility of deducing any sound or rational conclusions from these fanciful and extravagant compositions. But, on the other hand, it has been contended, with much plausibility and some degree of justice, that an indiscriminate accumulation of facts is no object with the philosopher, and only a subordinate one with the historian; that in proportion to the peculiarity and reputed antiquity of the religious and civil institutions subsisting amongst any people, it is natural to feel curiosity as to their origin; that the minute peculiarities which discriminate the nations of Europe scarcely produce any sensible modification of character, or exhibit to our observation any beings whose manner of thinking and acting is materially different from our own: that, in order accurately to appreciate the efficacy of religious dogmas and civil institutions in modifying the character of a people, our observation should be particularly directed to those nations which, in these respects, differ most widely from ourselves; that to this source may be traced much of the instruction as well as amusement derived from a perusal of the classic compositions of antiquity; that, from the same cause, the manners of savage tribes have attracted and deserved the attention of the philosopher, although these are in general extremely uniform, and little modified by any other circumstance than the greater or less facility of obtaining food; that, nevertheless, it is not amidst a people in such a stage of society that the influence of moral impressions can be accurately ascertained; that a nation must have advanced some steps in civilization, must have cultivated the arts, and been if, upon these grounds, the peculiarities of the Hindu institutions, opinions, and manners, deservedly render them the object of philosophic research, the gradations by which such a state of society was attained must be highly intesuch literary monuments as are still extant among them. Their sacred books, therefore, must ever possess a value, independent of all that may be said of their contents, or objected to the antiquity claimed for them. They embody evidence of the existence of peculiar modes of thinking, and forms of belief, as well as of the effects produced by peculiar institutions, civil and religious; and, as such, they can never cease to be regarded with interest, both by the philosopher and the historian.

Of ancient Brahminical science the principal remains are their astronomical tables and trigonometrical methods, both of which have given occasion to frequent and learned discussion in this and other countries of Europe. At present, however, we can only refer the reader to the works of Bailly, Playfair, and Delambre, in which he will find the subject treated with equal learning, ingenuity, and scientific precision, though in opposite views, and with confined to the construction and explanation of the almanack; and even this scanty amount of knowledge is the festivals the Brahmins exhibit the same species of idolatry,

portion of but few of their number. They have indeed fal- Brahmins. len from the proud eminence which was occupied by their order when the sages of Greece travelled into India to learn wisdom in that great storehouse of knowledge, and afterwards to carry it back to their own country, in order to plant there the first seeds of civilization. But there is one species of learning for which they have always evinced a singular aptitude and inclination; we mean metaphysical speculation, which possesses many attractions to men remarkable alike for the indolence of their habits and the extreme subtilty of their genius. In this department of research they had accordingly explored the whole cycle of systems, distinctions, classifications, refinements, and doubts, long before the western world had emerged from primeval barbarism; and in India the human mind had exhausted itself in endeavouring to detect the laws which regulate its own operations, when the philosophers of Greece were only beginning to enter within the precincts of metaphysical inquiry. Nor is it by any means certain that the latter are entitled to the credit they have received on the score of originality; that they did not borrow rather then invent; and that to the Gymnosophists of India belongs the honour of framing those systems which have been, perhaps too hastily, attributed to their disciples. It is even doubtful whether Aristotle himself did not derive both the materials and the arrangement of his system of logic from the same source. In a Mahommedan history, quoted by Sir William Jones, it is expressly mentioned that Callisthenes, having procured a regular treatise on logic, somewhere in the Punjab, transmitted it to Aristotle; and although this does not certainly prove that the Greek philosopher adopted as his own the system which had been sent him by his pupil, it at least warrants a conjecture that he might have done so; more especially as the syllogistic method was undoubtedly known in India long before his time, and as the fact must have been discovered by the numerous learned and accomplished men who accompanied Alexander's expedition. But be this as it may, one thing is pretty certain, that there is scarcely a hypothesis advanced by metaphysicians in ancient or modern times, which may not be found in some of the Brahminical writings. In these we meet with materialism, atomism, pantinged with science, before it becomes susceptible of that theism, Pyrrhonism, idealism, and every other fanciful vaindelible stamp which defies the efforts of time; and that riety of opinion which has yet been imagined or promulgated respecting God, the world, and the human soul. The Brahmins could boast of their Spinozas, their Berkeleys, and their Humes, long before Alexander dreamt of passing the Indus, and erecting a throne on the banks of the sacred resting, and can only be discovered through the medium of stream. That Pythagoras borrowed from them the greater part of his mystical philosophy, his notions respecting the properties of numbers as expressive of physical laws, his doctrine of the transmigration of souls, and the arguments by which he inculcated the unlawfulness of eating animal food, seems to admit of no doubt whatever; for all these things are of the very essence of Brahminism, and are to this hour taught and enforced by the sacred order in India.

Egypt and India, as we have already observed, are the only two countries in which the institution of castes has obtained in its most rigid form. This identity is of itself sufficiently remarkable; but there are other points of resemblance which we think even more striking. In ancient Egypt the cow was a principal object of religious adoration, and as such accounted peculiarly sacred; and we need scarcely add that, in India, the same superstition has prevailed to an equal, if not greater extent, ever since the introduction of the Brahminical religion. The Egyptians very different aims. As to the science of the modern worshipped Apis or the sacred bull, and the figure of this Brahmins, it seems, as we have already remarked, to be animal forms part of every hieroglyphical inscription, either as a symbol or a phonetical character. In some of their

Bramah.

Brahooick with rites and observances exactly similar to those anin the same sense, may be predicated of the Hindu mysuperstitions from India, or has India borrowed its mythology from Egypt, or have both drawn from a common source? Which is the original and which the copy, or are both merely copies from an original no longer extant? These are questions to which, in the present state of our knowledge, it is difficult, if not impossible, to give a satisfactory answer; although speculation has been busy on the subject, some contending in favour of Egypt, others in favour of India, and others, again, seeking a common source in that intermediate region, which formed as it were the cradle of the human race. We have no intention whatever to enter into these disputations, or to hazard conjectures respecting a subject in regard to which no safe or certain data have as yet been obtained. We may nevertheless be permitted to observe, that the question is chiefly one of pure chronology; that on this subject much still remains to be done before we can arrive at any well-founded conclusion respecting the comparative antiquity of these ancient nations; but that, in as far as we are at present able to see our way, the balance of probability appears to incline pretty decidedly in favour of the country of the Pharaohs.

See Abbé Dubois, Description of the Character and Customs of the People of India, English translation; Malte-Brun's Universal Geography, vol. iii. English translation; Maurice's Indian Antiquities; Asiatic Researches; Colonel Kennedy's Researches into the Nature and Affinity of Ancient and Hindu Mythology; Religion of the Brahmins; Ayeen Akberry; Dow's Hindustan, preliminary dissertation; Institutes of Menu, translated by Sir William Jones; Quarterly Review, vol. i.; Edinburgh Review, vols. x. and xv.; Klaproth's Asia Polyglotta; Kennedy's Origin and Affinity of Languages.

BRĂHOOIČK Mountains. See Beloochistan.

BRAIDING-MACHINE, a piece of mechanism by which staylaces, braid, and similar articles are manufactured. BRAILS, ropes passing through pulleys to haul up the bottoms, corners, and skirts of the sails of a ship for the con-

venience of furling them. BRAIN. See Anatomy; Mental Diseases; Phreno-

LOGY; PHYSIOLOGY; and the Index.

BRAINERD, DAVID, one of the most zealous and successful of modern Christian missionaries, was born at Haddam, in the state of Connecticut in 1718, and died October 9.1747, in the house of his friend President Edwards. His heroic and self-denying labours among the American Indians, wore out in the course of a few years a naturally feeble constitution, but left behind them important fruits. The narrative of his mission is contained in his journal, published in 1746. His life, compiled chiefly from his own diary, was written by President Edwards, and has gone through many editions. Brainerd was a man of strong mental powers, extensive knowledge, and great sagacity; and as a preacher he was forcible and pathetic.

BRAINTREE, a market-town of Essex, in the hundred Braintree Mountains ciently practised in the country of the Pharaohs; and, of Hinckford, eleven miles N. by E. of Chelmsford. It is judging by the inscriptions on their monuments, this type one of the polling places for North Essex, and is the seat of of animal worship must have prevailed in India from the the Braintree Poor Law Union. Besides the parish church, earliest times. The astronomical character of the Egyp- which is a fine gothic edifice, the Independents, Baptists, tian mythology is well known to those who have studied and Quakers, have places of worship in the town. The market its details; it seems to have been merely a reflex image of is held on Wednesday, and is well supplied with cattle, poul-'Tsabaism, or the worship of the host of heaven, the form try, and corn. Two annual fairs, of three days each, are of idolatry which first obtained among "the world's gray held here, commencing May 7 and October 2. The town fathers" in the regions of the East. But the same thing, is governed by a select vestry of 24 parishioners; but the drainage and sewerage are so defective as to cause a very thology, in its purest form, before it was overlaid with high annual average of mortality. The manufactures of silk the monstrous and fantastical inventions of a juggling and crape, which employ about 1000 persons, have quite priesthood. What inference, then, ought we to deduce superseded that of woollen cloth, which was introduced by from these and numerous other facts of a similar descrip- the Flemings who fled to England to escape the persecution which might be mentioned? Did Egypt derive its tion of the Duke of Alva. Straw-plaiting has been introduced of late years. There is a free school in the town, besides several charities, distributed over fourteen different places. Pop. (1851) 2836.

BRAIT, among jewellers, denotes a rough diamond.

BRAKEL, JAN DE, a brave officer of the Dutch navy, born in 1618. He greatly distinguished himself on many occasions, but chiefly by his gallant struggle in 1672 against the combined fleets of Britain and France. He fell in an action against the French in 1690.

BRAKENBERG, REINTER, a Dutch painter, born at Haerlem in 1649, was a pupil of Mommers, and according to some accounts, of Bernard Schendel. His pictures display considerable skill and freedom in composition, but are bad in design, and often licentious in subject.

BRAMA, the Bream, a fish of the family of Squamopinnæ of the acanthopterygious order. The only known species is Ray's Bream, a native of the Mediterranean, but often caught on our coasts (Yarrell's British Fishes). See

CHITHYOLOGY, and ANGLING.

BRAMAH, Joseph, a practical engineer and machinist, was born at Stainborough, in Yorkshire, on the 13th of April 1749. His father rented a farm on the estate of Lord Strafford; and, being the eldest of five children, he was intended for the same employment. He exhibited at a very early age an unusual talent for the mechanical arts, and succeeded, when he was quite a boy, in making two violoncellos, which were found to be very tolerable instruments; as well as in cutting a single block of wood into a violin, chiefly by means of tools which were forged for him by a neighbouring smith, whom, at a subsequent period of his life, he induced to assist him in London as one of his principal workmen. Notwithstanding the ingenuity which he had thus displayed, his destination in life might have precluded its further cultivation, had he not, fortunately for himself and for the public, been incapacitated, when he was about sixteen, by an accidental lameness in his ancle, for the pursuit of agricultural labour. He was then apprenticed to a carpenter and joiner, who seems, however, to have contributed but little towards his improvement in mechanical knowledge.

When the term of his engagement had expired, he obtained employment for some time in the workshop of a cabinet-maker in London, and soon after established himself as a principal in that business. Another accidental confinement left his mind at liberty for a time to occupy itself with reflection and invention; and he employed his involuntary leisure in the improvement of some of the most humble, but not the least useful, of domestic conveniences. He obtained a patent for his inventions, and established a manufacture of these and other similar articles in Denmark Street, Soho, where he continued to simplify and improve the arrangement of the pumps and pipes subservient to his principal purpose. He procured in 1783 a patent for a water-cock, intended to allow the

Bramah. fluid a more uninterrupted passage through it than was as part of an apparatus for retaining, drawing, and clari-Bramah.

In 1784 Mr Bramah took out a patent for his improvement in locks, which certainly appear to be of very material importance. Their peculiar character depends on the arrangement of a number of levers or sliders, in such a manner as to preserve, when at rest, a uniform situation, and to be only pressed down by the key to certain unthe levers not having any stop to retain them in their required situation, except that which forms a part of the key. The construction is more particularly detailed in the specification of the patent (Repertory of Arts, vol. v. p. 217), as well as in the inventor's Dissertation on Locks, 8vo; and some additional modifications, allowing the key to be varied at pleasure, are described in a patent, dated in 1798. It is not easy to say why the application for an act of parliament to prolong the privilege proved unsuccessful, unless it was supposed that the inventor had been already sufficiently remunerated for the share of ingenuity which his contrivance exhibited; but the report, that one of these locks had been readily opened, before a committee of the House of Commons, by means of a common quill, was a gross misrepresentation of the fact; the quill having in reality been previously cut into the required shape from the true key. The experiment, in fact, only served to show the perfection of the workmanship, so little force being required to overcome the resistance when properly applied.

For different modifications of pumps and fire-engines Mr Bramah took out three successive patents, the two last being dated in 1790 and 1798. (Repertory, vols. ii. iii.) His "rotative principle" consists in making the part which acts immediately on the water in the form of a slider, sweeping round a cylindrical cavity, and kept in its place by means of an eccentric groove; a construction which was very possibly suggested by his own inventive mind, but which had been before described, in a form nearly similar, by Ramelli, Cavalleri, Amontons, Prince Rupert, and Dr Hooke. The third patent related chiefly to the attachment of a considerable reservoir of water to the fire-engine in a cylindrical form, and to the furnishing of it with wheels of its own, of a proper size and strength

to allow it to be conveniently worked.

There was somewhat more of originality in the idea of applying practically, to the purpose of a press, the well-known principle of the hydrostatic paradox, by which, as by a lever with arms capable of infinite variation, the smallest imaginable weight is made capable of holding in equilibrium a force incomparably greater. Mr Bramah's patent for the invention is dated in the year 1796 (Repertory, vol. vi. p. 289), and it has been one of the most successful of his numerous speculations. He added to it, in a subsequent patent, the contrivance of a "retainer," for keeping goods in a constant state of pressure for an unlimited time after their removal from the press. The paring the apparatus. apparatus has certainly a considerable advantage in the great steadiness with which the force can be applied, in ried into execution in a particular department, notwiththe facility with which it can be regulated, and the convenience with which it can be continued without alteration; and it has been extensively applied, both on a small and on a large scale, for copying writings, for pressing gunpowder, for proving cables and chains, for raising weights of various kinds, and for drawing piles, and pulling up trees by the roots.

A simple but a very convenient arrangement of little pumps and pipes has been very generally employed in public-houses under the name of the beer-machine: for this Mr Bramah took out a patent in 1797, describing it substitute for common printing, copperplate engraving,

practicable in the ordinary construction. He afterwards fying liquors (Repertory, vol. ix. p. 361). He prefaces removed to Piccadilly, and established the various branches his specification with some general observations on the of his manufactory in some extensive premises at Pimlico. right of an inventor to a property, both in the objects which he selects for his improvements, and in the means which he employs for the attainment of them; and demands of the public justice an ample security for both these rights, grounding this claim on his resolution to make a clear and unreserved disclosure of all his inventions. Besides the method of pumping up the liquors equal depths, which nothing but the key can ascertain; from the various casks through flexible pipes, without the necessity of entering the cellar, he describes a mode of converting every cask into a forcing pump, excluding the air, and raising the liquor to any part of the house, by a load on its head, which is to be converted into a piston. He mentions also a filtering machine, a vent peg, a method of making pipes, and a new form of stop-cocks.

In 1801 he obtained a patent for some improvements in the construction of steam-engines, particularly relating to the boilers; and in 1802, one for a very elaborate and accurate machine for producing smooth and parallel surfaces on wood and other materials. The tools of different kinds employed in this machine, such as gouges, spokeshaves, and planes, are carried with a considerable velocity by a rotatory motion, and come successively in contact with the wood, which is placed on a movable carriage gradually advancing. The centre or gudgeon of the axis or shaft, instead of a common step, is supported by a barrel of oil, to which it is fitted by a collar; and this arrangement not only diminishes the friction very considerably, but allows the height of the shaft also to be very easily and accurately regulated by means of a small forcing pump. The inventor thinks this liquid support likely to be as permanent as it is advantageous; but it may be apprehended, that the constant friction of such a collar would cause it to require frequent repairs, in order to prevent the escape of the oil so powerfully compressed. The machine has been erected on a large scale in the arsenal at Woolwich, and is employed with perfect suc-The specification includes the description of a mode of turning spherical surfaces, either convex or concave, by the simple contrivance of a tool, movable on an axis precisely perpendicular to that of the lathe; and of cutting out concentric shells, by fixing, in the same manner, a curved tool, nearly of the same form as that which is employed by the common turners for making wooden bowls.

An improvement in the processes for making paper, with the assistance of new machinery, in large sheets, was secured to the inventor by a patent in 1805 (Repertory, second series, vol. viii. p. 1). The description is accompanied by that of a mode of drying the paper on sliding frames, hung on lines like sashes, and of keeping it in a state of compression by retainers adapted to the hydrostatic press; but Mr Bramah had not leisure to introduce these arrangements into actual practice, although he had been at a considerable expense in pre-

His next invention was, however, very effectually carstanding its unpromising appearance, as generally stated in the specification of the patent, which he obtained in 1806 (Repertory, second series, vol. x. p. 329). He proposes to facilitate the process of printing by means of a roller, composed of a number of circular plates, closely fitted together, and turning on the same axis, each bearing twenty-six letters, with figures, spaces, and various marks, either engraved or projecting, and capable of being shifted at pleasure, so as to express any single line by a proper combination of the plates. This is described as a

Bramah and calico printing; and the ink is intended to be supplied by a trough fixed above, and in contact with the cylinder. Now it is obvious that such a machine would be insufferably tedious and inconvenient for every purpose of common printing, which it would be scarcely possible to perform by its means; but when we discover that the inventor had probably in view the apparatus which he constructed the next year for the Bank of England, for numbering and dating their notes, we shall be aware that the means were admirably adapted to the end; a single line only being here wanted at once, in which a single figure was to be changed at each step, and that in a regular order. In fact, during the immense temporary circulation of one and two pound notes, the Bank has been able, by this machinery, under the management of about twenty clerks, to perform the labour of 120, who were before required for the purpose.

Mr Bramah procured a patent in 1809 for a mode of making and holding pens for writing, calculated to save the substance of the quill, by cutting a number of pens out of it, instead of a single one; and those who are not in the habit of making their own pens may often find a convenience in the portable form in which this and other similar "pterophori" are arranged. In 1812 he brought forward his patent for the construction of main pipes, to be carried through the principal streets of a metropolis, of sufficient thickness to withstand a great force, to which the water within them is intended to be subjected, by proper pumps, furnished with air-vessels; so that the water may not only be ready for the immediate extinction of fires, without the necessity of bringing an engine to the spot, but may also furnish a convenient moving power for various mechanical purposes, such as raising weights, by means of tubes sliding out of each other, like those of a telescope. He observes that he has frequently had occasion to employ a hydrostatic pressure, in many of his operations, equivalent to that of a column of water 20,000 feet high, which is about four tons for every square inch. He also asserts that he can form 500 tubes, each five feet long, capable of sliding within each other, and of being extended, in a few seconds, by the pressure of air forced into them, to a length of 2500 feet; and, with a power of this kind, he seems to have imagined that he could raise wrecks, and regulate the descent of weights of various descriptions.

His improvements in wheel-carriages, for which he obtained a patent in 1814, consisted in fixing each wheel to a separate movable axis, having its bearings at two distinct points of its length, but loosely inclosed between these points in a cylinder filled with oil; and, in some cases, he proposes to fix the opposite wheels to the same axis, though with a power of turning very stiffly round it, in order to lessen the lateral motion of the shafts in very rough roads. He also suggests the use of pneumatic springs, formed by pistons, sliding in cylinders, as a substitute for common springs of metal.

The purpose of Mr Bramah's last patent was the prevention of the dry rot, by laying on the timber meant to be preserved from it, a thin coat of Parker's Roman cement, much diluted with water; but he does not appear to have pursued this experiment, having transferred his right in the invention to other hands.

In addition to the seventeen patents which have been mentioned, he took out two or three others of less importance, at different times; besides a variety of contrivances, which he did not think it necessary to appropriate to himself by a legal privilege. Mr Nicholson has mentioned a double plunger for a forcing pump, as described to him by Mr Bramah (Nich. Jour. vol. vii. p. 50), which,

paratus the effect of a much smaller. Mr Bramah had erected, in the latter years of his life, some large machines at the Thames bank for sawing stones and timber; Bramante. he had begun to devise some improvements in bridges and in locks for canals; and he had at one time been actually employed in the execution of some water-works belonging to the department of the civil engineer, which he completed with ability and with success. His great and various exertions appear in some measure to have exhausted the strength of his constitution; and his last illness was immediately occasioned by a severe cold, taken in the prosecution of his experiments on the tearing up of trees, made in Holt Forest. He died in his sixty-sixth year, on the 9th of December 1814.

Mr Bramah was a sincere believer in the doctrines of the Christian religion; and, notwithstanding his diversified avocations, he left several manuscript essays on religious subjects. In his moral character he was cheerful, benevolent, and affectionate; in his habits he was neat and methodical; and he knew well how to temper liberality with economy. He often kept his workmen employed more for their sake than his own, when the stagnation of trade deprived him of the means of disposing of the products of their labour. It is surely on the characters of such individuals that the wealth and prosperity of the British empire most essentially depend; an inventive imagination controlled by a sound judgment, an incessant activity of mind and body, a head that can direct, and a heart that can feel, are the genuine sources of that practical superiority which is well known to distinguish the productions of our national industry. (Life of Mr Bramah, by Dr Brown, in the New Monthly Magazine for April 1815.)

Bramah's Press. See Hydrodynamics.

BRAMANTE, DONATO-LAZZARI, a celebrated architect, whose family was of Castel Durante, now Urbania, in the state of Urbino, where he is generally said to have been born, though others assert that he was a native of Monte Asdrualdo, a villa four miles from Urbino. Collucce assigns 1450 as the year of his birth, but Vasari states it as 1444. Cardinal Oliviero Caraffa brought him to Rome, and introduced him to Alexander VI., for whom he designed and erected the Chancery, a somewhat heavy pile, yet grand from its spacious tiers of arched galleries around a court, sustained by granite columns. Julius II., with whom he became a favourite, first employed him to connect into one vast whole the Belvedere with the older portions of the pontifical palace, which he accomplished so as to produce an imposing mass out of very heterogeneous materials. When the imperious and impatient pontiff determined in 1513 to rebuild St Peter's, he employed Bramante on the design; and such was Bramante's zeal and industry, that not only was the design completed, but the architect had erected the four great piers and their connecting arches before his death, which took place in the following year. The designs of Bramante were lost sight of by those who succeeded him in this vast work; and notwithstanding the boldness of the majestic dome of Michael Angelo, many Italians have regretted that the designs of Bramante were departed from, more especially in the present bald and tasteless western façade, which has nothing but its magnitude to deserve commendation. One of Bramante's best designs now remaining is the fine oratory in the cloister of San Pietro Montorio, a little circular temple with a colonnade of great elegance on three circular gradini.

Bramante was not merely an architect and a painter, but also a poet, as appears from the volume of his works published at Milan in 1756. He was the uncle of Raphael, whom in the form he has delineated, is certainly possessed of he instructed in architecture, and introduced to the notice no particular advantage, producing only with a large ap- of Julius II. The painter has gratefully commemorated his

Bran.

Braman- master by placing him in his School of Athens. Bramante number of the Bulletin de la Societé Industrielle de Mul- Branchide died at Rome in 1514.

BRAMANTINO, the name of several Milanese artists, of whom Bartolomeo Bramantino, or more properly Suardi, was the most eminent. He flourished about 1450, and distinguished himself as an architect and a painter. From him Lazzari Bramante is said to have derived much instruction relative to his art. He erected many churches in the Milanese territory, among which may be mentioned that of St Satyrus. (See Lanzi.)

BRAMBANAN, a village of Java, near its eastern extremity, in the region of Mataram, eight miles from Saracarta. It is noted for the remains of Hindu images, temples, and inscriptions, which are spread over an extent of ten miles. The most remarkable of those ruins are known under the name of the Thousand Temples, which constitute a square group of buildings, each side measuring 250 paces. One large temple stood in the centre of the square, which was surrounded at equal distances by three rows of smaller ones, the rows being but a few feet distant from each other. At each of the four cardinal points, where there appear to have been gates, were two gigantic statues, each of them with a mace in its hand, and a snake twisted round its body. The inside walls of the large temple were adorned with figures of the conch shell, of water-vases, and of the sacred lotus, all denoting a Hindu origin. There is no reliable evidence to show at what period those immense buildings were constructed. A Javanese manuscript asserts that it was in the Javanese year 1188, which corresponds to the year of the Christian era 1261.

BRAMHALL, John, D.D., archbishop of Armagh, was born of an ancient family at Pontefract in Yorkshire, A.D. 1593. He was invited to Ireland by the lord deputy Wentworth, and soon afterwards obtained the archdeaconry of Meath, the best in that kingdom. In 1634 he was made bishop of Londonderry. He rendered great service to the church of Ireland by procuring the passing of several acts for abolishing fee-farms and recovering impropriations, by which, as well as by other means, he regained to the church in the space of four years about L.40,000 a-year. In the Convocation he was instrumental in persuading the church of Ireland to adopt the Thirty-nine Articles; and he exerted himself, though ineffectually, to get the English canons established in Ireland. Articles of treason were exhibited against him in the Irish parliament; and at the treaty of Uxbridge in 1644, the English parliament made it a preliminary article, that Bishop Bramhall, with Archbishop Laud, and others, should be excepted from the general pardon. Upon this he went abroad; but on the Restoration, he was appointed archbishop of Armagh, primate and metropolitan of Ireland, and was chosen speaker of the House of Lords. He died in 1663. His works were published in 1677, in folio.

BRAMPTON, a town of England, in the county of Cumberland, Eskdale ward, 10 miles N.E. of Carlisle, erroneously supposed by Camden to be the Bremetenacum of the Romans, lies in a narrow valley at the confluence of the Irthing and Gelt. The houses are for the most part old and meanly built. It contains four dissenting chapels, a town-hall, built by the Earl of Carlisle in 1817, a grammarschool, and a market-house, in which very large quantities of corn are annually sold. Gingham and check-making are the only manufactures of the town. Pop. (1851) 3074.

BRAN, the outer skins or husks of ground wheat, rye, or other farinaceous grain, separated by the boulter from the flour. Wheat bran is employed in the manufacture of starch, and by dyers in making the "sour water" used in preparing the dyes. By the process of boiling in branwater, calico-printers remove colour from those parts of maddered goods which are not mordanted. Some valuable observations on this subject will be found in the ninth

hausen. See Dyeing.

BRANCHIDÆ, the hereditary priests of the temple of Apollo, at Didyma, in Ionia. They delivered up the treasures of the temple to Darius or Xerxes; and then, fearing the vengeance of the Greeks, they fled to Bactria or Sogdiana, upon the frontiers of Persia, where they built a city called by their own name. The punishment of their crime, however, fell upon their descendants, who were massacred by the army of Alexander the Great, and their city was destroyed.

BRAND SUNDAY, Dimanche des Brandons, in French ecclesiastical writers, denotes the first Sunday in Lent, which is thus called on account of an ancient practice in the Lyonnois, where the peasants walked by night about their orchards and gardens with lighted torches or firebrands in their hands; visiting every tree, addressing each one in turn, and threatening that if it did not bear well the ensuing season it should be cut down and burnt. This custom prevailed in many places till the middle of the seventeenth century. It was evidently a relic of paganism, akin to the ancient Lupercalia, or shepherd-festival, which was celebrated on the 15th of February, Februarius, i. e. the month of purification.

BRANDENBURG, one of the larger provinces into which the kingdom of Prussia is divided, and the division from which that powerful monarchy originally sprung. See Prussia. It is situated between Lat. 57. 0. and 53. 34. N. and Long. 11. 25. and 16. 10. E., and is bounded on the north by Mecklenburg and Pomerania, east by West Prussia and Posen, south by Silesia and the kingdom of Saxony, and on the west by the province of Saxony and Hanover. It has an area of 15,538 square miles, and is divided into the two governments of Potsdam and Frankfort, having 30 circles, 138 cities, 27 market-towns, and 3073 villages. The entire province is nearly a sandy plain, but interspersed with a few fertile spots; and a considerable portion of it is covered with woods. It is generally well watered by streams, most of which empty themselves into the Elbe or the Oder. The chief agricultural product is rye, with some wheat, barley, oats, and buckwheat. Fruit of all kinds is abundant, as well as culinary vegetables; and considerable quantities of hemp, flax, and hops are raised. The climate is cold and raw in winter, and excessively hot in summer. The manufactures are chiefly confined to Berlin and the other cities; but the rural inhabitants are employed in spinning or weaving, and produce much linen cloth. In 1849 it had 2,129,022 inhabitants, of whom 1,069,043 were males, and 1,059,979 females; 968,717 lived in towns and 1,160,305 in the country; 2,076,608 Protestants, 32,514 Catholics, 19,761 Jews, 23 Mennonites, 115 belonging to the Greek church, and 1 Mohammedan. There were 2880 primary schools with 289,869 scholars, 79 middle schools for boys, with 17,465 scholars, 224 similar institutions for girls, with 20,795 scholars, 34 higher schools and gymnasia with 8924 scholars, and 4 normal schools with 276 scholars, being in all 337,329 scholars, or nearly onesixth of the entire population.

Brandenburg, a town of Prussia, capital of the circle of West Havelland, in the government of Potsdam, and province of Brandenburg. It is situated on the river Havel, and also on the Magdeburg and Berlin railway, 37 miles W.S.W. of Berlin. It was founded about the seventh century by some Slavonian tribes, who were afterwards driven out by Albert the Bear, and Brandenburg became the capital of the mark of the same name. The town is inclosed by walls, and is divided into three parts by the river, the old town on the right and the new town on the left bank, while on an island between them is the "cathedral town," also called from its position "Venice." The cathedral, an ancient structure of the fourteenth century, the old church

Brandy.

Brandeum of St Katharine, erected in 1410, and the council-house, deserve notice for their antiquity and works of art. There are also a castle, gymnasium, riding academy, public library, theatre, and several hospitals. In the market-place stands the Rolandsaule, a column 18 feet in height, hewn out of a single block of stone. The town has a very considerable trade, and manufactures of woollens, linens, liosiery, and paper, with breweries, tanneries, and boat-building. Pop. (1849) 18,309.

BRANDEUM, in ecclesiastical writers, a linen cloth or veil put over the tombs of the apostles Peter and Paul, and left there some time that it might acquire a degree of sanctity, entitling it to be worshipped as a relic; and as such it was frequently sent by the pope as a present to some prince. It was otherwise called sanctuarium, sudarium, orarium, and velum. The use of brandéa was introduced as a means of diffusing the virtues and influences of relics, their translation in early times being prohibited.

BRANDING, a punishment inflicted by impressing a mark with a hot iron on the face or the hand.

BRANDON, a town in England, in the county of Suffolk, hundred of Lackford, on the Little Ouse or Brandon river, 88 miles from London by rail. In the neighbourhood of the town are numerous flint-quarries, which during the last war supplied the army with gun-flints. Its trade in this article has been wholly destroyed since the introduction of the percussion cap. Brandon anciently gave its name to the Dukes of Suffolk, and the title of baron to the Earls of Macclesfield. It now gives his English title to the Duke of Hamilton. Pop. (1851) 2022.

BRANDRITH, an iron trevet or stand for supporting a vessel over the fire.

Brandrith, or Brandrette, among builders, denotes a fence or rail around the mouth of a well.

BRANDT, an alchemist of Hamburg, in the end of the seventeenth century, who in his researches after the "philosopher's stone" is said to have accidentally discovered phosphorus. (F. Hoefer, Hist. de la Chimie, ii. 201.) He concealed the process; but it was discovered soon after by Kunckel, and hence it has been called Kunckel's phosphorus.

Brandt, Gerard, a learned divine of the Reformed religion, was born at Amsterdam in 1626, and was successively minister in several places of the Netherlands. His works were numerous and popular, especially a History of the Reformation in the Low Countries, Amsterdam, 1671-74, in 4 vols. 4to, which was translated into English, and published at London in 1719, 8vo; The Life of Admiral de Ruyter; An Account of the Trial of Barneveld, Hoogerbeets, and Grotius, in 1618, Rotterdam 1619, 4to; and Oratio Funebris Cornelii Hooftii, Satrapæ Mudani, Amsterdam 1648; all, except the last, in the Flemish language. Brandt died at Rotterdam in 1685.

Brandt, Sebastian, a man of letters of the fifteenth century, author of a rare treatise entitled Stultifera Navis, illustrated with curious woodcuts, printed in 1490. Several authors have erroneously represented him as the artist of the engravings, but they seem to be the work of Jan Bergmann.

BRANDY, a spirituous or alcoholic liquor, extracted from wine by distillation. When pure it is perfectly colourless, but it soon acquires a yellow tinge from the cask. The deep colour of common brandy is generally given by the addition of burnt sugar, caramel. The wine-brandy of France is esteemed the best in Europe. The chief brandies for foreign trade, and those accounted best, are those of Cognac, Bordeaux, Rochelle, Charenton, the Isle of Rhé, Orléans, the county of Blasois, Poictou, Touraine, Anjou, Nantes, Burgundy, and Champagne. The best brandy is distilled from wine of any kind, but is generally made from wine that has become too acid for the market, or what is technically called pricked wine. An inferior sort is made from the husks of the pressed grapes; but this contains an acrid oil which exists in the skin of the fruit and injures its fla-

vour. (Annales de Chimie, tom. 64.) The flavour of brandy is said to be sometimes imitated by adding to grain spirit a small proportion of nitrous ether. (See DISTILLATION.)

The import of brandy to the United Kingdom in 1853 was 1,870,567 gallons. The amount of duty paid was

L.1,402,932, the rate being 15s. per gallon.

BRANK, or scolding-bridle, an instrument formerly used in Scotland, and some parts of England, for correcting scolding women. It consisted of a head piece, which opened and inclosed the head of the shrew, and was furnished with a sharp iron, which entered the mouth and restrained the tongue. Thus harnessed, the offender was led in triumph through the streets. Dr Plott, in his History of Staffordshire, has given a description and figure of this instrument.

BRANTOME, PIERRE DE BOURDEILLES, LORD ABBOT OF, a French courtier of the reign of Charles IX., and his mother Catherine de' Medici, was born about 1527, and died at his château of Richemont in 1614. He is best known by his posthumous *Mémoires*, which first appeared in 1666; but the most complete edition is that of 1740, in 15 duodecimo volumes. They contain a very lively account of the manners of that age, and an unblushing chronicle of the profligacy of the writer, and of the courts and times in which he lived.

BRASIDAS, son of Tellis, a celebrated Lacedæmonian general, in the early part of the Peloponnesian war. He defeated the Athenians by land and sea, took many places, and rendered his native country formidable to all the neighbouring states. He repulsed the Athenians in their attempted surprise of Amphipolis, but died of the wounds he received in that battle, B.C. 422. See ATTICA.

In honour of him an annual festival, called Brasideia, was celebrated at Sparta. None but natives were permitted to attend; and whoever absented himself was fined. Brasideia were also celebrated at Amphipolis.

BRASS, an alloy of copper and zinc. This name, however, has not been exclusively applied to the alloy of these metals; for the gun-metal, which has been also called brass, is an alloy of copper with tin. The same alloy, with more tin, is used in machinery, and is preferred to the alloy of

copper and zinc, on account of its greater hardness.

It appears from the analysis of the brass of the ancients Different that it was an alloy of copper and tin. A small portion of kinds. tin gives to copper great hardness, and renders it capable of bearing much greater resistance. A larger portion of tin gives increased hardness, but is less fitted to bear a straining resistance, on account of its brittleness. Its elasticity is very great, which fits it for bells. In this state it is called bell-metal; and with a still greater proportion of tin it forms an alloy employed for the mirrors of reflecting telescopes. The alloy of copper with tin is easily distinguished from that with zinc, from the agreeable colour of the latter, which varies with the proportions of the metals. Pinchbeck has the least proportion of zinc. Common brass has more zinc, and the gold-coloured alloy called prince's metal contains a still greater proportion of zinc. An alloy of copper with a very large proportion of zinc is used for the common white metal buttons.

The various alloys of copper with tin and zinc forming Proportion the different kinds of brass, are to be considered as chemical of alloys. compounds, and, of course, governed by the same laws of definite proportions which obtain in the more conspicuous compounds. On these principles, which cannot be doubted, we have an unerring rule for uniting these and other metals in the best proportions, the weights of their atoms being previously known.

The weight of the atom of copper being 8, tin 7.35, and zinc 4, the following tables exhibit the proportions of the various alloys, expressed in atoms, and their proportions by weight, the third column pointing out the colour and character of the resulting compound. C, Z, and T are to represent the atoms of the metals respectively.

Brass.

Brank

Brass.

Atoms.	Proportions by Weight.	Character and Colour of the Compounds.
C+Z	2 to 1	The best proportions for common brass.
C+2Z	1 to 1	The alloy called prince's metal, of a beautiful gold colour.
C+3Z	2 to 3	Of a paler yellow, very little malle-
C+4Z	1 to 2	Still lighter in colour, and not mal- leable.
C+5Z	2 to 5	Yellowish-white, and brittle.
0+6 Z	1 to 3	Very brittle, nearly white.
2 C+Z	4 to 1	A very malleable brass, used in watch- work.
3 C + Z	6 to 1	An alloy much harder than copper, and inclining to its colour.

COMPOUNDS OF TIN WITH COPPER.

Atoms.	Proportions by Weight.	Character and Colour of the Compounds.
T+C	11 to 12	A very brittle and rather white alloy.
2T+C	11 to 6	Still more brittle and more white.
3T+C	11 to 4	Very white, used for speculums.
4 T + C	11 to 3	Coarse-grained, and too brittle for any purpose.
T+2C	11 to 24	A yellowish alloy, very hard and so- norous.
T+3C	11 to 36	Bell-metal.
T+40	11 to 48	A very hard alloy, used for some culi- nary vessels.
T+5C	11 to 60	Softer, but not malleable.
T+6C	11 to 72	Still increased in softness, and of a yellower colour.
T+70	11 to 84	Used for some purposes in machinery.
T+8C	11 to 96	An alloy used for cannon.
T+9C	11 to 108	More common for cannon and ma- chinery, and used for bronze sta- tues.

Hitherto the proportions of these alloys have depended upon the practice of workmen, guided by numerous trials; but what confirms the law of definite proportions, is the necessity of adhering to fixed proportions, ascertained by trial. By attending to the proportions pointed out above, the most striking and proper compounds will be produced, without the trouble of trial. Any intermediate proportions will, doubtless, be marked by defective colour, irregular crystallization, or imperfect malleability.

Although the most direct way of forming these different kinds of brass is by immediately combining the metals together, one of them, which is most properly called brass, was manufactured long before zinc, one of its component parts, was known in its metallic form. The ore of the latter metal was cemented with sheets of copper, charcoal being present; and the zinc was united with the copper, without becoming visible in a distinct form. The same method is still practised for making brass.

The materials used in making brass are copper in small round masses, produced by passing the melted metal through an appropriate vessel into water, in which state it is called shot copper; and calamine, an ore of zinc. This latter substance is a carbonate of zinc, often containing some oxide of iron, which gives it a reddish appearance. As it is chiefly found in combination with lead, the lumps frequently contain more or less galena, which requires to be separated by the same means as those employed for purifying lead ore. The calamine is first reduced to powder, and the lead is then separated by washing. When the calamine is separated, reduced to powder, and sifted, it is heated upon the hearth of a reverberatory furnace. This expels the volatile matter, which is principally water and carbonic acid. What remains is principally oxide of zinc, abounding with some earthy matter, and probably much car-bonic acid, which is not all expelled by the heat. The calamine thus prepared, charcoal powder and copper are the materials to be operated upon. The proportions in which they are mixed together are equal weights of copper and prepared calamine, and 16th their weight of powdered charcoal.

This mixture, intimately blended, is compressed into a crucible of the form of fig. 3, Plate CXXXVIII. One of these crucibles holds about 100 lb. of brass when the process is finished; but as this consists of the pure copper and zinc, the pot, when charged, will contain of copper 66.3 lb., of calamine 63 lb., and of charcoal powder 13 lb. When the crucible is filled, the contents should be covered with a mixture of clay, sand, and horse-dung, in order to defend the metals and charcoal from the action of the air. When this covering is strictly attended to, less charcoal powder may be employed, and a larger dose of the other ingredients may be put in

its place; but it is generally the most defective part of the process. Fig. 1, Plate CXXXVIII., is a plan of the furnace. The part AB is taken at the level EF, showing the opening into the furnace on the ground floor at a and b; while c and d are horizontal flues leading to the chimney f, which may be cut off from the same by the dampers seen in the dark part of the flue. CD, in the same figure, is a plan on the level GH, where the pots rest upon the cast-

iron plate on the bottom x, y.

Fig. 2 is an elevation and section of the same furnace. AB shows a front view of the pyramidal chimney, and the archway opening into it. CD is a section of the same, through the middle of the fire-place II. R,P,Q, is a vaulted passage going across the building, and open at both ends for the admission of air, which passes through the openings in the arch into the fires. The bottom of the furnace is not a common grate, but a thick plate of cast-metal, perforated with holes for the air to pass through; one hole being between each pot, as they are seen arranged in fig. 1, at I, I, and also in the section at x, y. When the pots are put upon the plate, the fire is not placed immediately upon them, as it would not only injure them, but displace the covering. To prevent this, the pots are first covered by some dried heath or common brambles, which defend them for a time, when the fuel is thrown in. By the time the brambles are consumed the coal will have coked upon the pots, and thus act as a defence for the rest of the process. The fire is kept up from twelve to twenty hours at the Cheudle brass-works in Staffordshire, from which these drawings were taken. They cast twice in the twenty-four hours.

After the refuse is skimmed off, the melted brass is cast into ingots if sold for melting over again, and into plates if intended to be rolled into sheets or made into wire. The plates are cast be-tween large blocks of Cornwall stone. The lower stone is fixed, and the face made even and smooth, by filling up the recesses of the rough stone with fine sand. The upper stone is similarly prepared, and is suspended over the fixed one. The height and breadth of the place to receive the metal is limited by iron bars laid on the lower stone. The upper stone is then let down upon the bars. The lower stone is a little longer than the upper one, and projects to the front. Being a little higher in that part, it forms a lip or mouthpiece for receiving the metal. The flat sides of the cast plate are therefore bounded by the surface of the stones, and the edges of these by the bars above mentioned. The ingot moulds are recesses in blocks of cast iron, open on one side.

The most certain and correct method of forming brass and the other compounds expressed in the table above given, is by immediately uniting the metals in given weights. It should, however, be observed, that it will be found difficult to introduce zinc into melted copper. The best way of uniting it with copper, in the first instance, is to introduce the copper in thin slips into the melted zinc, till the alloy requires a considerable heat to fuse it, and then to unite this alloy with the melted copper.

Thrice-calcined brass is a preparation employed by glassmen to Brass in give many very beautiful colours to their work. The manner of the glass preparing it is this: Having placed thin plates of brass on tiles on trade, the leet of the furnace, near the occhis, let it stand to be calcined there for four days, and it will become a black powder sticking together in lumps. Pulverize this, sift it fine, and recalcine it during four or five days more; at the end of which time it will not stick together, but remain a loose powder of a russet colour. This is to be calcined a third time in the same manner; but great care must be taken in the third calcination that it be neither overdone nor underdone. The way to be certain when it is right, is to try it several times in glass while melting. If it causes the glass, when well purified, to swell, boil, and rise, it is properly calcined; if not, it requires longer time. This, according to the different proportions in which it is used, produces a sea-green, an emerald-green, or a turquoise colour.

Brass, by long calcination alone, and without any mixture, affords a fine blue or green colour for glass; but there is a method of calcining it also with powdered brimstone, so as to make itafford a red, a yellow, or a chalcedony colour, according to the quantity and other variations in the use of it. This method of calcination is the following: Cut thin plates of brass into small pieces with shears, and lay them stratum upon stratum, with alternate beds of powdered sulphur, in a crucible; calcine this for twenty-four hours

Brass making.

Brass Braunsin a strong fire, then powder and sift the whole, and finally expose the powder upon tiles for twelve days to a reverberating furnace, at the end of which time powder it fine and keep it for use. The glass-makers have also a method of procuring a red powder from brass by a more simple calcination, which serves for many colours. The method of preparing it is this: They put small and thin plates of brass into the arches of the glass furnaces, and leave them there till they are sufficiently calcined, which the heat in that place, not being sufficient to melt them, does in great perfection. The calcined matter, powdered, is of a dusky red, and requires no further preparation.

Corinthian Brass, famous in antiquity, was a mixture of gold, silver, and copper. It is said that when Lucius Mummius sacked and burnt the city of Corinth, B.C. 146, this metal was formed from the immense quantities of gold, silver, and copper, which were melted and run together by the violence of the conflagration. But this is a fable. It was an artificial alloy long before known in Corinth.

BRASS-Colour is prepared by braziers and colourmen to imitate brass. There are two kinds, the red brass or bronze, and the yellow or gilt brass. The latter is made only of copper-filings, the smallest and brightest that can be found; with the former it is usual to mix some red ochre, finely pulverized; and both are used with varnish. In order to make a fine brass that will not take any rust or verdigris, it must be dried with a chafing-dish of coals as soon as it is applied. The finest brass-colour is made of powdered brass imported from Germany, diluted into a varnish, which is prepared and used thus:—The varnish is composed of one pound four ounces of spirits of wine, two ounces of gum-lac, and two ounces of sandarac; these two last drugs being pulverized separately, and afterwards put to dissolve in spirit of wine, and care being taken to fill the bottle but half full. The varnish being made, mix a quantity of it with the pulverized brass, and lay it on with a small brush. Too much must not be mixed at once, as the varnish dries very quickly. In this manner are brassed over figures of plaster, which look almost as well as if they were of cast brass.

Brass Leaf is made of copper, beaten into very thin plates, and afterwards rendered yellow. The German artists, particularly those of Nuremberg and Augsburg, are said to possess the best method of giving to these thin plates of copper a fine yellow colour like gold, by simply exposing them to the fumes of zinc, without any real mixture of it with the metal. These plates are cut into little pieces, and then beaten out fine like leaves of gold; after which they are put into books of coarse paper and sold at a low price for the inferior kinds of gilding. The parings or shreds of these leaves, being well ground on a marble plate, are reduced to a powder similar to gold, which serves to cover, by means of gum-water or some other glutinous fluid, the surface of various mouldings or pieces of curious workmanship, giving them the appearance of real bronze, and even of fine gold, at a very trifling expense, as the colour of the powder may be easily heightened by stirring it in a wide earthen basin over a slow fire.

BRAUER, Adrian, a Dutch painter, was born at Haarlem in 1608, of very humble parents, who bound him apprentice to the painter F. Hals. Brauer had an admirable eye for colour, and much spirit in design; which his master appears to have turned to his own profit, while his pupil was half starved. This ungenerous treatment led Brauer into low company and dissipated scenes, which he delineated with great spirit and vivid colouring in his pictures. Though his pictures now bring high prices, the unfortunate artist died in an hospital, at the early age of 32.

BRAULS, Indian cloths with blue and white stripes; otherwise called turbans, because they are applied to that use.

BRAUNSBERG, the capital of a circle of the same name in the government of Königsberg, on the Passarge, about three miles from its mouth in the Frische Haff. It

is the seat of the bishop of Ermeland, and has a seminary Brauronia for the education of Catholic clergymen, manufactures of leather and cloth, and some trade in corn and timber. Brazen Sea, Small vessels can come up to the town. Pop. (1849)

BRAURONIA, in Grecian Antiquity, a festival celebrated every fifth year at the Attic town of Brauron, in honour of Artemis Brauronia (Diana). The ceremonies were conducted by ten superintendents called ispomowi. The chief solemnity was a procession of girls between five and ten years of age, who went in crocus-coloured garments to the temple, where they were consecrated to the goddess. During this ceremony the *hieropoioi* sacrificed a goat, and the girls imitated bears. The origin of this custom is given by Suidas. There was another quinquennial festival of this name held at Brauron in honour of Dionysus (Bacchus).

BRAWN, the flesh of a boar soused or pickled.

BRAY, SIR REGINALD, was the second son of Sir Richard Bray, one of the privy council of Henry VI. Sir Reginald was instrumental in the advancement of Henry VII. to the throne of England, and was greatly in favour with that prince, who bestowed upon him honours and wealth. His taste and skill in architecture are attested by those two exquisite structures, Henry VII.'s chapel at Westminster, and the chapel of St George at Windsor. He principally directed the building of the former, and the finishing and decoration of the latter, to which, moreover, he was a liberal contributor. He died in 1503, and was interred in St George's chapel. On opening a vault there in 1740, to admit the body of Dr Waterland, a leaden coffin of ancient form was found, which, by other appearances, was judged to be that of Sir Reginald. By order of the dean it was immediately arched over.

Bray, Dr Thomas, a learned and pious divine, was born at Marton, in Shropshire, in 1656, and educated at Oxford. He at length obtained the vicarage of Over-Whitacre, and the rectory of Sheldon. Here he composed his Catechetical Lectures, which procured him such reputation, that Dr Compton, bishop of London, was induced to select him as his commissary to settle the affairs of the infant church of Maryland. He now engaged in several important undertakings. He caused sums to be raised for purchasing small libraries for the use of missionaries in the colonies; and to promote this design, he published his Bibliotheca Parochialis, and a discourse on Apostolical Charity. Dr Bray was anxious to get a fund established for the propagation of the gospel, especially among the Indians; and to his exertions The Society for the Propagation of the Gospel owes its existence. By his industry he also procured relief for prisoners, and formed the plan of the society for the reformation of manners, and some other charitable institutions. He was the author of Martyrology, or Papal Usurpation, folio; Directorium Missionarium; and other works. This excellent man died in 1730, aged seventy-three.

Bray, a parish of Berkshire, on the Thames, 23 miles from London. It obtains its chief notoriety from its vicar in the reigns of Henry VIII., Edward VI., Mary, and Elizabeth, whose accommodating conscience suited itself to every change of circumstances. He became twice Papist and twice Protestant, in order that he might adhere to "his one principle," which was "to live and die Vicar of Bray.

BRAY, a small seaport town, and a fashionable watering place of Ireland, in the counties of Wicklow and Dublin, at the mouth of the Bray, 12 miles S.S.E. of Dublin. The town is situated on both sides of the river which separates the two counties, is neatly built, and has a parish church, an elegant Roman Catholic chapel, and several other places of worship, an old castle now used as a barrack, two schools, an hospital, dispensary, and savings-bank. The harbour is accessible only to small vessels. Pop. (1851) 3156.

BRAZEN SEA, or MOLTEN SEA, in Jewish Antiquity,

History.

Brazil. one of the sacred utensils in the temple of Solomon. This immense reservoir stood in the inner court of the temple, and rested or appeared to rest on the backs of twelve oxen, three of which looked towards each quarter of the world. It was ten cubits in width, five in depth, thirty in circumference, and had a capacity of 3000 baths. The brim of it was perfectly round, and so it continued in the two upper cubits; but in the three lower cubits it was square. It was a handbreadth in thickness, and the brim was wrought like the brim of a cup, with figures of lilies in bloom. About the body of this huge vessel were two bor-

ders of engravings, representing the heads of oxen in demirelief; and out of these some suppose the water to have issued. This brazen or molten sea was designed for the priests to wash themselves in before they performed the service of the temple. Water was supplied by a pipe out of the well Etam. The description of this great work gives a very favourable idea of the state of metallurgic art in the time of Solomon.

BRAZIER, an artificer who works in brass. It also denotes a chaffing-dish or pan for holding live coals; some-

times spelt brasier.

BRAZIL.

In presenting an account of this extensive and important country, the only American monarchy, we shall, first, give a brief historical sketch of the progressive discovery of its coasts and interior, of its gradual settlement, and of the auspices under which its social institutions have developed themselves; secondly, a condensed view of its physical geography, meteorology, and natural products; and, thirdly, a similar view of its inhabitants, their form of government, moral and intellectual culture, and agricultural, manufac-

turing, and commercial industry.

I. History.—Brazil was discovered in 1499, by Vincent Yañez Pincon, a companion of Columbus. He descried the land near Cape St Augustine, and sailed along the coast as far as the river Amazon, whence he proceeded to the mouth of the Orinoco. He made no settlement, but took possession of the country in the name of the Spanish government, and carried home, as specimens of its natural productions, some drugs, gems, and Brazil wood. Next year the Portuguese commander Pedro Alvarez Cabral, appointed by his monarch to follow the course of Vasco de Gama in the east, was driven, by adverse winds, so far from his track, that he reached the Brazilian coast, April 24. and anchored in Porto Seguro (Lat. 16° S.) on Good Friday. On Easterday an altar was erected, mass celebrated in presence of the natives, the country declared an appanage of Portugal, and a stone cross erected in commemoration of the event. Cabral despatched a small vessel to Lisbon, to announce his discovery, and, without forming any settlement, proceeded to India on the 3d of May.

On the arrival of the news in Portugal, Emanuel invited Amerigo Vespucci to enter his service, and despatched him with three vessels to explore the country. This navigator's first voyage was unsuccessful; but in a second he discovered a safe port, the site of which is not accurately known, to which he gave the name of All-Saints. He remained there five months, and maintained a friendly intercourse with the natives. Some of the party travelled forty leagues into the Vespucci erected a small fort, and leaving twelve men, with guns and provisions, to garrison it, embarked for Portugal; having loaded his two ships with Brazil wood,

monkeys, and parrots.

The poor and barbarous tribes of Brazil, and their country, the mineral riches of which were not immediately discovered, offered but few attractions to a government into the coffers of which the wealth of India and Africa was flowing. Vespucci's settlement was neglected. For nearly thirty years the kings of Portugal paid no further attention to their newly-acquired territory, than what consisted in combating the attempts of the Spaniards to occupy it, and dispersing the private adventurers from France, who sought its shores for the purposes of commerce. The colonization of Brazil was prosecuted, however, by subjects of the Portuguese monarchy, who traded thither chiefly for Brazil wood. It was convenient for these traders to have agents living among the natives; and adventurers were found who were willing

to take up their abode with them. The government also sought to make criminals of some use to the state, by placing them in a situation where they could do little harm to society, and might help to uphold the dominion of their nation. The utter want of any legal check upon these earliest European settlers, combined with the ferocious characters of many of them, and the hardening influence of their feuds with the native cannibals, were anything but favourable to the morals of the infant empire.

The first attempt on the part of a Portuguese monarch to introduce an organized government into his dominions, was made by João III. He adopted a plan which had been found to succeed well in Madeira and the Azores; dividing the country into hereditary captaincies, and granting them to such persons as were willing to undertake their settlement, with unlimited powers of jurisdiction, both civil and criminal. Each captaincy extended along fifty leagues of The boundaries in the interior were undefined.

The first settlement made under this new system was that of S. Vincente. Martim Affonso de Sousa, having obtained a grant, fitted out a considerable armament, and proceeded to explore the country in person. He began to survey the coast about Rio Janeiro, to which he gave that name because he discovered it on the first of January 1531. He proceeded south as far as La Plata, naming the places he surveyed on the way from the days on which the respective discoveries were made. He fixed upon an island, in latitude $24\frac{1}{2}^{\circ}$ south, called by the natives Guaibe, for his settlement. The Goagnazes, or prevailing tribe of Indians in that neighbourhood, as soon as they discovered the intentions of the new comers to fix themselves permanently there, collected for the purpose of expelling them. Fortunately, however, a shipwrecked Portuguese, who had lived many years under the protection of the principal chief, was successful in concluding a treaty of perpetual alliance between his countrymen and the natives. The good understanding thus happily established was long preserved. Finding the spot chosen for the new town inconvenient, the colonists removed to the adjoining island of S. Vincente, from which the captaincy derived its name. An unsuccessful expedition was made into the interior in search of mines. Nevertheless the colony prospered. Cattle and the sugarcane were at an early period introduced from Madeira, and here the other captaincies supplied themselves with both. The founder of the colony was soon removed from the active superintendence of its progress, by being appointed governor-general of India; but on his return to Portugal he watched over its welfare, sending out supplies and settlers, and leaving it at his death in a flourishing condition to his son.

Pero Lopes de Sousa received the grant of a captaincy, and set sail from Portugal at the same time as his brother, the founder of S. Vincente. He chose to have his fifty leagues in two allotments. That to which he gave the name of S. Amaro adjoined S. Vincente, the two towns

Brazier

History. being only three leagues asunder. The other division lay much nearer to the line between Paraiba and Pernambuco. He experienced considerable difficulty in founding this second colony, from the strenuous opposition of a neighbouring tribe, the Petiguares; but at length he succeeded in clearing his lands of them; and not long afterwards he perished by shipwreck. The extreme proximity of his first settlement at S. Amaro to his brother's at S. Vincente was at first advantageous to both; but the former coming after his death into the hands of strangers, their interfering and contested boundaries gave rise to much trouble and litigation.

Rio Janeiro was not settled till a later period; and for a considerable time the nearest captaincy to S. Amaro, sailing along the coast northwards, was that of Espirito Santo. It was founded by Vasco Fernandes Coutinho, who having acquired a large fortune in India, sunk it in this scheme of colonization. He carried with him no less than sixty fidalgos. They named their town by anticipation, Our Lady of the Victory; but it cost them some hard fighting with the Goagnazes to justify the title. Having defeated these savages, the colonists carried on the building with spirit, planted canes, and established four sugar-works; and Coutinho seeing everything prosperous, returned to Lisbon to enlist more colonists, and to make preparations for an expedition into the interior in search of mines.

Pedro de Campo Tourinho, a nobleman and excellent navigator, received a grant of the adjoining captaincy of Porto Seguro. This, it will be remembered, is the spot where Cabral first took possession of Brazil. Tourinho and his associates fortified themselves on the place where the capital of the presidency still stands. The Tupinoquins at first offered some opposition; but having made peace, they observed it faithfully, notwithstanding that the oppression of the Portuguese obliged them to forsake the country. In this guilt Tourinho is not implicated. That he had influence enough with the natives to induce many of them to collect and settle in villages, is a proof that he dealt justly by them. Sugar-works were established, and considerable quantities of the produce exported to the mother country. It was found impossible, by reason of an endemic disorder, to rear kine in the province; but horses, asses, and goats, succeeded.

Jorge de Figueiredo, Escrivam da Fazenda, was the first donatory of the captaincy of Ilhéos. His office preventing him from taking possession in person, he deputed the task to Francisco Romeiro, a Castilian. The Tupinoquins, the most tractable of the Brazilian tribes, made peace with the settlers, and the colony was founded without a The son of the original proprietor sold the captaincy to Lucas Geraldes, who expended considerable wealth in improving it; and, in a short time, eight or nine sugar-works were established.

The coast from the Rio S. Francisco to Bahia was granted to Francisco Pereira Coutinho: the bay itself, with all its creeks, was afterwards added to the grant. When Coutinho formed his establishment, where Villa Velha now stands, he found a noble Portuguese living in the neighbourhood, who, having been shipwrecked, had, by means of his fire-arms, raised himself to the rank of chief among the natives. He was surrounded by a patriarchal establishment of wives and children; and to him most of the distinguished families of Bahia still trace their lineage. The regard entertained by the natives for Caramaru (signifying man of fire) induced them to extend a hospitable welcome to his countrymen; and for a time every thing went on well. Coutinho had, however, learned in India to be an oppressor, and the Tupinambas were the fiercest and most powerful of the native tribes. The Portuguese were obliged to abandon their settlement; but several of them returned at a later period, along with Caramaru, and thus a European community was established in the district.

A factory had, some time before the period at which these History. captaincies were established, been planted at Pernambuco. A ship from Marseilles took it, and left seventy men in it as a garrison; but being captured on her return, and carried into Lisbon, immediate measures were taken for reoccupying the place. The captaincy of Pernambuco was granted to Don Duarte Coelho Pereira as the reward of his services in India. It extended along the coast from the Rio S. Francisco, northward to the Rio de Juraza. Duarte sailed with his wife and children, and many of his kinsmen, to take possession of his new colony, and landed in the port of Pernambuco. To the town which was there founded he gave the name of Olinda. The Cabetes, who possessed the soil, were fierce and pertinacious; and, assisted by the French, who traded to that coast, Coelho had to gain by inches what was granted him by leagues. The Portuguese managed, however, to beat off their enemies; and, having entered into an alliance with the Tobayanes, followed up their success. After this triumph the colony continued, with the exception of a brief interval, to enjoy peace, and to prosper during the life of its founder. Attempts were made about this time to establish two

other captaincies, but without success. Pedro de Goes obtained a grant of the captaincy of Paraiba between those of S. Vincente and Espirito Santo; but his means were too feeble to enable him to make head against the aborigines, and the colony was broken up after a painful struggle of seven years. João de Barros, the historian, obtained the

captaincy of Maranhão. For the sake of increasing his capital, he divided his grant with Fernan Alvares de Andrada and Aires da Cunha. They projected a scheme of conquest and colonization upon a large scale. Nine hun-

dred men, of whom one hundred and thirteen were horsemen, embarked in ten ships under the command of Aires da Cunha. But the vessels were wrecked upon some shoals

about one hundred leagues to the south of Maranhao; and the few survivors, after suffering immense hardships, escaped to the nearest settlements, and the undertaking was

abandoned.

By these adventurers, the whole line of Brazilian coast, from the mouth of La Plata to the mouth of the Amazons, had become studded at intervals with Portuguese settlements, in all of which law and justice were administered, however inadequately. It is worthy of observation, that Brazil was the first colony founded in America upon an agricultural principle, for until then the precious metals were the exclusive attraction. Sufficient capital was attracted between the year 1531, in which De Sousa founded the first captaincy, and the year 1548, to render these colonies an object of importance to the mother country. Their organization, however, both in regard to their means of defence against external aggression and internal violence, was extremely defective. Portugal was distant, and the inhabited portions of each captaincy were too far asunder to be able to afford reciprocal assistance. They were surrounded by, and intermingled with, large tribes of savages. Behind them the Spaniards, who had an establishment at Assumption, had penetrated almost to the sources of the waters of Paraguay, and had succeeded in establishing a communication with Peru. Orellana, on the other hand, setting out from Peru, had crossed the mountains and sailed down the Amazons. Nor had the French abandoned their hopes of effecting an establishment on the coast. But the want of internal organization in the Portuguese settlements was even worse than the inadequacy of their defensive force. The governor of every captaincy exercised uncontrolled authority; the property, honour, and lives of the colonists, were at the mercy of these feudal chieftains; and the people groaned under many oppressions.

The obvious remedy for these evils was to concentrate the executive power, to render the petty chiefs amenable

History. to one tribunal, and to confide the management of the defensive force to one hand. In order to this the powers of the several captains were revoked, whilst their property in their grants was reserved to them. A governor-general was appointed, with full powers, civil and criminal. The judicial and financial functions in each province were vested in the Ouvidor, whose authority in the college of finance was second only to that of the governor. In levying the dues of the crown, he was assisted by the Juiz de Fora. Every colonist was enrolled either in the Milicias or Ordenanzas. The former were obliged to serve beyond the boundaries of the province, the latter only at home. The Milicias were commanded by Coroneis, the Ordenanzas by Capitaes Môres. Both were immediately under the governor. The chief cities received municipal constitutions, as in Portugal. Thome de Sousa was the first person nominated to the important post of governor-general. He was instructed to build a strong city in Bahia and to establish there the seat of his government. In pursuance of his commission, he arrived at Bahia in April 1549, with a fleet of six vessels, on board of which were three hundred and twenty persons in the king's pay, four hundred convicts, and as many free colonists as swelled the number of adventurers to one thousand. Care had been taken for the spiritual wants of the provinces, by associating six Jesuits to the expedition.

> Old Caramaru, who still survived, rendered the governor essential service, by gaining for his countrymen the good will of the natives. The new city was established where Bahia still stands. Within four months one hundred houses were built, and surrounded by a mud wall. Sugar plantations were laid out in the vicinity. During the four years of Sousa's government, there were sent out at different times supplies of all kinds; female orphans of noble families, who were given in marriage to the officers, and portioned from the royal estates; and orphan boys to be educated by the Jesuits. The capital rose rapidly in importance, and the captaincies learned to regard it as a common head and centre of wealth. The governor visited them, inspected their fortifications, and regulated the administration of justice. Meanwhile the Jesuits undertook the moral and religious culture of the natives, and of the scarcely less savage colonists. Strong opposition was at first experienced from the gross ignorance of the Indians, and the depravity of the Portuguese, fostered by the licentious encouragement of some abandoned priests who had found their way to Brazil. Over these persons the Jesuits had no authority; and it was not until the arrival of the first bishop of Brazil in 1552, that anything like an efficient check was imposed upon them. Next year Sousa was succeeded by Duarte da Costa, who brought with him a reinforcement of Jesuits, at the head of whom was Luis de Gran, appointed, with Nobrega the chief of the first mission, joint provincial of Brazil.

> Nobrega's first act was one which has exercised the most beneficial influence over the social system of Brazil, namely, the establishment of a college on the then unre-claimed plains of Piratininga. The spot selected by him for the site of this establishment is on the ridge of the Serra do Mar, ten leagues from the sea, and thirteen from S. Vincente. It was named S. Paulo, and has been at once the source whence knowledge and civilization have been diffused through Brazil, and the nucleus of a colony of its manliest and hardiest citizens, which has sent out successive swarms of hardy adventurers to people the interior. The mode of education pursued by the Jesuits at S. Paulo was the same as that observed in all their other missions. Their good intentions were in part frustrated by the opposition of Duarte the governor; and it was not until 1558, when Mem de Sa was sent out to supersede him, that their enlightened projects were allowed free scope. This great man, compre-

hending better than his predecessor the system of these History. missionaries, went hand in hand with the ecclesiastics during the whole of his government.

It has been observed above that Rio Janeiro was not colonized at the time when the rest of the coast was portioned out into captaincies. It was first occupied by French settlers. Nicholas Durand de Villegagnon, a bold and skilful seaman, having visited Brazil, saw at once the advantages which might accrue to his country from a settlement there. In order to secure the interest of Coligny, he gave out that his projected colony was intended to serve as a place of refuge for the persecuted Huguenots. Under the patronage of that admiral, he arrived at Rio Janeiro in 1558, with a train of numerous and respectable colonists. As soon, however, as he thought his power secure, he threw off the mask, and began to harass and oppress the Huguenots by every means he could devise. Many of them were forced by his tyranny to return to France; and ten thousand Protestants, ready to embark for the new colony, were deterred by their representations. Villegagnon, finding his force much diminished in consequence of his treachery, sailed for France, in quest of recruits; and during his absence the Portuguese governor, by order of his court, attacked and dispersed the settlement. For some years the French kept up a kind of bush warfare; but in 1567 the Portuguese succeeded in establishing a settlement

Mem de Sa continued to hold the reins of government in Brazil upon terms of the best understanding with the clergy, and to the great advantage of the colonies, for fourteen years. On the expiration of his power, which was nearly contemporary with that of his life, an attempt was made to divide Brazil into two governments; but, this having failed, the territory was re-united in 1578, the year in which Diego Laurenço da Veiga was appointed governor. At this time the colonies, although not yet independent of supplies from the mother country, were in a flourishing condition; but the usurpation of the crown of Portugal by Philip II. changed the aspect of affairs. Brazil, believed to be inferior to the Spanish possessions in mines, was considered of importance merely as an outpost to prevent the intrusion of foreign nations. It was consequently abandoned to comparative neglect for the period intervening between 1578 and 1640, during which it continued an appanage of Spain. The population increased; and domestic enterprise and foreign invasion called forth the energies of the people; but, as far as legislation was concerned, nothing was done.

No sooner had Brazil passed under the Spanish crown, than English adventurers directed their hostile enterprises against its shores. In 1586 Witherington plundered Bahia; in 1591 Cavendish burned S. Vincente; in 1595 Lancaster took Olinda. These exploits, however, were transient in their effects. In 1612 the French attempted to found a permanent colony in the island of Marajò, where they succeeded in maintaining themselves till 1618. This attempt led to the erection of Maranhão and Para into a separate Estado. But it was on the part of the Dutch that the most skilful and pertinacious efforts were made for securing a footing in Brazil; and they alone of all the rivals of the Portuguese have left traces of their presence in the national spirit and institutions of Brazil.

The very imperfect constitution of the United Provinces was the cause why many of the executive functions were delegated to companies of mercantile adventurers. Among the offices properly appertaining to the government, the maintenance and defence of the Spice Islands had been intrusted to the East India Company. The success of that body suggested the establishment of a West India Company. Its charter secured to it a monopoly of the trade to America and the opposite coast of Africa, between the

History. tropic of Cancer and the Cape of Good Hope. The company was taken bound to render an account of its proceed-

ings every sixth year.

This body despatched in 1624 a fleet against Bahia. The town yielded almost without a struggle. The Dutch governor fortified his new acquisition; and his proclamation offering toleration and protection to all, collected around him a multitude of Indians, Negroes, and Jews. The fleet soon after sailed; a squadron being detached against Angola, with the intention of taking possession of that colony, in order to secure a supply of slaves. The Portuguese, in the meanwhile, who had fled at first in the hope of eluding what they conceived to be merely an incursion of pirates, began to collect for the purpose of expelling the permanent intruders; and the weakening of the Dutch force by the departure of the fleet inspired them with fresh courage. The descendants of Caramaru formed a link between the aborigines and the Portuguese which existed in no other part of Brazil. The consequence was, the hearty co-operation of all the natives against the invaders. The Dutch were obliged to capitulate in May 1625. The honours bestowed upon the Indian chiefs for their assistance in this war broke down in a great measure the barrier between the two tribes; and there is at this day a greater admixture of their blood among the better classes in Bahia than is to be found elsewhere in Brazil.

For some years the Dutch confined themselves to depredations upon the marine of Spain and Portugal. In 1630 they attempted again to effect a settlement; and Olinda yielded after a feeble resistance. They were unable, however, to extend their power beyond the limits of the town, until the arrival of Count Maurice of Nassau in 1630. His first step was to introduce a regular government among his countrymen; his second, to send to the African coast one of his officers, who took possession of a Portuguese settlement, and thus secured a supply of slaves. Nassau suffered repulses in several of his expeditions, and particularly in that which he undertook against Bahia. Nevertheless, in the course of four years, the limited period of his government, he succeeded in confirming the Dutch supremacy along the coast of Brazil from the mouth of the S. Francisco to Maranhão. He expended the revenues of the country, the booty obtained from the Portuguese, and a great part of his private fortune, in fortifying the mouths of rivers, building bridges to facilitate mercantile intercourse, and beautifying and repairing towns. He strictly observed the Dutch policy of tolerating all religions. He promoted the amalgamation of the different races, and sought to conciliate the Portuguese by the confidence he reposed in them. His object was to found a great empire; but this was a project at variance with the wishes of his employers—an association of merchants, who were dissatisfied because the wealth which they expected to see flowing into their coffers was expended in promoting the permanent interests of a distant country. Count Maurice was recalled in 1644. His successors possessed neither his political nor his military talents, and had to contend with more energetic enemies.

In 1640, the revolution which placed the house of Braganza on the throne of Portugal restored Brazil to masters more inclined to promote its interests, and assert its possession, than the Spaniards. It was indeed high time that some exertion should be made. The northern provinces had fallen into the power of Holland; the southern, peopled in a great measure by the hardy descendants of the successive colonists, who had issued on all sides from the central establishment of S. Paulo, had learned, from their habits of unaided and successful enterprise, to court independence. Adventurers had penetrated into those central mountains where the diamond is found. They had ascended the waters of the Paraguay to their sources. They had extended their limits southwards till they reached the Spanish settlements

on La Plata. They had reduced to slavery numerous tribes History. of the natives. They were rich in cattle, and had commenced the discovery of the mines. While yet nominally subject to the crown of Spain, they had not scrupled on more than one occasion to wage war on their own account against the settlements of that country. When, therefore, the inhabitants of S. Paulo saw themselves about to be transferred, as a dependency of Portugal, from one master to another, they conceived the idea of erecting their country into an independent state. Their attempt, however, was frustrated by Amador Bueno, the person whom they had selected for their king. When the people shouted "Long live King Amador," he cried out "Long live Jono IV." and took refuge in a convent. The multitude, left without a leader, acquiesced, and this important province was secured

to the house of Braganza. Rio and Santos, although both evinced a desire of inde-

pendence, followed the example of the Paulistas. Bahia, as capital of the Brazilian states, felt that its ascendency depended upon the union with Portugal. The government, thus left in quiet possession of the rest of Brazil, had time to concentrate its attention upon the Dutch conquests. The crown of Portugal was, however, much too weak to adopt energetic measures. The tyranny of the successors of Nassau, by alienating the minds of the Portuguese and natives, drove them to revolt, before any steps were taken in the mother country for the re-conquest of its colonies. João Fernandes Vieyra, a native of Madeira, organized the insurrection which broke out in 1645. This insurrection gave birth to one of those wars in which a whole nation, destitute of pecuniary resources, military organization, and skilful leaders, is opposed to a handful of soldiers advantageously posted and well officered. But brute force is unable to contend with scientific valour, whilst the want of numbers prevents the intruders from reaching the enemy they always repulse. The struggle degenerates into unceasing skirmishes and massacres, conducting to no result. Vieyra, who had the sense to see this, repaired to the court of Portugal, and discovering the weakness and poverty of the executive, suggested the establishment of a company similar to that which in Holland had proved so successful. His plan, notwithstanding the opposition of the priests, was approved of, and in 1649 the Brazil Company of Portugal sent out its first fleet. The additional impetus communicated by this new engine to the exertions of the Portuguese colonists and their Indian allies, turned the scale against the Dutch. After a most sanguinary war, Vieyra was enabled in 1654 to present the keys of Olinda to the royal commander, and to restore to his monarch the undivided empire of Brazil; and in 1661, a treaty of peace was signed with them, and they renounced their pretensions to a portion of Brazil. After this, except some inroads on the frontiers, the only foreign invasion which Brazil had to suffer was from France. In 1710 a squadron commanded by Duclerc disembarked 1000 men, and attacked Rio de Janeiro. After having lost half of his men in a battle, Duclerc and all his surviving companions were made prisoners. The governor treated them cruelly. A new squadron with 6000 troops was intrusted to the famous admiral Duguay Trouin to revenge this injury. They arrived at Rio on the 12th September 1711. After four days of hard fighting, the town was taken. The governor retreated to a position out of it, and was only awaiting reinforcements from Minas to retake it; but Duguay Trouin threatening to burn it, he was obliged on the 10th October to sign a capitulation, and pay to the French admiral 610,000 crusados, 500 cases of sugar, and provisions for the return of the fleet to Europe. The same day Albuquerque, the governor of Minas, arrived with the expected reinforcement of 15,000 men. The conditions of the capitulation were, however, fulfilled. Dugusy Trouin departed to Bahia to obtain fresh spoils; but having

History. lost in a storm two of his best ships, with an important part of the money received, he renounced this plan and returned directly to France.

> After this the Portuguese governed undisturbed their colony. The approach of foreign traders was prohibited, while the regalities reserved by the crown drained the country of a great proportion of its wealth. The authority of the governors was despotic in its abuse, but limited in its corrective power; the administration of justice was slovenly in the extreme; the pay of all functionaries, civil, ecclesiastic, and military, was so parsimonious as to render peculation inevitable; and yet, in spite of all these disadvantages, the wealth and happiness of the people continued silently and steadily to increase. The reason was, that they were left in a great measure to themselves, and had an ample field within their own land for the exertion of their industry.

> We have already adverted to the important part which the inhabitants of the captaincy of S. Paulo have played in the history of Brazil. The establishment of the Jesuit college had attracted to its neighbourhood a number of settlers from S. Vincente. The Indians of the district were of mild dispositions, and frequent intermarriages took place between them and the Europeans. A race of men sprung from this mixture, native to the soil, hardy and enterprising, wearing but lightly the bonds which attached them to the mother country. The first object of inquiry with the colonists was, whether the land of which they had taken possession were rich in metals. Gold was found, but not in sufficient quantities to reward the labour bestowed in search of it. The Portuguese next devoted their energies to excursions against the more remote Indian tribes, with a view to obtaining slaves. Traces of gold having been observed in the mountain ranges north of S. Paulo, successive bands of adventurers attempted to penetrate the wilderness. The spirit of enterprise was thus nourished and confirmed. From the year 1629 the Paulistas repeatedly attacked the settlements of the Jesuits in Paraguay, although both provinces were nominally subject to the crown of Spain, and carried away numbers of the natives into captivity. Other bands penetrated into Minas, and, still farther northward and westward, into Goyaz and Cuiaba, in search of gold.

> At first the gold-searchers, like the slave-hunters, undertook temporary expeditions, with the view, doubtless, of returning laden with booty, and settling in their native homes. By degrees, however, as the distance of the newly-discovered mines increased, and establishments for working them became necessary, new colonies were founded. Different associations of adventurers penetrated, in the years 1693, 1694, and 1695, into the district of Minas Geraes, which had been explored by the Paulistas at least twenty years before. In the beginning of the eighteenth century five of its principal settlements were elevated by royal charter to the privileges of towns. In 1720 the district was separated from S. Paulo, of which it had previously been esteemed a dependency, and placed under the control of a governorgeneral. In 1670 the gold-searchers penetrated into Goyaz; but it was not till the commencement of the next century that, encouraged by the discovery of the mines of Cuiaba, in the province of Matto Grosso, a permanent colony was settled there.

The first attempt to regulate by legislative enactments the industry of the miners of Brazil was made as early as 1618 by Philip III. According to his code of regulations, the privileges of the discoverer were that he should have one mine of eighty Portuguese varas by forty, and a second allotment of sixty by thirty upon the same vein. A hundred and twenty varas were to intervene between the portions. Any adventurer might claim a mine, but he could only have one of the same extent as the discoverer's first portion. No one except the discoverer might have more than one original grant within the distance of a league and a half; but

the purchase of another person's allotment within that dis- History. tance was allowed. Mines might be sought for and worked upon private property, because they belonged to the king, but the owner of the land had a right to indemnification. Mining adventurers were entitled to turn their cattle into the lands of the municipality (concelho), and even into private property, without the owner's permission, upon paying the value of the pasturage. No man engaged in mining could be arrested for debt, or have a distress levied upon such capital as he had employed in the work. Mines might only be granted to such persons as possessed the means of peopling and working them. A grant was forfeited if not taken possession of within sixty days. executive and judicial functions within the mining districts were vested in a provedor and his secretary, those of the fiscal in a treasurer. None of these officials could hold a share in a mine, or trade in its produce, under penalty of loss of office and confiscation of property. The provedor or his secretary measured out the allotments; received and inspected the samples of metal from new mines; registered the grants, with the holder's oath to pay his fifths regularly and faithfully; and decided finally in all disputes to the amount of fifty milrees, with the reservation only of the right of appeal to the Provedor Môr da Real Fazenda to any amount. The treasurer received the royal fifths, and superintended the weighing, registering, refining, and stamping of all the gold. The king's share was deposited in a chest under three locks, the keys of which were kept by the provedor, secretary, and treasurer. A yearly account was returned of all the discoveries and produce.

For many years these laws were little more than a dead The Paulistas were wholly engrossed with their expeditions in quest of slaves; the government and the colonists of the other captaincies, with the Dutch and other wars. Some few gipsy-like establishments were scattered thinly throughout the gold country. By degrees the desire of gain induced the more powerful and wealthy colonists to solicit large grants. No attention was paid to the restriction of the number that might be conferred on each individual; and the consequence was, that men of influence monopolized the mines, and were obliged either to sublet them to those they had forestalled, or to leave them unopened. It was found necessary in 1702 to alter the ex-

isting laws.

The whole ordinary civil and military authority was vested in the superintendent (Guarda Môr). The appointment of the treasurer belonged to this officer. Both were allowed a limited number of deputies. At first the salaries of all these officers were levied upon the miners, but subsequently the privilege of mining was conceded to them in lieu of a salary. No second grant was made to any person until he had worked the first. The allotments were regulated by the number of slaves which the miner employed. Besides its fifths, the crown reserved an allotment, selected after the adventurer had taken his first grant and before he had chosen his second. If an adventurer did not begin to work his ground within forty days, a third part of it, upon information of the lapse, was assigned to the informer, and the other two-thirds reverted to the crown. Cattle were allowed to be imported into the mining districts from Bahia, but no persons were allowed to enter except the drovers. They were required to notify their arrival, the number of their cattle, and the prices they obtained. Any person might carry gold-dust from the mines to Bahia to purchase cattle, but not till he had paid his fifths and provided himself with a certificate. These regulations were enforced by strong penalties, in order to prevent frauds upon the revenue. Slaves, and all other goods except cattle, were only allowed to be introduced from Rio, and that either by the way of S. Paulo or Taboate. No idle persons were allowed to remain about the

History. mines; no goldsmith was tolerated there, nor any settler possessed of a slave capable of exercising this craft.

The same infatuated passion for mining speculations which had characterized the Spanish settlers in South America, now began to actuate the Portuguese. Adventurers crowded to the scene of action from all the captaincies; not mere "landless resolutes" alone, but men of substance also. Labourers and capital were drained off to the mining districts. The sugar-mills (Engenhos) were either abandoned or left half-cultivated, from the inability of the proprietors to offer for slaves the ruinous prices paid by the adventurers of the mines. Brazil, which had hitherto in a great measure supplied Europe with sugar, sank before the competition of the French and English, who had no mines to distract their attention. Commerce of every kind declined along with this staple commodity. The court endeavoured for a time to counteract this course of enter-

prise, but in vain.

A new source of wealth for Brazil, had it been properly managed, but, as matters have turned out, merely a new source of injudicious restriction, was now about to be opened up. Some adventurers who had prosecuted the business of gold-washing northwards from Villa de Principe in the captaincy of Minas, made a discovery of diamonds about the year 1710. The value of these minerals was not known till several years after, when an Ouvidor of the Comarca of Serro Frio, in which they were found, who had seen unpolished diamonds at Goa, ascertained what they were. In 1730 the discovery was announced for the first time to that government, which immediately declared the diamonds regalia. A further search showed that the district was equally rich in other gems. In 1741 its limits were described with greater precision, and the liberty to collect diamonds farmed upon a lease of four years to two influential inhabitants, at the rate of 230,000 reis for every negro, with permission to employ six hundred. At every renewal of the lease a high rent was exacted, and the tenants indemnified themselves by conducting their operations in the most wasteful manner.

While the population of Brazil, and the cultivation of its natural products, continued thus to increase, the moral and intellectual culture of its inhabitants was left in a great measure to chance. There was a hierarchical establishment, but one altogether inadequate to the extent of the territory. There were schools, but "few and far between." The colonists, thinly spread over what appeared an illimitable region, were most of them alike beyond the reach of instruction and of the arm of the law. The restrictions upon the free exercise of industry, introduced with a view to benefit the royal treasury, were little calculated to reconcile men to legal restraints which they scarcely knew in any other form. They grew up, therefore, with those robust and healthy sentiments engendered by the absence of false teachers; but at the same time they became habituated to a repugnance to legal ordinances, accustomed to give full scope to all their passions, and encouraged by their sense of ascendency over the Indians to habits of violence and oppression.

From the first moment of their landing in Brazil, the Jesuits had constituted themselves the protectors of the oppressed natives. But they were strenuously opposed by the interested colonists, and by the ordinary clergy. The Jesuits were not however easily dismayed, and, by dint of the most persevering exertions, they procured from government an explicit confirmation of the freedom of the natives. The next step of these venerable fathers was to collect their red children, as in all their other missions, into aldeas, over which officials of their order exercised both spiritual and temporal authority. Their intentions were pious and noble, but their plan was erroneous. They attempted to teach the most recondite dogmas of the Christian faith, before either

the hearts or heads of their pupils were sufficiently awakened to comprehend them. They taught observance to the rules of external decorum, without inculcating those more essential principles which are independent of all form. By depriving the Indians of the power of managing their own affairs, they effectually stifled within them the germs of human thought and action. The Indian of the aldeas was little better than a puppet, and, when separated from his tutors, he soon sunk back into hopeless and irreclaimable barbarism.

The persecution of the Indians was yet more efficaciously put a stop to by the sacrifice of an equally innocent and yet more injured race. The Portuguese establishments on the coast of Africa have ever been more extensive, and their slave dealings better organized, than those of any other nation. By this means a large number of negroes was annually imported into Brazil, and being found more active and serviceable as labourers than the native tribes, the latter were in a great measure left to enjoy their savage independence.

The Portuguese government, under the administration of Carvalho afterwards Marquis of Pombal, attempted to extend to Brazil the effects of that bold spirit of innovation

which directed all his actions.

Carvalho had experienced great resistance to his plans of reform at home from the Jesuits; and his brother, when appointed governor of Maranhão, experienced a resistance no less strenuous on their part to some measures of his government. This was enough to determine the proud minister to lessen the power of the order. With his sanction, the Jesuits and other regulars were deprived of all temporal authority over their aldeas in the state of Maranhão and Para. These, twenty-eight in number, were converted by the edict of the governor into nine townlets, eighteen towns, and one city. The towns were to be governed by juizes ordinarios, to fill which offices a preference was given to Indians. The aldeas independent of towns were to be governed by their respective chiefs. The lands adjacent to the towns and hamlets were divided among the Indians, and declared heritable property.

To these regulations of his brother, the minister superadded some enactments intended to supply the loss of the Jesuits as teachers. The task of religious instruction was delegated to the bishop. Till such time as the Indians should be sufficiently advanced in civilization to manage their own affairs, a director was appointed to reside in each settlement; a man of integrity and zeal, and conversant with the native tongues. He possessed no coercive jurisdiction, but, when he observed remissness on the part of the native authorities in the administration of the laws, might complain to the governor. He was expected to explain to the Indians the advantages of industry and sobriety, to instruct them in the simpler arts and manufactures, and to recommend the adoption of the amenities of civilized life. Above all, these functionaries were directed to combat the prejudice, that there existed a natural inferiority in the Indian character, and to promote, as far as in them lay, intermarriages between the white and red races. As a reward for the directors, they were to have a sixth part of all that the Indians reared, excepting what was specially appropriated for their own consumption.

These ordinances, originally promulgated for Maranhão and Para, were ratified in Lisbon, and extended to the whole of Brazil. But the good which they might have done was neutralized in a great measure by some compulsory services still left binding upon the Indians, and by listlessness on the part of the white inhabitants in carrying them into effect. No good understanding could subsist between an ambitious order and the minister who had so openly braved them. Carvalho felt his new arrangements insecure as long as a Jesuit remained in Brazil. First of all, he

History. sought to render the order suspected of being accessary to some partial revolts among the Indian troops on the Rio Negro. But it was the confession of one of the leaders of the conspiracy against the life of the king of Portugal, when put to the torture, that some Jesuits were implicated in the undertaking, that finally delivered them into his hands. In 1760 they were expelled from Brazil, under circumstances of considerable severity.

Pombal's next measure attracted more attention that his plans for the improvement of the Indians. The Brazilian Company, founded by Vieyra, which so materially contributed to preserve its South American possessions to Portugal, had been abolished, in 1721, by João V. Such instruments, however, were calculated to win the confidence of a bold spirit like that of Pombal. In 1755 he established a chartered company, with a capital of 1,200,000 crusados, in 1200 shares, to trade exclusively with Maranhâo and Para. In 1759 a similar company was chartered for Paraiba and Pernambuco. Remonstrances were made on the part of the Board of Public Good, and the British factory at Lisbon; but the members of the former body were punished, and those of the latter were disregarded. Encouraged by success, the minister established an exclusive company for the whale fishery, and bestowed upon it the monopoly of furnishing Brazil with salt. This company had its head-quarters in the island of S. Catharina. Some time after these arrangements, an extension of the facility of intercourse was granted, and Portuguese subjects, instead of being restricted to the annual fleets, were allowed to trade in single ships to Bahia and the Rio.

The arrangements of Pombal extended also to the in-terior of the country. The claims of the original donatories in the respective captaincies were indefinite and oppressive in the highest degree. Other ministers had from time to time bought up some of these rights; Carvalho extinguished them at once, indemnifying the holders. With all his power, however, he durst not interfere in behalf of such new Christians (converted Jews) as were accused of adhering in private to their ancestral faith; but he prohibited, under strict penalties, light and malicious denunciations. He strengthened and enforced the regulations in the mining districts. Observing the profuse mode in which the treasures of the diamond district were lavished, he moved the king to take the management of it into his own hands. In 1772 an ordinance was issued, in which Pombal, as prime minister, reserved to himself the management of this dis-The details of business were discharged by three directors in Lisbon, and three administrators in Brazil. At the head of the latter was placed an intendant-general, who, as the representative of majesty, exercised an unlimited power within his jurisdiction. He controlled the working of the diamond mines; he stood at the head of the judicial and police establishments; and he was authorized to punish every inhabitant convicted of having jewels in his possession with banishment and confiscation of goods, and even upon mere suspicion to order any individual to quit the district.

The policy of many of Pombal's measures is more than questionable. His encouragement of monopolies, and his preference of the interests of the crown to those of the state, as evinced in the regulations of the mining and diamond districts, do not admit of defence. But the admission of all races to equal rights in the eye of the law-the abolition of feudal privileges, and of certain restrictions upon commerce, with the livelier spirit which he knew how to infuse even into his monopolies—powerfully co-operated towards the development of the capabilities of Brazil. The spirit of improvement must have been already awake in the bosoms of the people, otherwise even his legislative energies must have been expended in vain. Still the merit abides with him of having firmly organized the powers of the land, and mar-

shalled their way. And yet when, upon the death of his History. king and patron in 1777, court intrigue forced him from his high station, his successor was lauded to the skies for concluding a treaty of limits, in which Pombal's chivalrous bravery had rendered Spain glad to acquiesce, whilst he who had done so much for his country's institutions was reviled on all hands.

During the first thirty years after the retirement of Pombal from active life, the most important feature in the history of Brazil was the conspiracy of Minas in 1789. In this rich district the population was increasing rapidly. Some young men began to be remarked for their literary talents, chiefly as poets. The successful issue of the recent revolution of the English colonies in North America, filled their minds with such enthusiasm, that they fancied it would be very easy to imitate them. A cavalry officer, Silva Xavier, nicknamed Tira-dentes (toothdrawer), formed a project to throw off the Portuguese yoke and to proclaim an independent republic. He associated in his plan Colonel Freire de Andrade, commander of the military forces of Rio de Janeiro, some wealthy merchants of that town, and some influential persons of Minas, such as Colonels Alvarenga and Abreu Vieyra, the fathers Oliveira, Rolim, and Toledo vicar of the town of S. José, and Antonio Gonzaga, a judge and famous lyric poet. They hoped, or made their partisans believe, that foreign assistance was at hand. They were informed that the new viceroy, Count de Barbacena, had brought orders from Portugal to exact at once all the sums due to the treasury as regalities for the working of the gold mines. The execution of such orders would have completely ruined the whole province. The plan of the conspirators then was to take advantage of the discontent produced by it. Awaiting this moment, they remained inactive for months, till the plot was in the meantime discovered. The viceroy wisely issued an immediate proclamation announcing that the arrears of the regalities due in Minas should not be exacted. The conspirators were all condemned to be quartered, but the queen modified the sentence. Tira-dentes alone was hanged; the others were banished to Africa. As a means of adding to its popularity the government decreed the immediate abolition of the oppressive salt monopoly, as a reward for the good conduct of the people.

By such means peace and tranquillity were preserved, and from that time affairs went on prosperously. The mining districts continued to be enlarged, especially in the direction of Matto Grosso and Goyaz, where diamonds had been discovered. Roads, although very imperfectly constructed, were opened to facilitate the communication with those districts. As to the littoral provinces, the companies of Maranhão, Pernambuco, and Paraiba were abolished, but the imulse they had given to the agricultural industry remained. Cotton, the growth of which they had promoted in Maranhao, was introduced into Pernambuco, and cultivated so successfully as to become in a short time the main article of export.

Removed from all communication with the rest of the world, except through the mother country, Brazil remained unaffected by the first years of the great revolutionary war in Europe. Indirectly, however, the fate of this isolated country was decided by the consequences of the French Revolution. Brazil is the only instance of a colony becoming the seat of the government of its own mother country, and this was the work of Napoleon. When he resolved upon the invasion and conquest of Portugal, the Prince Regent, afterwards Don John VI., having no means of resistance, decided to take refuge in Brazil. He created a regency in Lisbon, ordered that no resistance should be offered to the French invasion, and departed for Brazil or the 29th November 1807, accompanied by the Queen Donns Maria I., the royal family, all the great officers of state, a large part of the nobility, and numerous retainers. They arrived at Bahia on the 21st January 1808. The royal family was received with enthusiasm. The regent was requested to establish there the seat of his government, but a more secure asylum presented itself in Rio de Janeiro, where the royal fuitives arrived on the 7th of March. Before leaving Bahia, Don John took the first step to emancipate Brazil. By a decree dated the 28th of January, its ports were opened to foreign commerce, the merchandise being subject to a duty of 24 per cent. The exportation also of all the products of Brazil under any

History. flag was permitted, except some royal monopolies, such as dia-

monds, Brazil wood, &c.

Once established in Rio de Janeiro, the government of the regent was directed to the creation of an administrative machinery for the dominions that remained to him; and all the supreme tribunals of administration, of justice, and of finance, were established as they existed in Portugal. Besides the ministry which had come with the regent, the council of state and all the other departments of the four ministers then existing, viz. :-Reino, or home department; Fazenda, finances; Guerra e Estrangeiros, war and foreign affairs; and Marinha e Ultramar, marine and colonies, -there were in the course of one year created: 1. The Desembargo do Paço, a supreme court of justice and equity, which had the power to annul and revise the sentences of the other courts, and by whose means was exercised the royal prerogative of suspending and dispensing with laws; 2. The Meza da consciencia e ordens, a board by means of which the royal prerogative was exercised for the patronage of the church and of the military orders, and also for the administration of their property; 3. The Casa da Supplicação, a court of appeal inferior to the Desembargo do Paço, and superior to the provincial courts of appeal; 4. The general board of high police; 5. The Conselho da Fazenda Erario Regio, or court of exchequer and royal treasury; 6. The royal mint; 7. The bank of Brazil; 8. The royal printing office; 9. Powder mills on a large scale; 10. The supreme military court. The salaries of so large a number of high officials, and the maintenance of the court entailed expenses which the simple colonial administration had never required. The imposition, therefore, of new taxes, was a natural consequence. Heavy duties were successively imposed upon tobacco, sugar, dry and salted hides, cotton, and other exports. A tax of 10 per cent. upon house rent in the towns, and upon the sale of real estates, and harbour dues, were also levied. The expenses, however, continuing to increase, the government next had recourse to the reprehensible measure of altering the money standard. Gold was coined in a new form, the intrinsic value of which was not comparatively equal to the former standard, and the Spanish dollars were recoined retaining the same weight and size, and sent into circulation with a value of 20 per cent. higher than their intrinsic and commercial value. The whole monetary system was thrown into the greatest confusion by the simultaneous circulation of three different standards of currency. From this ensued a confusion in the finances of the country, and in private transactions, as well as a fluctuation in foreign exchange, from which Brazil suffers even at the present day. The bank, in addition to its private mercantile functions, farmed many of the regalia, and was in the practice of advancing large sums to the state, sometimes in consideration of valuable deposits, sometimes upon the assignment of taxes not yet due. Its connection with the mint enabled it to meet every emergency, and the hostility of some foreign merchant houses, and to maintain at first a high degree of credit. The treasury found great facility in raising money by compelling the bank to put into circulation enormous sums in notes, which its deposits could not guarantee. These transactions, however, gave rise to an extensive system of corruption, and the breaking of the bank some years later was the consequence. Thus the government of the Prince Regent commenced its career in the New World with the most palpable and dangerous errors in the financial

Notwithstanding these evils, the increased activity which a multitude of new customers, and an increased circulating medium, imparted to the trade of Rio, added a new stimulus to the industry of the whole nation. Immense numbers of English artisans and ship-builders, Swedish ironfounders, German engineers, and French artists and manufacturers, sought fortunes in the new land of promise, and diffused, both by example and precept, industry and ingenuity throughout the country. Useful measures were continually appearing; vaccination was introduced, various educational institutions were founded, and several arrangements were adopted in favour of commerce, such as the appointment of inspectors to prevent frauds on exported goods, and the permission to give money in bottomry, with such interest as the parties might agree upon. Foreigners were permitted the free exercise of their worship; and it is worthy of remark, that while all the tribunals which existed in Portugal were established, and a See of Rio de Janeiro erected in

imitation of the Patriarchal See of Lisbon, no Inquisition was History. established.

In the beginning of 1809, in retaliation of the occupation of Portugal, an expedition was sent from Para to the French colony of Guiana. After some fighting, the governor and garrison capitulated, and Guiana was incorporated with Brazil. Although this conquest was of short duration-for by the treaty of Vienna in 1815, the colony was restored to France—it contributed to the improvement of agriculture in Brazil. It had been until then the policy of Portugal to prevent its colonies from enjoying the same productions. The cultivation of sugar, for instance, was reserved to Brazil and prohibited in Africa; while the cultivation of the spices of India was prohibited in Brazil, and even those which grew spontaneously (such as cinnamon), were ordered to be destroyed. Now, however, many seeds of different plants were imported not only from Guiana, but also from India and Africa, cultivated in the Royal Botanical Garden, and from thence distributed amongst private individuals.

The same principle which dictated the conquest of French Guiana, dictated some attempts to seize the Spanish colonies of Monte Video and Buenos Ayres, Portugal being also at war with Spain. Here, however, a conquest by force of arms was not easy, and the chiefs of these colonies were invited to place them under the protection of the Portuguese crown. At first they affected loyalty and devotion to their king and to the mother country, and refused the invitation; but a little after they threw off the mask, and declared themselves an independent republic. The Spanish governor, Elio, was able for some time to hold the Banda Oriental in subjection, and received succours from the court of Rio de Janeiro, but was afterwards defeated by Artigas the chief of the independents; and Monte Video met with the same fate as Buenos Ayres. The inroads made on the frontiers of Rio Grande and S. Paulo, together with the dangerous example of anarchy and of republican principles, decided the court of Rio de Janeiro to take possession of Monte Video. A force of five thousand select troops, under General Lecor, was sent from Portugal, together with a Brazilian corps under general Curado. The irregular troops of Artigas, terrible in skirmishes and surprises, were incapable of resisting disciplined troops, and were forced after a total defeat to take refuge on the right bank of the Uruguay. The garrison of Monte Video evacuated, and General Lecor took possession of the city on the 20th January 1817. The territory of Missiones was occupied afterwards. Artigas, however, having recrossed the Uruguay, continued master of a part of the Banda Oriental; but this province properly formed part of the Brazilian territory from 1817. Without possessing one sea-port, Artigas sent letters of marque to American privateers, which did incalculable mischief to the Portuguese commerce.

The importance which Brazil was acquiring decided the regent to give it the title of kingdom, and by a decree of the 16th of January 1815, the Portuguese sovereignty thenceforward took the title of the United Kingdom of Portugal, Brazil, and Algarves. Thus the old colonial government disappeared even in name. The national pride of the Brazilians was flattered, and for some time nothing else was heard of but addresses of thanks and congratulations, feasts and rejoicings in every district. In March 1816 the Queen Donna Maria I. died, and the Prince Regent became king, under the title of Don João VI.

Although Brazil had now become in fact the head of its own mother country, the government was not in the hands of Brazilians, but of the Portuguese who had followed the court. This government was ignorant and profligate, and the morals of the court were far from being pure. The amiable character of the king preserved his personal popularity, but the public discontent daily increased. At the same time that the employes were badly paid, and obliged to discount their salaries at great loss, to obtain from speculators, favoured by the government, the necessary money to live frugally, a royal decree assigned 120,000 crusados per annum to be taken from the custom-houses of Bahia, Pernambuco, and Maranhão for forty years, commencing from 1811, to the noblemen and high Portuguese officials who had suffered during the French war. The selection of the employes was in general bad. Justice was ill administered, and negligence, disorder, and corruption reigned in all the departments. In Portugal the discontent was still greater on account of its anomalous position, standing as it were in the relation of a colony to a colony of its own.

Ristory. There fauses, and the fermentation of liberal principles produced by the French Revolution, originated in 1817 a conspiracy in Lisbon, which was, however, discovered in time to prevent its success. A similar result took place in the province of Pernambuco, where education had made some progress, specially remarkable in the instruction afforded to the priests. The inhabitants had certain recollections of clory The inhabitants had certain recollections of glory, valour, and liberty, connected with the war, which, when abandoned to themselves, they had alone sustained against the Dutch. The city of Recife had attained such commercial importance, that it began to be jealous of Rio, and to complain of the sacrifices it was compelled to make for the support of a luxurious court. A regular conspiracy to establish a republican government had in fact arrived at the point of having ramifications in Bahia and other provinces; but an accident the to its bursting forth before the time, and probably was the cause of its being so promptly smothered. In Bahia the governor was able to avoid a similar outbreak, and even to detach at once a sufficient force to put down the revolution of Pernambuco, so that the republic established there scarcely lasted ninety days. Some of the chiefs fled in time; three, Martins, Mendonça, and the priest Almeida were hung, and a great number were condemned to exile and imprisonment. Don John, fearing the progress of the republican spirit in Brazil, sent to Portugal for bodies of picked troops, which were stationed in Rio and in the different capitals of the provinces under the command of the best generals.

under the command of the best generals. In Portugal the popular discontent produced the revolution of 1820. Representative government was proclaimed, and the constitution was to be framed by a congress of the representatives of the people, the Spanish constitution of 1812 being adopted provisionally. In Rio de Janeiro the Portuguese troops, with which the king had surrounded himself as a defence against the liberal spirit of the Brazilians, took up arms on the 26th February 1821 to force him to accept and swear to the system proclaimed in Portugal. The Prince Don Pedro, heir to the crown, who now for the first time took part in public affairs, actively exerted himself as a negotiator between the king and the troops, who were joined by bodies of the people. The king attempted a modification of the Spanish constitution, adopting a chamber of peers, but the insurgents would accept no compromise. He finally submitted, took the oath, and named a new ministry. The scenes of Rio de Janeiro were repeated, or simultaneously enacted in Pernambuco, Bahia, Maranhão, and other provinces, where the governors were deposed and provisional juntas created in their stead. The Brazilians were aware that the revolution in Portugal was made against Brazil; and some were disposed to resist it. In Bahia the Brazilian troops did actually fight with the Portuguese, but were defeated. Nevertheless, the idea of a free government filled them with enthusiasm, and the principles of a representative legislature were freely adopted. From this time such use was made of the liberty of the press, that talents and knowledge of a high order were revealed, which had not been supposed to exist in Brazil. The first care everywhere was the election of deputies to the cortes of Lisbon, to take part in the framing of the new constitution of the united kingdom. Magistrates, advocates, priests, and military men, put themselves at the head of this movement and were elected. From this time great political importance was given to the existing municipal councils, which being formed by popular elections, were considered to represent the people. As the king could not abandon Portugal to itself, he determined from the first to send the prince thither as regent. Don Pedro, however, who had always exhibited active talent and a thirst for glory, had acquired great popularity by his conduct in the revolution, and the king was afraid to trust his adventurous spirit in Europe. He decided, therefore, to go himself, and leave the prince in Brazil as regent and locumtenens. It is now beyond doubt, that the secret instructions he left him were to oppose as far as possible the independence of Brazil, which he considered to be imminent; but if it could not be averted, to place himself at the head of the movement. and obtain the sovereignty of Brazil, so that this most considerable portion of the united kingdom might remain in the hands of the family of Bragança, rather than in the hands of

The Brazilian deputies, on arriving in Lisbon, expressed their dissatisfaction with the cortes for having commenced the

framing of the constitution, and taking measures in respect to History. Brazil before their arrival. Brazil felt that she could not be treated as a secondary part of the monarchy. The organization which the cortes were giving to the monarchy would have the effect of reducing Brazil to its former condition of a colony. They insulted the prince regent by a decree which ordered him to come to Europe for his education. Sharp discussions and angry words passed between the Brazilian and Portugueso deputies. The news of these proceedings excited great discontent in Brazil. The tone of the discussions with regard to the prince regent irritated him, and the decree ordering his retirement to Portugal filled the Brazilians with alarm. They saw that, without a central authority, the country would fall either into its former condition of a colony, divided into provincial governments subject to Portugal, or else into a state of anarchy. The provisional government of S. Paulo, influenced by the two Andradas, brothers of the leading deputy in Lisbon, commenced a movement for independence by asking the prince regent to disobey the cortes and remain in Brazil. municipal council of Rio de Janeiro made a similar representation, to which the prince gave a decisive assent. The Portuguese troops assumed at first a coercive attitude, but were forced to give way before the unanimous ardour and the formidable military preparations of the Brazilians. They submitted, accordingly, to embark for Portugal. These scenes in Rio were repeated in Pernambuco, where the Portuguese, after various conflicts, were obliged to leave the country. In Bahia, however, the Brazilians succumbed, and the Portuguese troops remained masters of the city. In Maranhâo and Para also, the Portuguese party prevailed. In Rio the agitation for independence continued. The two brothers Andradas were called to the ministry; and the municipal council conferred on the prince regent the title of Perpetual Defender of Brazil. With great activity and courage he set off to the central provinces of Minas and S. Paulo, to suppress disaffected movements and direct the revolution. In S. Paulo, on the 7th of September 1822, he proclaimed the independence of Brazil. He had just received despatches and letters from Lisbon; and it was remarked that he destroyed one of the letters without communicating its contents to any one; from which it was inferred to be that in which his father pronounced the moment arrived for placing himself at the head of the independents. On his return to Rio de Janeiro on the 12th October, he was proclaimed Constitutional Emperor with great enthusiasm.

Bahia was chosen by the cortes at Lisbon as a centre for resisting the independence. Thither numerous forces were sent to General Madeira, who had at his disposal, besides militia, 12,000 of the best disciplined troops, who had served under the Duke of Wellington in the Peninsular wars. The city, however, was vigorously besieged by the Brazilians by land, and succours were sent to them from Rio and Pernambuco. The Portuguese made many obstinate sallies, but were always repulsed; and finding their provisions fail they were obliged to embark for Portugal, July 2. 1823. Their squadron was composed of 15 ships of war and 77 transports. The Brazilian squadron, under the command of Lord Cochrane, although weaker, was better prepared for action than that of the Portuguese, which was embarrassed with so many troops. Cochrane attacked them, and took some ships. Taylor, another Englishman in the Brazilian service, followed it to the coast of Portugal, and even took some ships within sight of land. Cochrane proceeded to reduce Maranhão, and sent Grenfell to Para. Independence triumphed in both provinces. All resistance seemed impossible to the Portuguese after their power was destroyed in Bahia. The troops in Monte Video were abandoned by General Lecor, who declared for the independence, and they also embarked for Portugal; the Banda Oriental remaining part of Brazil, with the title of Provincia Cisplatina. Before the end of 1823 the authority of the emperor and the independence of Brazil were undisputed throughout the whole country. It is worthy of mention that during the whole contest the name of the king was always pronounced in Brazil with respect; all the manifestoes and proclamations were directed against the cortes, and the king was always commiserated by his Brazilian subjects as under coercion, and as a prisoner of the cortes.

In almost every part of Brazil, chiefly in the north, as soon as the Portuguese yoke was thrown off, republican movements spread. To suppress these the authorities employed the Portuguese, and, above all, the militia regiments formed of the com-

History. mercial young men. These, as soon as they lost all hope of assistance from Portugal, looked to the emperor for support. The emperor, on his side, began to fear the spirit of republicanism in Brazil, and to consider the Portuguese as his firmest supporters. This disposition much influenced the course of his government and his future destiny. The contest with the troops and with the Portuguese party went on jointly with the organization of the empire. At first a council was given to the prince, composed of Procuradores of the provinces freed from the Portuguese yoke, which assembled in Rio de Janeiro on the 2d of June 1822. This council immediately deliberated upon the convocation of a constituent assembly, which the prince convoked by a decree of the 6th of June. On the 3d May 1823, Don Pedro, crowned emperor since the 1st December, opened this constitutional assembly in Rio de Janeiro. Then commenced the discussion of a project of constitution, in which the democratic element prevailed, though not so much as in the constitutions adopted at the same time by Spain, Portugal, Naples, and Sardinia. In Brazil a chamber of senators was to be created, in whose selection the monarch would take a part; while, in the constitutions of those kingdoms, the legislative power was vested in a single chamber. The two Andradas, and their brother, at first a distinguished leader of the independence in the cortes of Lisbon, and now in the constituent assembly, encountered great opposition; while their yoke was becoming every day more insupportable to the young emperor, whom they imagined they could govern as a sovereign of their own creation. On the 16th July the emperor resolved to dismiss them, and a new ministry was formed. The Andradas organized a violent opposition against this and the person of the emperor. A very tumultuous and angry debate ensued in the assembly in consequence of the petition of a newspaper editor, who had been assaulted by some Portuguese officers in the Brazilian service. The emperor determined to dissolve the assembly on the 13th November 1823, and exiled to France the three Andradas and some of their partisans, allowing to each a small pension. In the decree which dissolved the assembly, Don Pedro convoked another to deliberate upon a proposed constitution more liberal than the one the assembly was discussing. Public opinion, meantime, was in a state of intense fermentation. In Portugal, Spain, Naples, and Piedmont representative government had fallen. The disand Piedmont representative government had fallen. solution of the Brazilian constituent assembly led to the belief that the emperor intended also to make himself absolute. In Rio S. Paulo and Minas the discontent was so strong and universal that the emperor published new decrees, proclamations, and manifestoes, explaining his motives, and protesting that he wished to maintain the representative system. As a proof of his sincerity he soon after offered to the nation the project of the promised constitution, with the framing of which he had commissioned the council of state.

The proclamation of a republic in the province of Pernambuco, Ceará, and others in the north, disorders in the south, and the loss of the province of Cisplatina, were the consequences of the coup d'état of 13th November 1823.

The Brazilians were universally discontented: on one side fearing absolutism if they supported the emperor, on the other they feared anarchy if he fell. The emperor, knowing the danger of an underlined position, caused the municipal councils to petition him to dispense with the deliberation of a constituent assembly, and to adopt immediately as the constitution of the empire the project framed by the council of state. Accordingly, on the 25th of March 1824, the emperor swore to the constitution with great solemnity and public rejoicings

This policy of the emperor saved him and saved Brazil. The year 1824 was a time of difficulty, but the assurance given to the Brazilians that they would not lose the representative government enabled the emperor to triumph over the rebellion of the northern provinces, and to prevent similar movements in others. On account of the continued disorders the legislative chambers were not convoked during this year. The next year found Brazil in a state of tranquillity and obedience, but still the chambers were not convoked. The cortes of Lisbon having fallen, the king fancied that the Brazilians would submit to him, and sent emissaries to Rio de Janeiro to treat with the emperor. They arrived in September 1823, but the Brazilian ministry did not permit them to land. Afterwards preparations were began in Portugal to fit out a squadron against Brazil; but these were finally given up, the ministers, acceding

to the wishes of the king, having always opposed the war. Negotiations were opened in London between the Brazilian and Portuguese plenipotentiaries; but Mr Canning, seeing that nothing would result from them, obtained from the king the appointment of Sir Charles Stuart as his ambassador to treat with Brazil on the basis of the recognition of the independence. On the 29th of August 1825, a treaty was signed with him, by which the king, Don John VI., assumed the title of Emperor of Brazil, and immediately abdicated in favour of his son, acknowledging Brazil as an independent empire. Brazil was obliged to take upon herself all the debt of Portugal contracted in London = L.1,500,000, and pay besides L.200,000 as indemnification for property of Don John VI. (including a fine library of 80,000 volumes). A treaty of commerce was promised by which Portugal would be considered as the most favoured nation, her merchandise paying provisionally no higher duties than 15 per cent. in the custom-houses. Finally, Brazil was to pay the sums liquidated as expenses incurred by Portugal for the transport of troops and other indemnities to private Portuguese subjects.

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The rebellion of the province Cisplatina (Banda Oriental), favoured by Buenos Ayres, was followed by a declaration of war by the emperor against that republic. On the pretence of that war he commenced forming regiments of Germans engaged in Europe. He entered into a treaty of commerce with rance, and another with England, for the cessation of the slave trade, and finally convoked the legislative chambers at Rio de Janeiro on the 4th May 1826.

Until the middle of the year 1823, Don Pedro had acquired in Brazil a high and well deserved popularity. He was the creator of the empire: he had delivered Brazil from anarchy, and had given her political liberty; but since the dissolution of the constituent assembly, he had entirely lost his popularity. He had given himself up to the influence of the Portuguese, preferring them in all things to the natives. He had also shown a desire to make himself absolute. The authors of the rebellion in the northern provinces, which he had provoked, were punished with much greater rigour than similar conspirators had been by his grandmother and his father in the colonial times. The most popular men who had worked for the independence, the Andradas, were banished. with Buenos Ayres was considered, like the rebellion in the north, as provoked by him, and threatened disastrous consequences to the country, whose resources he should have employed in the development of its internal prosperity and its new institutions. The treaty with Portugal was not only indecorous but unjust. Brazil purchased for near two millions sterling the independence which she had won by her arms, and was obliged to pay the expenses of a war in which she had been victorious. The continual changes of ministry showed in the emperor either inconstancy or a disposition obstinately to prosecute measures which the ministers disapproved. His licentious life alienated the respect and consideration of his subjects; above all, when contrasted with the high character of the empress for virtue, charity, and condescension.

The death of his father offered an opportunity to the emperor for regaining in some measure his popularity. He was unanimously acknowledged as king of Fortugal; and representatives of the clergy, the nobility, and the people, came to Rio de Janeiro to make their submission. A terrible suspicion immediately sprung up that the independence of Brazil would be annulled. Don Pedro, however, promptly tranquillized the public mind, by abdicating the crown of Portugal in favour of his daughter Donna Maria, and giving it a constitution exactly on the model of that of Brazil, with the difference of an hereditary chamber of peers instead of senators. This resolution, taken on the eve of opening the Brazilian legislative assembly, won him very flattering reception from the chambers and the public.

The ministry, however, did not present any measure or system of public utility, or any regulations to give practical working to the representative government. The entire session of the chambers was passed in barren and odious accusations and recriminations. The emperor, preoccupied with the war with Buenos Ayres, no sooner closed the session than he sailed for the southern provinces; but, in the meantime, the empress died, and he immediately returned. In the session of 1827, it was seen that the respect for the emperor, and the hope of his return to better feelings, were not entirely lost. The legislative body, notwithstanding their dissatisfaction at the system of

History. government, allowed so large a civil list that it almost absorbed a tenth part of the total revenue of the empire. The violence. however, of the opposition in the chamber of deputies was always increasing. The lavish expenditure of the public monies, and the bad state of the finances—the currency exclusively composed of copper money and of the notes of a bank in a state of bankruptcy—the shameful manner in which the operations against Buenos Ayres, both by sea and land, were conducted; the evils suffered by commerce, the presence of mercenary soldiers and the vexatious recruiting, afforded ample subjects for public discontent and for the denunciations of the opposition. The emperor continued the same line of policy; he was constantly changing his ministers, but always selecting them from an unpopular faction; and when he did call any popular deputy to the ministry, it seemed as if it were done for no other purpose than that of corrupting his politics. Commercial treaties were entered into with Austria, Prussia, Great Britain, the Hanse Towns, the United States, Denmark, and the Netherlands, conceding in exchange of illusory reciprocity, favours that were considered to be injurious to the growth of the Brazilian shipping. The first of those treaties met with bitter censures, but the government always persisted in the same system. The chambers established by law equal custom-house duties for all nations, in order to render the treaties unnecessary. During the session of 1827, the public internal debt was consolidated and inscribed in the great book, and a department was created for the application of the sinking fund and payment of dividends.

The year 1828 was a calamitous one for Don Pedro and for Brazil. It commenced with a defeat of the Brazilian army by the Argentine forces, and this entirely through the incapacity of the commander-in-chief. In Rio de Janeiro the German and Irish regiments mutinied, and there were three days' fighting in the city between them and the Brazilian troops. Misunderstandings arose with the United States and France on account of the merchant vessels made prizes of by the Brazilian squadron blockading Buenos Ayres; and the imperial government being threatened with force, consented to pay for them. Afterwards England made a similar claim in a menacing tone, with a like result. The financial embarrassments were increasing to an alarming extent. The emperor was compelled by the English government to make peace with Buenos Ayres, renouncing the Banda Oriental, provided that it did not unite itself to Buenos Ayres, but formed an independent state with the title of the Republic of Uruguay. At length, to fill up the sum of disasters, affairs went wrong with Don Pedro even in Portugal. His brother, Don Miguel, treacherously usurped the crown, availing himself of his authority as regent, with which he had been invested. So many misfortunes were the result of a policy the responsibility of which the emperor incurred personally, as it was in opposition to the feelings of the public and of the chambers. In these the debates continued to be of a boisterous character, and the emperor refused his sanction to some bills adopted by the chambers for the development of the constitution.

It was under such unlucky auspices that the elections of the new deputies took place in 1829. As was expected, the result was the election everywhere of ultra-liberals opposed to the emperor, who still persevered in his course. A trifling riot in an insignificant town of Pernambuco was immediately seized as a pretext for the suspension of the habeas corpus in all that province, and the formation of a military commission to try even civilians. These measures caused great discontent, and the discussions in the chamber of deputies turned almost exclusively upon the necessity of impeaching the ministers who had decreed them. The emperor had recourse to intimidation to prevent it, in which he succeeded.

In October, the second wife of Don Pedro, the Princess Amelia of Leutenburgh arrived in Rio de Janeiro. She was well received by the public. The arrival of an empress, beautiful, and adorned with so many brilliant accomplishments, encouraged a hope that the emperor would never return to such favourites as the last, from whose influence he had just liberated himself.

In 1830, the chamber elected in 1829 assembled. If in the first the opposition against the personal policy of the emperor had been violent, and led by men of the highest talent, in this the opposition obtained almost a unanimity of votes. The democratic press every day insulted the emperor in a most in-

decent manner, and the people everywhere exhibited their dis- History. affection; when he appeared in public the vivas given him were answered with chilling indifference by the multitude, while thunders of applause greeted the empress and the imperial prince, a delicate way of conciliating respect for the monarchy, with a show of reproof towards the person of the monarch. During the session of 1830, the chambers adopted a criminal code, framed according to the doctrines of Jeremy Bentham, in which punishment by death for political offences was abolished, and in the budget they included a clause which compelled the government to disband the foreign regiments.

Like Charles X. in France, the emperor of Brazil had rebelled against the principle that the monarch must preserve in the ministry men only who possess a majority in the chamber of deputies. Charles X. was a victim of this obstinacy, and Don Pedro, who might yet have profited by the lesson, persevered, however, in the same principles. Animated by the example of France, the republican party thought that the moment had arrived to dethrone him. Some journals suggested the idea of reforming the constitution by turning Brazil into independent federal provinces governed by authorities popularly elected, and only acknowledging the emperor as a common centre, assisted by a federal congress, as in the United States. This idea was gaining ground in the provinces, not only because it flattered local interests and passions, but because whatever tended to evince disaffection to the emperor, and limit his authority, pleased the discontented. The emperor alarmed, set off with the empress for Minas to stir up the former enthusiasm of that province in his favour, from recollections of the independence. There he published a proclamation against the pretended reform of the constitution, which, however, was coldly received, and only considered by his enemies as a proof of weakness.

On his return to Rio in March 1831, scenes of disorder occurred. Some deputies, at the time in Rio, presented a very energetic remonstrance to him, upon which he decided to form a ministry which included the most forward members of the liberal party; but men who ought to have been chosen, the most conspicuous and moderate leaders of the majority in the chamber, were excluded. The agitation and discontent continued. Don Pedro, tired of struggling, and disgusted at the opposition of his subjects, accused them of ingratitude. The Portuguese emigrants who escaped from the tyranny of Don Miguel, and the emissaries of the liberal clubs of Spain, had made him believe that by presenting himself in Europe, expelling Don Miguel, and offering a constitution to Spain, he would be without difficulty proclaimed emperor of the whole peninsula. Imagining himself sure of such a brilliant destiny in Europe if he lost his Brazilian crown, he attempted to risk a decisive attack against the liberal party, dismissed the ministry, and formed another composed of men considered as favourable to absolutism. The agitation in the capital increased—the people met in a state of excitement in an immense square in the city called the Campo S. Anna, the troops joined them, and deputations composed of the justices of peace and of some citizens, went respectfully to ask the emperor only to dismiss the unpopular ministry. He replied at three o'clock in the morning on the 7th April, dismissing the ministry without naming another, and abdicating the crown in favour of the heir-apparent, who was then five years and four months old.

The country was thus left without a government, and exposed to all the horrors of anarchy. Don Pedro immediately embarked with the empress on board the English ship of the line Warspite, leaving the new emperor Don Pedro II., and the princesses Januaria, Francisca, and Paula. Hearing on board great demonstrations of rejoicings in the city, he asked some persons who came from shore if the republic were pro-claimed:—"No," they answered, "on the contrary, the people are delirious with enthusiasm for the new emperor." If paternal tenderness was flattered by this reply, self-love must have been cruelly wounded. On the 13th April Don Pedro retired from Brazil. The subsequent history of this unfortunate prince belongs to the history of Portugal. See PORTUGAL.

Meanwhile the deputies and senators assembled to snatch the country out of the hands of the republican party. They first elected a provisional, and afterwards (May 3d) a permanent regency, composed of three members. The first care of the new regent was the appointment of a ministry composed of the most influential members of the chambers.

History. lican party, however, enraged at seeing the power escape from their hands, excited discontent in all directions; and such horrible scenes of disorder succeeded, that it seemed as if Brazil were destined to the state of chronic anarchy which prevailed among its neighbours of the Spanish race. The regency and the ministry showed the greatest prudence and courage. To the activity and energy, however, of Feijoó, a priest, minister of justice, the country is chiefly indebted for the preservation of order and the union of the provinces. In the chambers the ultra-liberals united with the absolutists, and other disappointed men formed a violent but small opposition. The government and its supporters adhered to the reform of the constitution, and treated to gain time, and so to modify it that the monarchy might be saved. According to the constitution, the existing legislature was only empowered to designate the articles which ought to be altered, the power of decreeing a definitive reform being reserved to their successors. These discussions and struggles occupied the year 1831. A reactionary third party, however, began to appear in favour of the restoration of Don Pedro, and opposed to every reform of the constitution. This party, though strong in Rio de Janeiro, was not so in the provinces. It impeded the progress of the government, but perhaps tended to limit the reform of the constitution. Of course with the death of Don Pedro I. this party was essentially modified.

The reform was finally decreed in 1834. Instead of a regency of three members elected by the legislative chambers, one regent only was appointed, chosen by the electors in the same manner as the deputies. The councils of provinces, which hitherto had simply a consulting vote in local matters, were replaced by legislative provincial assemblies, with power in such matters to make provincial laws, which were to be executed with the sanction of the president of the province. These reforms were well received, and immediately put into execution. They inaugurated in Brazil in reality a republican government analogous to that of the United States, for not the least difference existed between the election of the regent and that of the president of this republic. The election for the regency fell on the ex-minister of justice Feijoó, a man of small attainments and democratic principles, whose remarkable selfwill and obstinacy brought him into great difficulties. provinces, although more or less agitated, had already been reduced to obedience. Para and Rio Grande alone were in open rebellion. The former, in which great horrors were perpetrated, became pacified; but in Rio Grande the warlike habits of the people, the interest which many of the inhabitants had in a civil war, which afforded them opportunities of enriching themselves by plunder, the facility in receiving succours from the other rebels of the republic of Uruguay, and the nature of the ground, rendered the pacification of the province very difficult. The imperial forces occupied all the cities and villages, while the rebels ravaged the open country. The regent was accused of conniving at the rebels, and the opposition of the chamber of deputies became so violent, that rather than change his policy he resigned. In September 1837 he appointed the senator Araujo Lima minister of the home department, a man of extensive abilities and experience, and who had been a candidate at all the elections for the regency. Araujo Lima appointed a ministry composed of men of the greatest note in the chambers, gave a great impulse to the war in Rio Grande, and strove to give his government the character of a monarchical reaction against the principles of democracy, which had guided the policy of Feijoo. On a new election for the regency, he was chosen by a large majority.

The experiment of a republican government in Brazil had proved so discreditable—the country was so wearied of cabals and instability, that the men known hitherto for their sympathy with democratic principles, saw that it was only by being more monarchical than the regent himself, that they would be able to seize the power. Under this impression they set to work. They maintained, that as soon as the Princess Donna Januaria completed her eighteenth year, she would be entitled to the regency in the name of her brother. The article, however, of the constitution which they appealed to was not clear; and the good sense of the public perceived, that if the empire could be governed by a princess of eighteen, it would be governed far better by the emperor himself, who was then fourteen. A bill was accordingly presented to the legislature, dispensing with the age of the emperor, and declaring that he had attained his

majority. It was carried after a noisy discussion, and the ma- History. jority of the emperor was proclaimed in a sort of revolutionary

manner on the 23d of July 1840.

The emperor appointed a coalition ministry (including two of the Andradas), which fell before a year had expired, and was replaced by the party of the last regent, which began to be called the Saquarema party. In 1842 a rebellion broke out in the provinces of San Paulo and Minas, which was with difficulty repressed. A misunderstanding between the emperor and his ministers cast him again into the arms of the Feijoó party, which was now called the Santa Luzia party. Several ministries taken from this party governed the empire from 1843 to 1848, and the most important service it rendered was the pacification of Rio Grande de Sul, obtained more through negotiation than by force of arms. In September 1848, the emperor formed a Saquarema ministry, with the ex-regent Araujo Lima, now Visconde de Olinda, at its head. The ministry commenced with two great difficulties. Hostilities had been roused by the English government on account of neglect shown by the Brazilian authorities in putting the treaty in force for the abolition of the slave-trade. On the other hand, the governor of Buenos Ayres, General Rosas, was endeavouring to re-volutionize afresh the province of Rio Grande, separate it from the empire, and in this way break up or weaken the Brazilian monarchy. The slave-trade had hitherto been impudently carried on, protected by some authorities, and to-lerated by others. The number of slaves introduced in 1849 amounted to 54,000. This excess of itself, and the symptoms of insurrection which appeared, had already rendered unpopular the dealers in slaves, who enriched themselves by exacting money from the ruined planters. The appearance of the yellow fever also, until now unknown in Brazil, was attributed to the importation of slaves; so that public opinion began at last to declare against the traffic. The minister of justice, Sr. Eusebio de Queiroz, profited by this feeling to pass severe laws against slave dealing, and to secure their rigorous enforcement, so that in 1850 the importation of slaves diminished to 23,000, in 1851 to 3280, and in 1852 to 700. In 1853 there was not a single disembarkation; so that it may now be said that the slave-trade is extinct in Brazil.

In the contest with General Rosas, the success of the ministerial policy was no less brilliant. The Visconde de Olinda left the ministry, through ill health, in the beginning of 1849. He was succeeded by the Visconde de Mont Alegre, who had been one of the three regents appointed by the legislature in 1831: the secretaryship of foreign affairs was given to Sr. Paulino de Souza. This ministry entered into an alliance with the governors of Monte Video, Paraguay, and the states of Entre-Rios and Corrientes, for the purpose of maintaining the independence of the republics of Uruguay and Paraguay, which Rosas intended to reunite to Buenos Ayres. The troops of Rosas which besieged the city of Monte Video, and infested the frontiers of Brazil, under the command of General Oribe, were forced to capitulate. Rosas then formally declared war against Brazil. An army composed of the troops of Entre-Rios, Corrientes, Uruguay, and Brazil, commanded by General Urquiza, and assisted by the Brazilian squadron, under the command of Admiral Grenfell, marched on Buenos Ayres. Rosas was able to oppose the allies with an army of 30,000 men; but the cavalry of Urquiza and the Brazilian infantry (amounting in all to 23,000 men), completely routed them on the field of Monte Caseros, and crushed for ever the power of that bloody dictator. The Brazilian infantry took 50 pieces of cannon at the point of the bayonet, and earned a still more glorious distinction by their clemency to their prisoners.

From 1844, Brazil was free from intestine commotions and civil war, and had resumed its activity in useful undertakings. Public education received a strong impulse, and many new streets, roads, canals, improvement of ports, steam navigation, embellishment of cities, and other works of public utility were commenced. The finances rose to a degree of prosperity previously unknown, and commercial intercourse immensely

increased.

At length with a consolidated government, and after so many struggles and revolutions, this country seems to be progressing quietly to a destiny that will insure it the riches of its soil and the advantages of its climate.

The Emperor Don Pedro II. and the Empress, a sister of the King of Naples, are universally beloved and respected for Geography.

Boundaries.

Physical their intellectual and moral endowments, and their affectionate interest in the welfare of their subjects. Two princesses, Isabel, born in July 1846, and Leopoldina, born in 1847, are their only surviving children.

> II. Physical Geography.—Brazil is bounded on the north by New Granada, Venezuela, and the Guianas, British, French, and Dutch; on the east by the Atlantic; on the south by the republics of Uruguay and the Argentine Confederation; and on the west by Paraguay, Bolivia, Peru, and Equador. It extends from about the 4° N. Lat. to 33. 40. S. Lat., and from 35° to 70° W. Long. Its greatest length is about 2600 British miles, its greatest breadth about 2500; it has a sea-board of nearly 3700 miles.

> The original line of demarcation between the Portuguese and Spanish possessions was fixed by two bulls of Pope Alexander VI., the one of the 2d, the other of the 3d of May 1493. The kings of Castile and Portugal afterwards concluded the treaty of Torrizillas, which was approved by the Pope in 1529. The reunion of the two crowns in 1580 suspended all discussions about the boundaries. They, however, recommenced after the revolution and independence of Portugal. The treaty of Utrecht in 1777 regulated many points, but the treaties always referred to rivers, mountains, and other positions passing through deserts, the names of which were not well established. For some time past the government of Brazil has taken great pains to establish amicably with the neighbouring states the boundary lines of the empire. In 1851 these were established with the republic of Uruguay, and at present (1854) commissioners of both countries are occupied in tracing the lines agreed upon. Treaties have been concluded with Peru, Bolivia, Equador, and New Granada, which have not yet been published. The negotiations with France and the republic of Paraguay are still pending.

According to the existing treaties, eight boundary lines are recognised, which we shall describe in detail.

1st Line—from the Ocean to the Uruguay.—1. The rivulet Chuchy extending 3610 fathoms (braças) from its mouth in the ocean, S. Lat. 33. 45., to its chief fording place, Lat. 33. 41. 52. 2. A straight line of 3805 fathoms, nearly an east to west course from the fording place of the Chuchy, as far as the fording place of the channel of São Miguel, opposite the fort of that name, and in the middle of it: Lat. 33. 41. 41. 3. The river of São Miguel, extending 4030 fathoms in a northerly course from its fording place, as far as its entrance at the bottom of the Gulf of São Miguel, the most southern point of the Lake Merim: Lat. 33. 36. 54. 4. West margin of the Gulf of São Miguel, and of the Lake Merim at the ordinary height of their waters, from the entrance of the stream of São Miguel as far as the mouth of the river Sanguarão: Lat. 32. 39. 12. 5. Straight margin of the Jaguarao, from its mouth in the Lake Merim, as far as its rise in the most southerly of its sources, in the mountain of Acegua above the Cuchilla Geral, which furnishes its waters, easterly towards the Lake Merim and the Lagoa dos Patos, and westerly towards the Uruguay: Lat. 31. 32. 6. Straight line to the N.W. from the source of the Jaguarao, as far as the entrance of the rivulet of St Luiz, on the right margin of the Rio Negro, crossing that river. 7. The stream of St Luiz, from its entrance as far as its rise in the Cuchilla of Sant' Anna. 8. The Cuchilla de Sant' Anna, which furnishes waters to the Rio Negro and Ibicuhy. 9. The Cuchilla de Haedo, which furnishes waters to the Rio Negro and Quarahim, as far as the point in which the Quarahim takes its rise, called the rivulet of Invernada in the map of the Viscount de São Leopoldo. 10. The stream of Invernada throughout its whole length. 11. The Quarahim from the mouth of the rivulet of Invernada, as far as its entrance into the Uruguay; the island or islands in the Uruguay from the point of the said entrance belonging to Brazil.

2d Line-from the Uruguay to the Paraná.-12. The Uruguay from the mouth of the Quarahim on its left bank, as far as the entrance of the Pepiry on its right bank: Lat. 27. 10. 30. 13. The Pepiry, from its mouth, as far as its principal source in the mountain, which furnishes waters respectively to the rivers Uruguay and Iguaçû: Lat 26. 10. 14. Straight line of 500 paces from the source of the Pepiry to the source of the Santo Antonio. 15. The river Santo Antonio, from its rise as far as its junction with the Iguaçû: Lat. 25. 35. 16. The Iguaçû extending 34 miles in a straight line, and with its windings, 23 leagues of 20 to a degree,

from the mouth of the Santo Antonio on its left bank, as far as its (the Iguaçû's) junction with the Paraná. Lat. 25. 35. 36.

3d Line-from the Paraná to the Paraguay.-17. The Paraná from the mouth of the Iguaçû on its left bank, as far as the entrance of the Garey on its right bank, immediately below the Salto Grande (Great Fall) of the Parana: Lat. 24. 4. 20. 18. The Garey, from its month, as far as its rise in the mountain of Maracaju. 19. Maracaju mountain, which furnishes waters for the rivers Parana and Paraguay; from the rise of the Garey, yet unexplored, as far as the source of the river Apá, also unexplored. 20. The Apá, from its rise as far as its entrance into the river Paraguay.

4th Line-from the Paraguay to the Madeira.-21. The Paraguay from the mouth of the Apá on its left bank, as far as the mouth of the discharge of Lake Bahia Negra on its right bank : Lat. 20. 25.; this point being at an equal distance from the Brazilian fortress of Coimbra to the Paraguayan fortress of Olimpo, and ten leagues on each side the Bahia Negra, which, as well as the stream which discharges its waters, runs north and south. 22. The said stream, which is six leagues in length. East bank of the said Bahia Grande, which is five leagues. 23. Straight line, N.E., ten leagues of the right bank of the Paraguay, by marshes, from the extreme north of the Bahia Negra, as far as the zenith of the angle which forms the southern and west sides of the mountain (serra) of Albuquerque. This line covers the fortress of Coimbra, which is on the southern point of a mountain above the right bank of the Paraguay, in Lat. 19. 55. 24. West side of the mountain of Albuquerque. This mountain, covered with dense and lofty groves, extends ten leagues on each side. The north side, on which is the garrison of Albuquerque, stretches perpendicularly with the Paraguay when that river turns to the east, in Lat. 19., to form the extreme southern point of the island of Paraiso; the east side is also washed by the river when it resumes its gen-ral course of north to south. The south side faces the fortress of Coimbra, from which it is distant ten leagues. The west side constitutes a portion of the boundaries of the empire. 25. The east face of the lofty and wooded serra, which, in its extent of twenty leagues north and south, covers with the west belt the isolated lake Mandiorê, which empties itself into the Paraguay, and the connected lakes Guahiba, Überava, and Jany, which empty them. selves into the same river by way only of the stream Guahiba, passing the said serra near the lake Mandiorê, and seven leagues to the west of the Uberava. Its extreme north is called *Ponta dos Limites* (Point of the Boundaries). 26. Broken line, west course, from the point of the boundaries as far as the right bank of the river Paragahû, in Lat. 15. 48. This line covers the serra of Aguapehy which separates the Argentine and Amazonian valleys, and from whose southern zenith, Lat. 16., with scarcely an interval of a fathom rise the rivers Aguapehy and Alegre which run parallel for the first seven leagues, and are shortly precipitated in two great falls on the northern face of the mountain, the Aguapehy to the east to join the Sauru, a tributary of the Paraguay, and the Rio Alegre to the west to enter the Guaporé. 27. The Paragahû, from the latitude of 15.48. as far as its mouth on the left bank of the Guaporé. 28. The line which covers the territory of the left bank of the Guaporé, from the mouth of the Paragahû as far as the mouth of the São Simão Pequeno on the same left bank of the Guaporé, three leagues below the Destacamento das Pedras, which is on the right bank: Lat. 12, 52, 35. 29. The Guaporé, from the mouth of São Simão Pequeno as far as its own mouth on the right bank of the Marmoré: Lat. 11.55. On this line is the fortress called Prince on the right bank of the Guaporé, 21 leagues above the mouth with the windings of the river, and 14 leagues in a straight line. 30. The Marmoré for the space of 44 leagues from the mouth of the Guaporé, as far as the junction of the same Marmore with the Berry, which forms the Madeira: Lat. 10. 22. A little below this confinence there is an island on the Madeira well adapted for a fortress.

5th Line-from the Madeira to the Amazons.-31. Right line from east to west from the above-mentioned latitude in the higher part of the Madeira, as far as the same latitude in the river Savary. 32. The Savary, from the Lat. of 10. 22., as far as the most western of its three mouths in the Amazons, Lat. 4. 17. 30. Opposite the Savary in the Amazons are three considerable islands, one of which is called the Ilha do Gallo. On the right bank of the Savary we have, besides the Amazons, the hamlet of S. Paulo or

6th Line-from the Amazons to the River Negro.-33. The Amazons, running up stream for the space of six miles; from the river Savary on its right bank as far as the garrison of Tabatinga on the left bank. 34. Garrison of Tabatinga on the left bank of the Amazons on firm ground. 35. Straight line from Tabatinga to the north as far as the mouth of the Apaporis on the left bank of the Japura, crossing this river. 36. Line from the mouth of the Apaporis in a

Physical Geography.

phy.

Physical northern direction, as far as the extreme western point of the hill of Guaicia. 37. Collina do Guaicia (Hill of Guaicia), from whence flow towards the south the sources of the rivers Scarra and Xié, tributaries of the river Negro, and towards the north the sources of the Memachy, the Aquio, and the Tornon, tributaries of the Guania (the name of the Rio Negro above the Caciquiare). 38. Line of level ground from the eastern extremity of the hill of Guaicia as far as the right bank of the river Negro opposite the Pedra do Cocuhy; six leagues in extent.

7th Line-from the river Negro to the Rupununy .- 39. Pedra do Cocuhy, also called Glorieta do Cocuhy, and also Pâo d'Açucar, on the left bank of the river Negro. Lat. 1. 20. N. Long. west of Greenwich, 67. 20.; an equally distant point (eleven leagues on each side) from the Brazilian fortress of São José de Marabitanas, and of the Venezuelan hamlet of São Carlos, both on the margins of the river Negro. 40. Straight line of 22 leagues in nearly an east course, level ground from the skirt of the Pedra do Cocuhy on the left bank of the river Negro as far as the middle of the Maturacá, which, in the high floods of the Cababoris, is a canal of communication between the Cababoris, tributary to the river Negro, and the river Barria, tributary to the Pacimony, which is tributary to the canal Caciquiare. Lat. 1. 8. N. 41. Straight line of six leagues, level road from the middle of the canal Maturaca as far as the mountain Cupy, which is the beginning of the great Cordilleira that extends to the east. 42. The Cordilleira which furnishes waters, to the south for the rivers Negro and Branco, and to the north for the canal Caciquiare and rivers Orinoco and Essequibo, namely:-Cerro Cupy, Serra Invery, Cerros de Guahy; Cerros de Ucuruciro, in an eastern direction to the distance of 43 leagues of 20 to a degree; Serra Parima, whose extreme south is called Serra Tapirapeco, and the northern extremity Cerros Machiaty, course N.N.W. for 50 leagues; Cerros Merevary, and Cerro Arivarra, in an eastern direction; Serra Pacaraima, which runs for nearly forty leagues to the east, taking a south-easterly course for 24 leagues, going back nearly south for twenty, and turning to the east for nearly 100 leagues, terminates in the Point Anahy. 43. Point Anahy, or Uanahy, of an altitude of 1500 feet, in the zenith of the angle formed by the river Rupununy, when it quits a northern course to take an eastern. Lat. 3. 55. 6. N. Long. west of Greenwich, exactly 59. The mouth of the Rupununy on the left bank of the Essequito is a little more to the north, and much further to the east, being in Lat. 3. 57. 45. N. and Long. 58. 20. 30. W.

8th Line-The Rupununy, north and south course, from the Point Anahy as far as its source in Lat. 2. 49. N. Long. west of Greenwich 58. 50. 45. The elevations which in the same course of north and south furnish waters to the west for the river Branca, and to the east for the Essequito. 46. The Cordilleira, which, with an east course, and with the names of Serra Acarahy, and Serra Tumucamaque, furnish waters to the south for the Amazons, and to the north for the rivers Essequibo, Corentyn, Marony, and Oyapoc. 47. The Oyapoc, from its source in the eastern extremity of the Serra Tumucamaque, Lat. 2. 24. N. as far as its mouth in the ocean, in Lat. 4. 22. 24. N.

Rivers.

The principal rivers of Brazil are the Amazon, and its tributaries the Tocantins, the Xingu, the Topajoz, from the south; and

Mountains.

the Rio Negro and Yapura from the north. See AMAZON.

From latitude 19° to 21° south, stretch the mountains of Itacolumi, 5710 English feet above the level of the sea, and of Itambi, 6900. These, and their connecting range, may be considered as the nucleus of the mountain formation of Brazil. Towards the north, and parallel to the coast, extends the Serra do Mar, under the varying names of the Serra dos Esmeraldos, Serra do Frios, &c. Towards the S.W. a similar, or rather the same chain (the Mantiqueira), stretches, throwing out spurs on either side, till it gradually subsides into the high plain on the eastern side of the Parana, near its mouth. By means of the Serra dos Vertentes the Itacolumi connects with the system known under the names of Montes Pyreneos, Serra do Sijada, and Serra do Anambuhy, extending in the direction of W.S.W. to the banks of the Paraguay, a little above where it receives the waters of the Parana. That part of the latter chain termed Montes Pyreneos extends towards the north to the sources of the Tocantins. An important arm of this latter, the Itiapamba, but of which little is yet known, runs out to the N.E., and loses itself in the northern sea-board provinces of Brazil. To the west extends the Serra Geral. To the south and the west, in the provinces of S. Paulo and Matto Grosso, these mountains attain an elevation considerably above the level of a high and extensive inland plain. To the N.E., in Minas Geraes and Goyaz, they rise from a much lower level above the sea. Nevertheless, while those mountains which have for their base the high inland plains of Piratininga and Matto Grosso seldom attain a higher elevation than 1900 Parisian feet above the sea, the average height of the Montes Pyrencos is 3900. From the Serra dos Vertentes, in Lat. 20° south, flow the streams which combine to

form the Rio Francisco; at first in the direction of north, afterwards curving towards the east, till it reaches the ocean in Lat. 11° south. On the southern declivity of the same serra arise the highest sources of the Parana. They flow at first in the direction of due west, receiving numerous tributaries to the north from the Montes Pyreneos, &c., to the south from the Serra do Mantiqueira. Having reached the base of the Serra do Sijada, in Long. 535 west, and Lat. 20° south, the Parana assumes a south-easterly direction, and, still receiving numerous tributaries from the two mountain ridges which bound its valley, joins the Paraguay in Lat. 27° south, and Long. 58° west. From the south-eastern declivity of the Mantiqueira descends the Uruguay to the estuary of La Plata. From the eastern side of the same ridge, and its northern continuation the Serra do Mar, a number of minor streams flow into the ocean. To the northward of the Serra dos Vertentes, the western streams of the Serra do Mar and the eastern of the Serra do Sijada flow into the Rio Francisco. From the southern declivity of the Serra Geral, and from the western side of the Serra do Anambaty, flow the confluents of the Paraguay. From the northern side of the Serra Geral, and from the central and eastern branches of the Montes Pyreneos, descend the four great tributaries of the Amazons, which join that inland ocean from the south, and the streams that intersect the coast of Brazil between Para and the mouth of the Rio Francisco.

The great constituent of all the mountain ranges of Brazil is Goology. granite; the maritime ridge seems exclusively composed of it. The soil on the shore consists of clay, covered in many places with a rich mould, resting on a bed of granite, mixed with amphibole, felspar, quartz, and mica. In the high inland plains of Piratininga we find on the surface a red vegetable earth impregnated with oxide of iron; beneath this a layer of fine argil, intersected with veins of sand; and, thirdly, an alluvial stratum containing a great quantity of iron, resting on mouldering granite, quartz, and mica. A mass of solid granite supports the whole. Between Rio Janeiro and Villa Rica the soil consists of a strong clay, and the rocks are composed of granite. The mountains in Minas Geraes are composed of ferruginous quartz, granite, or argillaceous schistus. Beds of limestone have been found near Sorrcaba, near Sabara in Minas Geraes, and in the gold mines near S. Rita. The immense central plateau of Matto Grosso has never been sufficiently explored; but from the nature of its mineral products there is every reason to believe that the granitic formation prevails there also. The Itiapamba, the great chain on the northern coast, consists chiefly of granite. The northern coast from Maranhao to Olinda is bounded by a reef of coral, in many places resembling an artificial mole. It is employed by the inhabitants in building their houses. The valley of the Amazons has been so little explored, and its impenetrable woods and luxuriant vegetation throw so many difficulties in the way of the geologist, that a long time must yet elapse ere we can hope for satisfactory intelligence. As far as the observations of Spix and Martius extend, its geognostical relations are sufficiently simple. All along the banks of the main stream, and of its tributaries, as long as they continue in the plain, only two mountain rocks are discovered—the variegated and the green sandstone. Sometimes the sandstone appears in the form of a composite breccia, containing iron; sometimes of a fine-grained crumbling red; sometimes of a hard white stone; but the former is the more prevalent. Beds of marl, clays of different colours, and porcelain clay, occur frequently. On the Tapajoz gypsum occurs in one place. To the south this sandstone formation is bounded by the granitic ridges of the Itiapamba, Montes Pyrencos, and Serra Geral. On the northern ridge of the first-mentioned chain a transition limestone is interposed between the granite and the sandstone. To the north the sandstone is bounded by the gneiss and granite of the Parimé range; to the westward, on the rivers Negro and Yapura, a quartz rock of slaty structure is the basis on which it rests. The western and south-western limits of the sandstone of the Amazons are imperfectly known.

The metallic and mineral products which occur in the geological Mineraformations above described are various. Iron is found in vast logy. quantities in the high plains of S. Paulo and in Minas Geraes. Entire hills are composed of brown iron ore and magnetic iron glance. In the latter province an argillaceous ironstone fills whole valleys, and spreads like a mantle over many of the hills. In Goyaz and Matto Grosso whole districts are covered with forma-tions rich in iron ore. Gold is next, in the extent of country through which it occurs, to iron. It is found in grains intermingled with the latter metal almost wherever it is worked. The chief scene of the exertions of gold-miners has hitherto been in the district of Minas Geraes, among the central mountains, and at the sources of the Paraguay. It is certain, however, that the gold country extends to S. Paulo on the south, and to the mountains among which the Tocantines arises on the north. The soil where the gold is found is ferruginous and deep in many places, resting

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Physical on rocks of gneiss and granite. The gold rests on a stratum of Geogra- cascalho or gravel, incumbent on the solid rock. It occurs sometimes in grains, sometimes in crystals, and occasionally in large masses. Lead and zinc have been found on the banks of the Rio Abaité, a tributary of the Rio Francisco; chrome and manganese in Paraopeba; platina in other rivers; quicksilver, arsenic, bismuth, and antimony, in the neighbourhood of Villa Rica; and copper in Minas Novas. The diamond occurs in greatest abundance in a district of the Serra do Frio, sixteen leagues from north to south, and eight from east to west, known by the designation of the diamond district. The little that is known of the territory of Matto Grosso, and the sources of the Tocantines, induces a strong belief that this gem is likewise to be found there. It is found in a stratum, of variable thickness, of rounded quartz-ore pebbles, cemented by an earthy matter. They are found along the banks of rivers, and in cavities and water-courses on the mountains. Fine crystals of euclase are found in Matto Grosso; and no country surpasses Brazil in the size and purity of its beryls. Lapidaries and jewellers continue to believe that the oriental diamonds have a finer water. Topazes occur in nearly the same localities as the diamond. They are found among a conglomerate of friable earthy talc, quartz, and crystals of specular iron ore; and they are of many colours, yellow, white, blue, &c. chrysoberyl, amethyst, and green tourmaline, have been found in the Serra dos Esmeraldos. Martius states that coal appears in the mountain district, but does not specify any locality. He explicitly asserts that none occurs in the valley of the Amazons. Vast quantities of culinary salt effloresce from the soil during the dry season in the upper districts of the Paraguay. Saltpetre is likewise said to be a product of the province, but upon questionable authority. In the upper district of the Rio San Francisco immense deposits of marl occur, strongly impregnated with this latter salt; so strongly, indeed, that the wells and rivulets contain a perceptible solution of it. In the neighbourhood of Arrayal are some caves which yield annually about 2250 cwt. of saltpetre. In Piauhy quantities of alum have been found efflorescing from the sandstone. The only fossil remains of animated beings occurring in Brazil of which we have any authentic account are found in these caves. Martius and Dollinger maintained that they correspond in every respect with the Megalonyx of Cuvier. They are scattered about in a fine greasy earth, which covers the limestone to the depth of eight inches. Bones, supposed to have formed part of a mammoth, have been found in Minas Geraes; and similar remains have been discovered in Bahia, near the Rio Solitre, and in Pernambuco. Bones resembling those of the megatherium, found in Paraguay, and now in the Cabinet of Natural History at Madrid, are said to have been seen near the Rio de Contas. We are not aware that any volcanic appearances have been observed in Brazil, unless the vague stories of hills where subterranean noises are at times heard may be supposed to indicate something of the kind.

Meteorology.

A country so extensive as Brazil, and so diversified in its surface, necessarily exhibits a considerable variety of atmospheric phenomena. The greater portion lies within the tropics, and has consequently the periodical interchange of wet and dry seasons. The narrow valleys, exposed to great heats, and surrounded by lofty mountains, have the vapours forced down upon them, and have a moist atmosphere. The high plains of the interior, the extensive level region of the northern coast, and the summits of the mountains, are comparatively dry. The wide valley of the Amazons, with its "boundless contiguity of shade," and "lakes, and ocean streams," is most subject to moisture. At Rio Janeiro, nearly on the level of the sea, and in Lat. 22. 50. S., the thermometer of Reaumur indicates, on an average, during the months of September, October, and November, a mean temperature of 20. 49. The highest observed by Spix and Martius was 23. 49., the lowest 15. 49. The rainy season lasts from October to March, and is heaviest in February. In September the hygrometer stands on an average at 49°, in October at 76°, in November at 85°. Owing to the proximity of the mountains, and the cooler atmosphere at their summits, the mists generally settle around their brows with considerable density towards evening. At Cachoeira, in the neighbourhood of Bahia, about the thirteenth degree of south latitude, and only six Parisian feet above the level of the sea, the thermometer of Reaumur gave, in February 1819, between six and seven in the morning, 17° to 19°, mid-day 25°, sunset 21° 23'. In Bahia itself the temperature at sunset is said to vary in the rainy season (September to March) from 17° to 18° Reaumur; in the dry months from 16° to 17°. The cloudless mid-day sun causes an extraordinary heat in the town; the sea breezes render the mornings and evenings cool; but the nights are warmer. At Oeyras, the capital of Piauhy, in about seven degrees of south latitude, and 779 feet above the level of the sea, the thermometer of Reaumur varies in the warm months at mid-day from 29° to 30°. Martius found it vary during the day re follows:-morning 23° 35', mid-day 24° to 25°, evening 23° 30'.

He does not mention in what month this was. The driest months Physical are July, August, and September. The south wind prevails during these months. The climate is healthy. Throughout the course of the Amazons the mean temperature is 22° of Reaumur; the lowest being 13°, and the highest 38°. Thunder-storms are frequent and violent in the highest degree. We have no observations with the hygrometer. S. Paulo, situated in Lat. 23. 33. S., is 1200 feet above the level of the ocean; and having a westerly declination of the surface of the ground, is consequently shielded from the sea breezes. The average temperature is 22° to 23° of the centigrade thermometer. The rainy season commences in November, and lasts till April. The greatest quantity of rain falls in January. Hoar frost is sometimes seen in the cold months. The prevalent winds are affected by the place of the sun: when he is in the northern signs, S.S.W. and S.E. winds prevail; when he is in the southern they are more variable. Villa Rica is situated in Lat. 20. 27. S., about 3760 English feet above the level of the sea. It is overshadowed by the huge mountain Itacolumi, the summit of which is 5710 feet above the sea, and surrounded by mountains on all sides. Here the average indications of the thermometer are, morning 12° Reaumur, mid-day 23°, evening 16°, midnight 14°. When the thermometer stood at 16° Reaumur on the summit of Itacolumi, it was found to be at 22° in Villa Rica. The temperature is agreeable enough to the sense, but the thunder-storms are frequent and violent. The wind among the mountain ranges is very variable, but cooling, from whatever direction it happens to blow. The cold weather in the months of June and July has frequently been known to affect the fruits. Respecting the temperature and other skyey influences of the high inland plateau of Matto Grosso we are entirely in the dark. Meteors are extremely frequent in the middle regions of the atmosphere in Brazil. Martius and Spix describe an immense mass of meteoric iron which they examined on their route from Bahia to Oeyras. Its estimated weight is about 17,300 Parisian pounds, it measures from 31 to 32 cubic feet, is extremely hard, and occasionally crystallized, and breaks in some places with a shelly impression. Except on the loftiest mountains, and on the wide sertaôs, the Vegetable

vegetation of Brazil is luxuriant beyond description. In the moun-productain passes in the neighbourhood of the sea-shore, the conjoint effects tions. of heat and moisture produce a superfluity of vegetable life, which man's utmost efforts cannot restrain. Trees split for paling in the neighbourhood of Rio Janeiro send forth shoots and branches immediately, and this whether the position of the fragments be that in which they originally grew, or inverted. On the banks of the Amazons the loftiest trees destroy each other by their proximity, and are bound together by rich and multiform lianas. In the province of Maranhão, the roots, grasses, and other plants, extending from the shores of pools, weave themselves in time into a kind of vegetable bridge, along which the passenger treads, unaware that he has left the firm earth, until the jaws of a cayman protrude through the herbage before him. The vegetable productions of Brazil have a strong analogy with those of Guiana. The most common are the compositæ, leguminosæ, euphorbiaceæ, rubiaceæ, aroideæ, and ferns of the most varied forms. The vegetation of the valleys differs from that of the campos, as it again does from that which occurs in the sertdos. Along the coast, the mangoes are the most numerous and prominent species. The most marked peculiarity of this class of plants is, that the seeds begin to shoot before they drop from the parent plant, and that the drooping branches strike roots into the soil. They are never found inland except where the surface is scarcely elevated above the level of the sea. They flourish from Rio Grande do Sul to Maranhão, converting the land into a morass wherever they are allowed to flourish unmolested. Immediately behind them numerous families of palms raise their graceful heads. The underwood in the neighbourhood of Rio Janeiro consists principally of crotons. Every large river of Brazil has its own appropriate form of vegetable life, giving a peculiar character to its banks. The vegetation of the Amazons may be divided into three classes; 1. that which we find on the islands; 2. the vegetation upon the banks overflowed at regular intervals by the stream; 3. that which stands high and dry. The difference between them consists in the character of the bark and the species of the plants. Brushwood and herbage are nowhere to be seen; everything tends to the gigantic in size. The most various forms group awkwardly together, crossed and intertwined with leaves. The preponderance of trees with feathery foliage, and with glossy, fleshy leaves, lends alternately a tender and a luxuriant character to the scene, which is in every other respect painful from its monotony. Representatives of the most estranged natural families grow side by side. It is only on the islands, where the willow and some other plants are found in numbers, that we are reminded of the monotony of our northern vegetation. Cocoa trees and the vanilla, capsicum frutescens, and different kinds of pepper, the cinnamon tree, and Brazilian cassia, abound. The flora of all the tributaries of the Amazons is similar

Geography.

Geography.

Physical to what we have described, until the traveller ascends above the falls, and finds himself in another region. The sources of the Madeira alone offer a partial exception, retaining a vegetation indicative of extensive plains, lakes, and morasses. The vegetation of the southern campos (corresponding to the North American prairies) is widely different. On the plains of the southern provinces we find scattered about strong tufts of grayish-green and hairy grasses, springing from the red clay. Mingled with these are numerous herbaceous flowers, of the most varied colours and elegant forms. At intervals small groves of trees, seldom exceeding twenty feet in height, so distant that the individual form of each is easily recognised, with spreading fantastic branches and pale green leaves, break the monotony of the scene. Solitary myrtles, numerous varieties of pleasing fruits, and now and then a cactus, add to the variety. A similar vegetation, but with a richer variety of plants, occurs in the diamond district. On the western declivity of the Serra do Mar, and along the upper banks of the Rio San Francisco. extends a wooded country, but of a character entirely different from that which is found in the valleys below. The name Catingas is applied to the forests in both of the above-mentioned districts, although their characters are entirely dissimilar. The term merely expresses that they cast their leaves during the dry season, and push them forth when the rains return. Malvæ, euphorbiaceæ, mimosæ, and such like, are the prevailing types on the Rio Francisco; cactuses, palms, and ferns, abound on the Serra do Mar. In this latter district the ipecacuan flourishes best. It is, however, in the glowing steppes of Pernambuco that we find the cactus predominant. In the valley of the Paraguay the most striking feature is presented by the water plants, which in one river are sufficiently strong to impede the navigation of a stream both deep and broad.

The forests of Brazil contain almost every species of useful and ornamental wood. The cocoa-tree is found in great quantities in the provinces on the sea-shore, and furnishes one of the most important items of internal commerce. A considerable surplus of cocoa is annually exported. One of the most valuable sorts of timber is furnished by the Ibiripitanga or Brazil-wood (Casalpinia brasiliensis), which yields a fine red dye. The wood itself is very hard and heavy, and takes a beautiful polish. It grew at one time in great abundance along the coast; but being a government monopoly (thence called pao da rainho, Queen's wood), it was cut down in a reckless manner, and is now by no means so abundant as it once was. The other trees most worthy of mention are the jaracanda or rosewood tree, the trumpet-tree, (Secropia peltata); the laurel; the soap-tree; the tapia or garlic pear-tree, and the whole family of palms. Not least important is the Siphonia elastica, or caoutchouc tree, which during the season is tapped every day, and furnishes in considerable quantities a gum which is poured into moulds, and when it attains the proper consistency, forms excellent shoes, bottles, &c. &c. The Banana is one of the most useful of all the trees that grow in Brazil, and its fruit is the chief food of the native Indians. The fruits of Brazil are numerous and excellent. The best of these are the pine-apple, the mango, the custard-apple, the guava, and the various kinds of melons and nuts.

In an empire of such vast extent as Brazil, embracing as it does, every variety of temperature and elevation, the value and importance of the agriculture products cannot fail to be very great. So small, however, is the number of farmers, compared with the extent of the soil, that it is believed that not one acre in 200 is under cultivation. In some provinces, especially those near the sea, the quantity of grain raised is not sufficient to supply the demand, and thus large quantitles of wheat are annually imported from the United States. The reason of this is that the soil under tillage is occupied in the production of articles for foreign markets. The chief products of Brazil are coffee, sugar, cotton, mandioc or cassava flour, tobacco, rice, maize, fruits, and spices. Of these by far the most important now is coffee, while sugar ranks next in value, and cotton after sugar. It was not until 1810, that Brazilian coffee came to be highly valued in the European markets. In that year, however, Dr Lecesne, a planter, expelled by the revolution from St Domingo, settled near Rio, and introduced the most improved methods of rearing the coffee-plant. So successful has the result of the new system been, that whereas in 1818 the annual exports of coffee did not amount to 80,000 bags, they now average nearly a million and a half of bags. Estimating the value of each bag at L.3, the total value of the coffee exports is not less than L.4,000,000. The cultivation of sugar has not increased nearly in the same proportion with that of coffee. It is produced in greatest quantity in the districts adjoining Bahia. The quantity of sugar exported in 1850 was 16,200 bales, representing a value of about L.1,700,000. Cotton is found to thrive best in the dry table-lands of the northern provinces, especially in Maranhao and Pernambuco. Its quality is considered excellent; but the rude and expensive method of its culture, and the high rates of carriage in these inland districts, operate very unfavourably for this branch of traffic. The annual value of cotton exported is not much above

L.800,000. The quantity exported to Britain in 1851 was Physical 19,339,104 lb. The tea plant has been recently introduced into Brazil, where it flourishes extremely well. Though not equal in quality to that of Chinese growth, it finds a ready market in Europe. It has hitherto been cultivated almost exclusively in the province of S. Paulo, but is beginning to spread rapidly through the empire, and threatens to supersede the cotton trade altogether. As its cultivation is of so very recent date, it is not yet possible to ascertain exactly the amount and value of the annual exports. Tobacco grows in greatest abundance in the neighbourhood of Rio, but, from its inferior quality, it cannot compete with that of the United States, and the demand for it is annually decreasing. Rice grows in considerable quantities, and, not being much used by the natives for food, a large surplus remains for exportation. The cassava or mandioc is extensively grown, and forms the staple food of the lower classes. The root, which is the part of the plant used for this purpose, contains a deadly poison. It is easily expelled, however, by the action of fire, and the residuum is ground into a wholesome and nutritious flower. Tapioca, which is extensively used in Europe, is a preparation from the root of the cassava. The quantities annually exported from Brazil alone, amount to about 1600 cwt.

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The varieties of animated life in Brazil are more numerous per-Animals. haps than in any other region in the world. Of beasts of prey, the most formidable are the jaguar or South American tiger, the ocelot, the tiger-cat, the puma, and the saratu, a kind of fox. Large herds of the peccary roam in the forests, in which also is to be found the tapir. This animal resembles the hog, but is many times larger, and is amphibious. It is capable of remaining a long time under water without rising to the surface to breathe. Its flesh is like that of the ox. The varieties of the monkey tribe that abound in the forests appear to be almost infinite. The Simia Jacchus has never been seen elsewhere. There are several varieties of bats, of which the Vespertilia leporinus and the V. spectrum are the largest. Two species of sloth, the Bradypus tridactylus and didactylus, are not uncommon. No less immense is the variety of birds, from the ouira, an eagle far larger than our most powerful birds of prey, to the humming-bird, no larger than a bee. The rhea, a species of ostrich, is found in Brazil. Snakes of every kind abound in the marshy districts, some of which, such as the rattlesnake, the jararaca, are remarkably venomous; while others, such as the boas, attain an enormous size and strength. A vast number of troublesome insects infest the margins of all the great rivers. Of these the most formidable is the puim, which is so small as to be scarcely visible, and inflicts a most painful and even dangerous bite. The red ant is peculiarly destructive to vegetation; and whole districts are sometimes laid waste by its ravages. The spider here attains an enormous size, but is not so venomous as might be expected from its appearance. The Brazilian birds are celebrated for the beauty of their plumage. "Red, blue, and green parrots," says Malte-Brun, "frequent the tops of trees. The gallinaceous jacus, the hoccos, and different kinds of pigeons, haunt the woods. The oriols resort to the orange groves; and their sentinels, stationed at a distance, announce with a screaming noise the approach of man. Chattering manakins mislead the hunter; and the metallic tones of the uraponga resound through the forest like the strokes of a hammer on an anvil. The toucan (ramphastos) is prized for its feathers, which are of a lemon and bright red colour, with transversal stripes reaching to the extremities of the wings. The different species of humming birds are more numerous in Brazil than in any other country of America. One sort is called by the people the Cnanthe engera or winged flower." The gayest butterflies flutter through the air, the blue shining Menelaus, the Adonis, the Nestor, and the Laertes. More than ten species of wild bees have been observed in the woods; and the greater number produce honey. The cactus coccinellifer, and the insect peculiar to it, are found in the province of S. Paulo. Lizards and caymans abound. The quantity of turtle in the Amazons and its principal tributaries is almost incredible. The waters swarm with fish, of which the only one entitled to notice in a sketch like this is the paranha, the tyrant of the fresh waters, which divides with the cayman the terror and hatred of the inhabitants. Of domestic animals, the most important are the horse. the ox, and the sheep. Vast numbers of horses, sprung from the original European stock, roam at large over the extensive plains of the southern provinces. They are generally found in droves of twenty or thirty. Oxen are also allowed to wander half wild. They are hunted down with the lasso in great numbers, and are valued chiefly on account of their hides, horns, and tallow, which are exported in immense quantities. The carcases are commonly abandoned to birds and beasts of prey, though they are sometimes salted and used as food. Sheep do not thrive in Brazil at all so well as the larger kinds of cattle.

III. Statistics.—The population of Brazil has been va-Populariously estimated at different times, and indeed even now tion.

Statistics, the facilities for investigating the matter are not great, service of the country, or large fortune, give a certain claim Statistics. To the natural difficulties the people themselves add new causes of incorrectness. Fearing the conscription, they conceal from the authorities the number of their sons; and to avoid payment of taxes and the contribution of labour for the benefit of roads and other municipal works, they likewise conceal the number of their slaves; a more difficult matter, however, as slaves are essentially a stationary population. The following are official data in round numbers extracted from the reports of the presidents of the different provinces presented to their legislative chambers:-

1	·				
Names of the Provinces.	Chief towns.	Date of the report.	Number of inhabitants.		
71 0 1 1 0 1	n				
Rio Grande do Sul	Portalegre	1848	260,000		
Santa Catharina	Desterno	1849	81,000		
Paraná	Coritiba	1853	67,000		
San Paulo	San Paulo	1853	546,000		
Rio de Janeiro	Rio de Janeiro	1851	823,000		
Espirito Santo	Victoria	1853	60,000		
Bahia	Bahia	1848	900,000		
Sergipe	Sergipe	1848	135,000		
Alagoas	Maceió	1849	208,000		
Pernambuco	Recife	1852	900,000		
Paraiba	Paraiba	1853	200,000		
Rio Grande do Norte	Natal	1847	160,000		
Ceará	Fortaleza	1853	210,000		
Piauhy	Oeyras	1848	120,000		
Maranhâo	San Luiz	1848	213,000		
Pará	Belem	1848	165,000		
Amazonas	Villa da Barra	1853	35,000		
Matto Grosso	Cuyabá	1849	48,000		
Govaz	Villa Boa	1849	100,000		
Minas Geraes	Ouro Preto	1852	1,300,000		
	0410 11000	1002	1,000,000		
Total for the 20 pr	Total for the 20 provinces,				
To compensate omi		se in some	6,521,000		
provinces since 1			479,000		
l					
The most approxim	ative total, .	•	7,000,000		

The classification of the different races in some of the provinces is entirely wanting; the following is subjoined as an approximation, drawn up from the data existing for several provinces:-

White population	2,000,000
Free mixed population, mulattoes, cafuses, a	nd
other varieties	1,000,000
Civilized aborigines	800,000
Mixed slave population	600,000
African, or black slaves	

Colonies of

Political

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tion.

There are 6 in Rio Grande do Sul, 6 in Santa Catha-European rina, 4 in San Paulo, 3 in Rio de Janeiro, and 1 in Espirito emigrants. Santo, numbering altogether in 1852, 20,833 inhabitants. The most flourishing is that of San Leopoldo in Rio Grande, which contains 10,576 inhabitants, and whose exports in 1852 were valued at L.120,000. The chief traffic is in articles of leather, such as saddlery, portmanteaus, &c.

There is no means of ascertaining the average number of emigrants from Europe who annually settled in the provinces or quitted them, but in 1853, 9610 foreigners established themselves in Rio, of whom more than 8000 were Portuguese, while 1976 left it, of whom likewise the great proportion were Portuguese.

The number of emigrants landed at the provincial ports may be calculated at a little less than that of those who landed at Rio.

The Brazilian monarchy derives from the ancient monarchy of Portugal the principle of hereditary succession to the crown. The laws of succession are defined with great distinctness in the constitution, and are the same as in Eng-

In Brazil there is no privileged aristocracy, but descent from the noble families of Portugal, length of time in the

to the privileges of aristocracy readily admitted by the Brazilians. The emperor rewards services according to their difficulty or importance with the titles of marquis, count, baron, or knight (moços fidalgos). In 1853 there were in Brazil 6 marquises, 5 counts, 17 viscounts, 66 barons, and 120 knights. Titles are not hereditary, but if a son prove himself worthy of his father, he inherits his title. There are in the empire three orders of chivalry adopted from Portugal, those namely of Christ, Aviz, and Santiago, and two created since the declaration of independence, those namely of Cruzeiro and Rose. Great numbers of crosses of the first and last of these orders have been distributed. That of Aviz is reserved for military services, and that of Cruzeiro for very important and extraordinary services exclusively. The senate represents the only element of aristocracy recognised by the constitution.

The democratic element preponderates in the constitution of Brazil, but its action is greatly modified by the complicated system of election.

The constitution established four powers, the moderator (what is called in England the royal prerogative), the legislative, the executive, and the judicial. The moderator is vested in the emperor, whom it empowers to select senators and ministers, to sanction laws, to convoke extraordinary assemblies, prorogue parliament, dissolve the chamber of deputies, grant amnesties and pardons, and suspend judges to be afterwards tried.

The legislative power is vested, for the affairs of the empire, in the general legislative assembly with the sanction of the emperor, and for the provincial affairs in the provincial assemblies with the sanction of the president (governor) of the province. The general legislative assembly consists of two chambers, that of deputies, and that of senators. The deputies are nominated by indirect election. Citizens, and even manumitted slaves, born in the empire, who possess an income of L.22, 10s., choose the electors in parochial assemblies, and these electors nominate the deputies. The qualification for an elector is an annual income of L.45; that of a deputy an income of L.90. Minors, monks, and servants, are incapable of voting; naturalized foreigners, and persons not professing the religion of the state, are incapable of being elected deputies, but they can be senators. The deputies are elected for four years, and must hold an annual session of four months, opening on the 3d of May. The senators are elected for life. Every province has a number of senators, equal to half its number of deputies; but they are nominated in triple lists, from which the emperor selects one-third. A senator must be forty years of age, and possess a clear annual income of L.180. The allowance of a senator is one-half more than that of a deputy. Each house nominates its own officers. When the two houses sit in general assembly, as at the opening and close of the session, to hear the emperor's speech, &c., the president of the senate presides, and the senators and deputies sit promiscuously. They sit apart, and proceed by way of bill, when they make laws, interpret and suspend them; they determine the public charges, and assess the contributions, &c. The chamber of deputies has the initiative in taxes, in recruiting, and in the choice of a new dynasty. The senate has the exclusive privilege of taking cognizance of offences committed by members of the imperial family, councillors of state, senators, and deputies, during the session; of enforcing the responsibility of secretaries and councillors of state; of convoking the assembly in case the emperor fail to do so within two months after the period fixed by law; and also of calling it together on the death of the emperor.

The executive power is vested in the emperor assisted by his ministers and secretaries of state, who are responsible for treason, corruption, abuse of power, acts contrary to the

Statistics, liberty, security, or property of the citizens, and waste of public property. From this responsibility they cannot escape upon the plea of orders from the emperor. The executive functions are the convocation of the general ordinary assembly; the nomination of bishops, presidents, governors of provinces; commanders by sea and land, and ambassadors; the formation of alliances, and all foreign negotiations; the declaration of peace and war; the granting letters of naturalization, &c. The ministers are six: one for each of the departments of home, justice, war, marine, finances, and foreign affairs. One of these is president or premier. To these is superadded a council of state, composed of ten ordinary and ten extraordinary members nominated by the emperor, and the imperial prince, if of age, is by right a councillor of state. This council is divided into as many sections as there are ministerial departments.

Every town and village, with the surrounding district, has a municipal council composed of seven or twelve members, elected directly by the citizens who possess an annual income of L.22, 10s. This council is charged with all that concerns the good of the district, meets four times a-year, besides extraordinary sessions, and every meeting may last as many days as may be found necessary for the expedition of business. They impose fines to a certain amount, and even enforce their decrees by a penalty of thirty days' imprisonment. They annually draw up a municipal budget, which is submitted to the provincial legislative assembly for approval. If their revenue and the produce of fines be not sufficient to defray expenses, an allowance from the provincial treasury is granted. Their decrees are called posturas, and the penalties imposed by them are applied to the infractors by the justices of peace. Their enactments can be annulled by the provincial legislative assembly.

Judicial system.

Each parish has four justices of peace elected for four years, but only one is actively engaged for the year. They are nominated by the citizens in the same manner as the municipal councils. No one can bring a case into court without having previously attempted a conciliation with his adversary before a justice of peace. Trial by jury is authorised for civil as well as for criminal cases. Each province is divided into comarcas, and then into municipalities. In each comarca there is a judge called Juiz de Direito, who presides at the sessions of the jury, in every municipality, twice or thrice a-year. In each municipality there is a municipal judge, who decides in civil cases, and prepares the process for the criminal. The decisions of this judge may be amended by the Juiz de Direito. Both must be doctors of law. The empire is divided into four appeal districts, in each of which there is a Relação (court of appeal), composed of fourteen members. There is, besides, in Rio a supreme court of justice, composed of seventeen members, whose duties are to permit or refuse the revision of causes, to try its own members, or those of the court of appeal, the members of the diplomatic body, and the presidents of provinces, and to decide on disputed cases between the other courts. Promotion by election is made from municipal judge to Juiz de Direito, and from this grade to that immediately above it. Admittance into the supreme court can only be obtained by seniority. All judges are responsible for abuses of power, and for corruption. They may be removed from one district to another, but cannot lose office except by sentence.

The civil laws, originally the same with those of Portugal, have been greatly modified by a number of new ones. A criminal code was organized in 1830 on the principles of Jeremy Bentham, and is considered very perfect and clear. The new form of procedure, and the new organization of justices, is embodied in a code decreed in 1832. Finally, a new code of commerce, nearly copied from that

of France, was decreed in 1850. Finances.

To carry on the war of the independence, and to crush a subsequent revolution in the northern provinces, the government contracted two loans in 1824-5, of the nominal amount of L.3,686,200; and on the recognition of its independence by Portugal in 1825, it undertook the liability of a loan of L.1,500,000. The war with Buenos Ayres, and the assistance rendered by Don Pedro to the constitutional party of Portugal, led to two farther loans in 1829, of the nominal amount of L.769,200. Internal difficulties in 1839 compelled the regency to contract another loan of the nominal amount of L411,200. The dissensions in Portugal caused a temporal suspension in the payment of the dividends on the Portuguese loan, and in 1842, L.732,600 stock were delivered to the Portuguese agents in settlement of this claim. The debt contracted Statistics. and assumed by Brazil between 1823 and 1843, therefore, amounted to L.7,099,200 nominal; and throughout all its difficulties and embarrassments the imperial government punctually and honourably provided for the dividends as they became due. Their disorder, so long as it existed, was wholly borne by the Brazilian people, on whom, for a season, it fell with great severity.

By the renewal in 1844 of the sinking fund, the operations of which had been suspended in 1828, the Portuguese loan of L.1,500.000 was reduced to L.954,250; and on its expiration in July 1852, it was paid off by a new 4½ per cent. loan of that amount, contracted for at 95. In the same way, reductions of the other loans have been made, and now the foreign debt of Brazil stands only at L.4,900,000, 5 per cent. stock, and L.1,000,000, 41 per cent.: total, L.5,900,000. Gradually, it is in process of farther reduction, and if the operation of the sinking fund be, as is intended, persevered in, at no very distant period, the foreign debt of Brazil will be extinguished.

The deficiencies of former years have been funded and form the greater part of the internal debt of Brazil. The total funded debt of the empire now stands thus:-

FOREIGN DEBT.

Balance of	5 per cent. 1	oan of	1824	L.3,197,800
•••	•••		1829	597,500
•••	•••	• • •	1839	391,200
•••	• • •		1843	673,200
•••	41 per cent	. loan of	1852	1,035,100

 L.5,894,800 Internal Debt..... 6,167,490

Total Debt of Brazil..... L.12,362.290

It thus appears that with a revenue of nearly L.4,000,000 a-year, the Brazilian debt, foreign and domestic, does not much exceed three years' revenue. This is a proportion such as few states can

For a few years previously to the declaration of the emperor's majority, the imperial expenditure had not been very largely in excess of the revenue. In 1836-7, the deficit was reis 476,825,000; in 1837-8, reis 885,100,000; in 1838-9, there was even a surplus of reis 40,591,000; in 1839-40, the deficiency was increased to reis 1,033,946,000; in 1840-1, the year of the emperor's majority, it rose to reis 3,639,608,000. In consequence of the greater vigour then resorted to in reducing a rebellion which had been raging since 1835 in the province of Rio Grande do Sul, the deficit went on augmenting until after 1844, when these efforts were crowned with success. In 1841-2, the deficit was reis 6,212,609,000; in 1842-3 reis 5,724,843,000; in 1843-4 reis 6,620,866,000; in 1844-5 reis 9,484,520,000. Nor was it for three or four years after the pacification, that the deficit entirely disappeared. In 1849-50, however, there was a large surplus after payment of all expenses, of reis 3,035,006,000 or L.341,438; in 1850-1, the surplus was reis 3,552,404,000 or L.399,645; in 1851-2, reis 4,010,220,000, or L.451,149; in 1852-3, reis 3,970,202,000 or L.446,647; in 1853-4, reis 3,528,934,000 or L.897,005. To sum up, while in the eleven years, 1836-1848, the deficiencies in the Brazilian finances altogether amounted to reis 40,550,675,000, in the last five years there has been an aggregate surplus of reis 18,096,766,000, or L.2,035,885.

The revenues of Brazil have risen in that period (from 1836 to 1854), from reis 12,265,262,000, their lowest point in 1837-8, to reis 35,646,407,000, or L.4,010,220, the highest in 1851-2, about which sum it seems reasonable to estimate them for succeeding years. The following table gives the revenue and expenditure for the last five years.

Years.	Reccipts.	Expenditure.
1849-50	26,977,836,000	Reis.
1850-1	31,576,930,000	23,942,830,000 27,864,404,000
1851-2	35,646,407,000	31,636,187,000
1852-3	35,290,691,000	31,320,489,000
1853-4	34,000,000,000	30,471,066,000

Under the influence of the new tariff of customs'-duties, issued 12th August 1844, combined with growing prosperity at home, greater liberality of treatment of its produce in foreign markets, and with an improved collection of the customs' revenue, a state of chronic deficit has been changed into one of large surplus. The government of Brazil has availed itself of financial prosperity to establish naval and to extend and perfect judicial means for the effectual suppression of the slave trade, has reduced the tonnage duties on shipping by two-thirds, has lowered some oppressive internal taxes, and abolished others, has already made some partial modifications of her customs' tariff, and is now engaged in preparing a measure for a general diminution of import, and the entire repeal of export duties.

Statistics.

The

Church.

Estimates for the fiscal year, ending the 30th June 1854:-REVENUE.

2,515,800,000 246,600,000
246,600,000
,634,500,000
146,000,000
258,300,000
1,097,900,000
803,300,000
279,050,000
5,929,550,000

Total...... Reis, 34,000,000,000 or L.3,825,000 EXPENDITURE.

Home department	Reis,	3,760,318,000
Justice	• • • • • • • · • · • ·	2,278,291,188
Foreign	• • • • • •	654,546,000
Marine	••••	3,869,434,990
War		7,325,448,027
Financial		12,583,027,765

Total...... Reis, 30,471,065,970 or I.3,427,995

Surplus..... L.397,005

In addition to the above imperial revenues of Brazil, each of the twenty provinces has a separate revenue, raised by the authority of its provincial assembly, and spent on its own local objects, amounting altogether for the twenty provinces to about one-third

of the imperial revenue.

The Roman Catholic religion is the established religion of the empire. All other forms of worship are tolerated, but may only be practised privately. Dissenters enjoy all political and civil rights, with the sole exception of being elected into the chamber of deputies. There is one archbishopric in Bahia, with suffragan bishops in Rio de Janeiro, Pernambuco, Maranhão, Pará, San Paulo, Minas, and Goyaz. Every bishopric is divided into a convenient number of parishes, according to the population; a vicar is attached to each parish, and assisted by other priests if necessary. The peculiarity of the ecclesiastical organization of the Brazilian church is, that the clergy do not receive the tithes. As a conquest of the military and religious order of Christ, all the churches of Brazil belonged from the beginning to that order, whose grand master appointed the bishops, and submitted them directly to the approbation of the Pope. The order became so powerful that the king obtained the union of the grand mastership to the crown, and so disposed of all the livings and other benefices of the order, and paid from his treasury the salaries of the clergy, receiving the tithes from the people, as a civil tax. The tithes were afterwards abolished as oppressive. This organization is still recognised by the Holy See, and in the capacity of grand-master of the order of Christ, the emperor appoints all the bishops and other ecclesiastical functionaries. There are convents of Franciscans, Carmelites, and Benedictines. These are very rich, and generally very learned men, who are usefully employed in teaching the sciences. They pay double annual taxes as a compensation to the treasury for not paying taxes upon transfers of property, as theirs is not transferable.

Literary establishments, and public instruction.

In every parish there is a schoolmaster for boys, and a schoolmistress for girls. As education is free, they receive no fees from their pupils, but a salary from the provincial treasury. In every large town there is a Lyceum, maintained also by the provincial treasury. From the scholars of these establishments a small annual fee is exacted. In those lyceums, the Latin, French, and English languages, rhetoric, philosophy, geography, mathematics, natural philosophy, and chemistry, are taught. In the less important towns and large villages the course of instruction at the lyceums is limited to Latin, French, and philosophy or rhetoric. In every bishopric there is a theological seminary supported by the property belonging to the see. The advanced sciences are taught by the respective faculties, forming together the university, and distributed in the following manner. The civil and common law, political economy, and other social sciences are taught in San Paulo, and Olinda; mathematics, and their application to engineering, in Rio de Janeiro; medicine, surgery, zoology, mineralogy, botany, chemistry, and physics, in Bahia and Rio de Janeiro. All the salaries of the professors, as well as all the expenses for the higher sciences, are defrayed from the imperial treasury.

Besides the public establishments of education, there are many private ones. The public library of Rio de Janeiro is a very rich one, and contains more than 100,000 volumes; in the other important towns there are also good libraries, museums of zoology

and mineralogy, open to the public. The effective strength of the army and navy is every year fixed by the general legislative assembly, upon the data furnished by the VOL. V.

ministers of the two departments. The army is organized on the Statistics principles established by Marshal Beresford when in the service of Portugal. It is principally from the northern provinces that the infantry is recruited, and from the southern that the best cavalry is obtained.

The actual army is thus composed:-

Stoff on d	Men.
Staff and engineers	355
Infantry	12,785
Cavalry	2.350
Artillery	3.517
Sappers and miners	1,091
	20,098

Besides the regular army there is the national guard, organized since 1831, on the same plan as that of France; the subaltern officers being elected by the soldiers, the superior officers by the subalterns, the generals, instructors, majors, adjutants, serjeants, named by the government. These appointments are for four years. The national guard is divided into three classes, the first of which may, in the event of war, be called upon to serve on the same terms as soldiers of the line. The total effective strength of the national guards is as follows :---

Artillery		6,593 2,194
	Total	106 930

The navy is principally manned by civilized aborigines, organized in bodies called imperial sailors, with a certain military discipline, which has of late proved exceedingly beneficial. The aborigines have a peculiar aptitude for a maritime life. Officers destined for the Brazilian navy receive a suitable education in the naval school of Rio, and for some years the government introduced the practice of sending the more apt scholars to serve in the British, French, and American navies. In this way a body of efficient naval officers is gradually being formed.

The naval forces for the present year 1854 are fixed thus:-

These 66 ships are manned by 6000 sailors, including gunners and marines.

It is obvious, from the insufficient establishments for general Character education, that the intellectual development of individuals must of the Bra have been for a long period achieved in a great measure by unaided zilians. exertions. Now things are better, but in the more thinly inhabited districts devotion to such pursuits must not be expected in men exclusively occupied in procuring subsistence and securing self-defence. Even where the population is more dense, a lazy feeling of animal comfort represses the exertions of the majority. It is among the more aspiring class, who aim at the learned professions or state employment, and who are consequently obliged to cultivate their minds, that we must look for that attachment to intellectual pursuits which is rarely acquired except from habit. In the theological seminaries, established at the seat of each bishop, little more was inculcated than a knowledge of the classics, an outworn scholastic system of logic, and a knowledge of the routine duties of a priest. The schools of medicine in Rio Janeiro and in Bahia, from the attention bestowed upon practical surgery and anatomy, have done more to awaken the mind. The number of situations under government requiring a certain knowledge of practical mathematics and natural history, has been made more efficient in diffusing a knowledge of and a taste for these kindred pursuits. The number of foreign engineers and naturalists encouraged to settle in Brazil has rendered the natives in some measure acquainted with all that has been of late achieved in Europe in the mathematical and experimental sciences. Late events have forced upon the inhabitants a number of political questions, which, coming home to every man's business and bosom, have excited the whole community.

In parliament and by the press the most delicate political questions have been discussed with success, and the progress of the government and of legislation evinces a certain auministrative foresight and prudence rarely displayed by other new states.

The Brazilians who frequent the university of Coimbra in Por-

tugal often distinguish themselves among their fellow-students;

2 P

Army and navy.

Statistics. and notwithstanding the difficulties they have to contend against, onot unfrequently rise to the highest offices of the state.

The most remarkable writers in the Portuguese language on political economy and commercial law were Couttinho, bishop of Pernambuco, and Silva Lisboa, afterwards Viscount de Cayron, a senator of the empire, both Brazilians. Among historians the Brazilian Rocha Pita is distinguished. Portugal is poor in dramatic literature, but one of her most distinguished comic poets was the Brazilian Silva, who afterwards fell a victim to the inquisition of Lisbon. In epic poetry, on the other hand, Portuguese literature is rich. Brazil claims the authorship of two of its most beautiful poems of this class, the Caramuru of Durâo, and the Uruguay of Gama. The best of the minor poets is Gonzaga, whose collection of lyrics is well known under the title of Marilia de Dircêo. Little inferior to him is Souza Caldas, whose translation of the Psalms denotes a talent of the first order. Claudio, Avarenga, Gregorio de Mattos, Euzebio de Mattos, Gusmão, in former times; and in modern, Odorico, Mendes, Borges de Barros, Domingos Magalhaês, Marquis of Paranagoá, A. de Macedo, Porto-Alegre, Barbosa, and others, are well worthy of notice as lyric poets.

Religious eloquence was formerly much cultivated in Brazil, and Vieira is one of the most original and eloquent preachers known. In more recent times S. Carlos and Montalverne deserve particular notice. In the natural sciences Frei Leandro, Arruda, Camara, and José Bonifacio de Andrada, are known for their works and discoveries. In sacred music José Mauricio, a mulatto, left compositions of

merit that were executed in the chapel of D. John VI.

The Brazilians have a natural taste for music, and an Italian theatre maintained with but little interruption in Rio de Janeiro, has assisted in improving and refining this taste. The old fashioned Brazilian instrument, which was a particular kind of guitar, has almost disappeared from the large cities, but is still frequently employed in the provinces to accompany the modinhas (romances) which are peculiar to Brazil, and which have a particular style.

The school of the fine arts of Rio de Janeiro has produced some good but no remarkable painters. Of late, however, the most promising artists have been annually sent to Italy at the public expense to prosecute their studies in that country.

There is in the Brazilian national character, with great mildness and generosity, a certain tendency to vindictiveness. Homicides for the sake of vengeance alone are proportionally as numerous in Brazil as in certain countries of Europe; while the crimes against property are much fewer. The greatest number of homicides, however, takes place in the most backward provinces of the centre and north.

The Roman Catholic religion predominates in Brazil, and although there are enlightened men among the clergy, a great number of the priests are ill educated, and the institution of celibacy keeps the members of the principal families from entering the profession. Such is the want of priests that the government finds itself obliged to send to Italy for them. Among educated classes the spirit of materialism of the French writers of the eighteenth century made great progress, but a considerable reaction has lately taken place. The lower classes, above all in the interior, are still deplorably superstitious.

The Brazilians are in general hospitable, generous, and charitable, endowed with great pride and vanity, and susceptibility of character, and are easily led away by flattery. The unlimited power they exercise over the African slaves, and the colonial system from which they have but a short time been freed, the imperfect religious education, the facility with which they can live in abundance at small cost, while the climate enables them to dispense with many things necessary in other countries, the enervating effects of the hot atmosphere, all combine to indicate the qualities and vices which

we must expect in this people.

Except a few rude manufactures for family use, this branch of national industry is in Brazil confined to mining operations, the smelting of metals, the polishing of precious stones, the manufacture of salt, ship-building, tanning and dressing hides, and the making of oil. In the town of Rio, the number of gold and silver smiths appears to a stranger astonishing. Like the other tradesmen they live in a street by themselves. Though they cannot yet compete with European artizans in the matter of taste and elegance, their wares are far from being destitute of either. So great is the dearth of mechanics, that when, in 1844, some French workmen arrived, the provincial government "induced three of them, a carpenter, a cabinet-maker, and a blacksmith, to establish themselves in the country; and this event was deemed so important as to be officially noticed in the President's message to the next provincial assembly. Skilled labour of every kind is very scarce and expensive. Machinery of every description is thus kept in its present rude and primitive form, and the general development of the interal resources of the country retarded.

The diamond washings, with the exception of a few of which but

little is known, are confined to the diamond district in Minas Geraes, Statistics. and are still conducted on the ill-judged system of a government monopoly. The cascalhao, mentioned above, is dug up and removed to a convenient place for washing. As much is raised during the rainy months as is expected to give employment to the slaves for the other six. It is deposited in heaps of from five to fifteen tons. A shed is erected in the form of a parallelogram twenty-five or thirty yards long and about fifteen wide, composed of upright posts supporting a thatched roof. A stream of water is conveyed down the middle of the area of this shed, covered with strong planks, on which the cascalhao is laid two or three feet thick. On one side of the canal is a flooring of planks from four to five yards long, imbedded in clay, extending the whole length of the shed, and having a slope from the canal of three or four inches to a yard. This flooring is divided into twenty compartments or troughs, each of about three feet in width, by means of planks set on edge. The upper end of each trough communicates with the canal. Three overseers take their seats at equal distances on high chairs placed on the heaps of cascalhao, on the side of the canal opposite to the troughs. As soon as they are seated a negro enters into each compartment, provided with a short handled rake, with which he draws to him fifty or eighty lb. of cascalhao. He then lets in water upon this, and keeps stirring it with his rake until the earthy particles are washed off; upon which, throwing out the largest stones, he carefully examines the rest for diamonds. As soon as he finds one he rises and holds it out between his finger and thumb; an overseer receives it from him, and deposits it in a bowl half full of water, suspended from the centre of the structure. At the close of the day's labour, the diamonds obtained are taken from this deposit and delivered to the principal overseer, who weighs and registers them. On an average the mines yield 20,000 carats annually. The establishment is burdened with a load of debt incurred to foreigners for advances of money at the time that government first took it in hand. It is calculated that the diamonds cost government 33s. 9d. per carat. The washings give employment and support to a population of about 6000. The trade in gems which have not been deemed of sufficient importance to be claimed as regalia, centres in Minas Novas. The dealers in precious stones have their residences for the most part in The greater part are sent in a state of nature to Bahia and Rio Janeiro; some, however, are polished, rudely enough, in the neighbourhood.

The gold country extends over Minas Geraes, Goyaz, Matto Gold Grosso, and part of S. Paulo. In all these districts the winning of mines. this metal is pursued in a manner exactly similar. It is found either in the beds of rivers, or in veins, at times twenty feet under the surface, at times close under the roots of the grass. Like diamonds, it is found intermingled with cascalhao. This mass, with the auriferous particles, is removed from its site to a convenient place for washing. Where water of a sufficiently high level can be obtained, the ground is cut into slips twenty or thirty feet wide, two or three broad, and one deep. Near the bottom is a trench two or three feet deep. On these steps the cascalhao is deposited, and on each stand six or eight negroes, keeping it in motion with shovels as the water flows gently upon it from above, until the whole is reduced to liquid mud and washed down. In the trench the particles of gold, from their weight, quickly precipitate. Other negroes are busy clearing away the stones and removing the surface mud. After five days' washing the precipitate is carried to some convenient stream. Here each negro is provided with a bowl of a funnel shape, about two feet wide at the mouth, and five or six inches deep. Standing in the stream, he takes about six lb. of the sediment into his bowl, admits regulated portions of water, and keeps moving the sediment until the gold deposit itself at the sides and bottom of the vessel. He then rinses the bowl in a larger vessel of clean water, and begins again. This operation occupies about five minutes. When the particles of gold in the sediment are very minute, troughs similar to those employed in diamond washing, but longer and narrower, are constructed. On their bottoms are stretched hides, tanned with the hair on, or pieces of rough baize. The water containing the sediment is conveyed down these, and the gold precipitating in the course is entangled in the rough surface. Every half hour the hides are carried to a neighbouring tank, stretched over it, dipped, and beaten repeatedly. The gold is found at the bottom of these reservoirs mingled with esmeril, from which it is separated by the aid of mercury. The whole business is carried on in a most cumbrous, inartistic, and wasteful manner. The gold thus procured is brought to the nearest mint, where the crown's fifths are deducted, and the rest refined and melted. The deliverer may either have his gold in the form of an ingot, with the public stamp, or he may have a receipt for it, which entitles him to receive the amount from any mint in Brazil. This business gives employment to the great bulk of the population in Minas Geraes, in Matto Grosso, and in Goyaz. The total amount of gold obtained from the Brazilian mines, from their discovery till 1803, according to the registers, amounted to L.155,000,000

Diamond mines.

tures.

Brazil Brazil sterling. Of unregistered gold, it is estimated that the value was It is only pursued in small boats near the shore. The pans in which nearly L.40,000,000. From 1811 to 1825, the annual average of registered and contraband gold was 1971 lb., representing a value of L.127,144. The Congosoco mines, as wrought by the Anglo-Brazilian Mining Company, are very productive. In 1829, the value of gold from these mines was L.258,876 sterling. Its profits are not now so great as they were in that year, but are still considerable.

Iron-foundries.

The iron of Brazil has hitherto been almost entirely neglected, although no country is richer in this invaluable metal. In 1817-20 there were, as far as we have been able to learn, only the following iron-works in the empire: 1. That of Ypanema, in the province of S. Paulo. The immense deposit of magnetic iron ore in this neighbourhood was long worked in an unsatisfactory manner. In 1810 a company of Swedish miners and founders settled there, and erected two small refining furnaces. In 1817 they produced yearly 4000 arrobas of iron, which was manufactured on the spot into horses' shoes, nails, locks, and other articles. A larger establishment, with two smelting and several refining furnaces, and bellows moved by water, had been built at that time, but was waiting for workmen from Germany. Nothing more has been learned of its fate. 2. To the N.W. of Antonio Pereira, near the centre of Minas, Eschwege erected a small iron foundry in 1816, and intrusted the management of it to a German overseer. The daily produce was in 1818 two arrobas. It was worked up on the spot into hatchets, knives, billhooks, horse-shoes, and nails. 3. At Gaspar Soares, in the same province, a foundry on a large scale was erected in 1812 at the king's expense. It consisted of one smelting and two refining furnaces. The first mentioned had never been used, and the other two were lying idle when visited by Spix and Martius. The ore is excellent, and a canal might be dug at comparatively little expense, to the navigable portion of the Rio Doce. There were several furnaces in the province belonging to private individuals, and a considerable quantity of iron was brought from Rio, but still the supply was deficient.

The most important salt country in Brazil commences at the Rio Salt mines. The most important sant country in actual de Salitre, a tributary of the Rio de S. Francisco, about six leagues from Joazeiro. At this place an artificial hollow extends along the river for the space of 60,000 square feet, and a fine, soft, ochre-coloured earth forms the bottom of the trough. The annual floods melt the saline particles contained in this mould; and when the river falls, a salt pool is left. The heat of the sun then evaporates the water, and the surface is left covered with hollow quadrangular pyramids of the salt. The soil is of a similar conformation along the bed of the S. Francisco for an extent of nearly two degrees of longitude, and everywhere nearly thirty leagues in breadth. Hollows, such as we have described, natural or artificial, are scattered over the whole extent. These are the salt mines of the country. The greater number belong to the wealthy landholders on the Rio de S. Francisco; but many, especially on the western side, are yet unappropriated, and may be worked by any one. At certain seasons this district is visited by immense multitudes, some coming from very great distances. The earth is dug up to the depth of an inch, and deposited in wooden troughs; then water is poured upon it, which absorbs the salt. The earth is allowed to subside, upon which the water impregnated with salt is drawn off into another trough, and left to crystallize in the heat of the sun. The salt is packed in four-cornered bags of cow-hide, each containing from 30 to 40 lb. A plate of salt is valued at from 20 to 40 reis; a sack at from 300 to 400. The annual produce of the salines exceeds 35,000 sacks. Salines nearly as productive are found at the sources of the Paraguay, in Matto Grosso; and considerable quantities of salt are manufactured on the shores of the northern provinces. Between the salt district and the hills saltpetre occurs in great quantities. Fifteen leagues above the Rio de Salitre, large caves are found in the limestone-rock, filled with black earth, which sometimes contains three-fourths of its weight in saltpetre. This is washed out, and the water heated to a certain degree, in order that it may deposit the culinary salt; the saltpetre is then left to crystallize. A similar process is followed at Formigas, near the source of the S. Francisco.

Ship-building.

Ship-building is diligently pursued at more than one station along the coast. The port of S. Francisco is the most southerly point at which the construction of vessels is carried on to any extent. Vessels of large size, and a number of small craft for coasters, are built The demand for ship-carpenters is always brisk. To the north of Bahia, on account of the reef, the ships built are generally of a small tonnage. Laranjeiras, Itapicurù, and Villa do Conde, build vessels capable of holding from 4000 to 8000 arrobas of lading. Pernambuco fits out a great number of small craft. The royal docks at Bahia are small, and few ships of war are built there; but such as are have the character of surpassing even the East Indian vessels in durability. Merchant ships are for the most part built at Tapagipe, about a league and a half to the north-east of the city. The whale-fishing stations are S. Catharina, Itaparica, and Bahia.

the blubber is boiled are small, and heated by common stoves. The receivers are extremely apt to collect dust and dirt of all kinds. Whale-Throughout Brazil, not above 100 fish, great and small, are taken Whatein the course of a year. Each yields, on an average, from fourteen to eighteen pipas (150 gallons English each) of train oil; and the value of this oil, together with the whalebone, may amount to L.150. On the islands of the Solimoes (Upper Amazons), a considerable quantity of oil is yearly collected from the eggs of the turtle, which are dug up, broken in the boats, and left till the light oil separates and swims on the top. It is boiled and separated from the impurities, when it assumes the colour and consistency of lard. This product is deposited in earthen pots containing fifty or sixty pounds Of these more than 8000 are yearly prepared on the Ama-The Madeira yields 1000. The drying and salting of fish is carried on to a considerable extent along the sea-coast, on the Amazons, and upon a large lake near the salines on the Rio de Francisco. A coarse kind of woollen cloth for home consumption is manufactured at S. Paulo. Hats are made at S. João d'el Rey. There is an establishment for the manufacture of arms in the town of S. Paulo; a powder-mill in the neighbourhood of Rio, and one of less importance in Minas. A coarse cotton cloth is woven in Goyaz, Maranhão, and Sergipe d'el Rey, used to clothe the slaves, or form bags for packing cotton. In S. Paulo, Goyaz, and Para, tannng

The commerce of Brazil, despite the disadvantages against which Commerce. it has had at various times to contend, has been on the whole uniformly progressive. These disadvantages consisted chiefly in the restrictions originally imposed on the young colony by the jealousy of the mother country, which refused to admit the Brazilian products, except at certain stated seasons of the year. The exportation of native productions to the old world was limited to the ports of Rio, Bahia, Olinda, and Paraiba. These restrictions continued in force long after analogous measures had been exploded in the commercial systems of other countries, and were not repealed till the beginning of the present century. In 1810, all the ports of Brazil were thrown open to British goods on the payment of duty at the rate of 15 per cent.; and though this rate has been greatly increased by the tariff of 1844, the average annual value of manufactured goods imported into Brazil from Great Britain alone, during the last ten years has been nearly I..2,500,000.

is carried on to a small extent.

The following tables exhibit the state of trade in Brazil in 1853-54 as compared with 1843-44.

Value of Imports to, and Exports from, Foreign Countries.

	IMI	PORTS.	EXPORTS.		
	1843-4.	1853-4.	1843-4.	1853-4.	
Great Britain	.L.3,318,975	L.5,121,112	L.1,186,425	L.2,442,262	
France	. 784,800	1,107,450	300,487	671,175	
United States	. 736,987	864,900	1,229,400	2,442,825	
Portugal	. 491,512	646,312	460,912	408,712	
Hanse Towns	. 288,562	582,637	357,075	593,550	
River La Plata	. 194,062	505,912	264,487	336,825	
Other Countrie	s 405,112	670,162	1,124,212	1,444,725	

Value of Principal Imports.

Total......L.6,220,010 L.9,498,485 L.4,923,998 L.8,340,074

	1843-4.	1853-4.		1843-4.	1853-4.
CottonL.		L.3,121,425	Flour,) T	451 575	L.494,212
Woollen	487,350	629,325	Wheat }	2.201,010	11.101,411
Linen	279,675	231,750	Pork, beef	92,925	192,037
Mixed	142 650	285 862	Fish	109,462	181,800
Silk	145,687	236,475	Hardware	325,912	388,687
Gold &	-		Wines	284,287	301,612
Silver	18.112	924,412			

Value of Principal Exports.

	1843-4.	1853-4.		1843-4.	1853-4.
Cotton	L.410,512	L.549,675	HidesI	.563,850	L.654,750
Rum	60,862	103,725	Tobacco	86,850	236,137
Rice	48,487	44,100	Wood	27,562	123,300
Sugar	1,160,212	1,780,987	India-rub-	•	•
Coffee	2,023,312	3,751,200	ber		401,737
Cocoa		88,537	Diamonds	• • •	223,875

Quantities Exported.

1	843-4.	1853-4.	1843-4.	1853-4.
Coffeecwt.1,	798,366	2,336,880	Hides, No. 148,879	141,698
Sugar ,, 1,	623,690	2,290,268	salted \ No. 140,019	141,000
	232,644		Hides, dry ,, 228,431	151,912
Tobacco ,,	83,669		Rumgals. 1,377,894	2,174,661
Rice,	106,367	59,003		

Brazil.

Brazil Nut

BRAZIL Nut, the fruit of the Juvia (Bertholletia excelsa), a tree that abounds on the shores of the Orinoco, and in the northern parts of Brazil. See BERTHOLLETIA.

Brazil Wood. See Dyeing.

BRAZING, the soldering together of edges of iron, copper, brass, &c., with an alloy composed of brass and zinc, and sometimes with the addition of a little tin or silver. The alloy in a nearly pulverulent form is to be wetted with borax made into a paste with water; after which it is suffered to dry, and is then carefully exposed to bright ignition in a clear fire. (Ure's Dict. of Arts and Manufactures.)

BRAZOS DE Dios, one of the largest rivers of Texas, North America. It rises among the mountains in the N.W. part of the state, and after a generally S.S.E. course of about

900 miles. flows into the Gulf of Mexico.

BRAZZA. an island in the Adriatic, off the coast of Dalmatia, in the circle of, and 8 miles from, the town of Spalatro. Area 170 square miles. Pop. 16,000. The surface is rugged and mountainous, but is industriously cultivated, and its wine is accounted the best in Dalmatia. It produces also oil, figs, almonds, and saffron, but the corn crop scarcely supplies the wants of the inhabitants for three months. Its kids are celebrated; as are also its milk, cheese, and honey.

BREACH, a break or rupture in a fence or embankment. In 1707 the falling of the Thames wall during a very high tide occasioned the well-known Dagenham breach. The force with which the water burst in upon the neighbouring level tore a channel of a hundred yards wide, and in some places twenty feet deep, by which a multitude of trees that

had been buried for ages were laid bare.

Breach, in Fortification. See Fortification.

BREAD. See BAKING.

BREAD, Assize of, the ordinances which regulate the

weight, measure, or price of bread.

BREAD, Sacramental, in the Protestant churches, is common leavened bread, in conformity to the ancient practice. In the Roman Catholic mass, azymous or unleavened bread is used, particularly in the Gallican church, where there is provided for this purpose what is called pain à chanter, made of the purest wheaten flour pressed between two iron plates graven like wafer-moulds, and rubbed with white wax to prevent the paste from sticking. The Greeks observe various ceremonies in making the eucharistic bread. In the Abyssinian churches there is a kind of sacristy allotted for this service. Sirmond, in his disquisition on azymous bread, shows, that there were as many ceremonies used in the ancient Latin church in the preparation of the unleavened bread as are still retained in the Eastern churches.

Ecclesiastical writers enumerate other species of bread allotted for purposes of religion; as, Kalendarius, that anciently offered to the priest at the kalends; Prebendarius, the same with capitularis, that distributed daily to each prebendary or canon; Benedictus, that usually given to catechumens before baptism, instead of the eucharist bread, which they were incapable of partaking of. The panis benedictus was called also panagium and eulogium, being a sort of bread blessed and consecrated by the priest, by which the catechumens were prepared for the reception of the body of Christ. The same was used afterwards, not only by catechumens, but by believers themselves, as a token of their mutual communion and friendship. Its origin is dated from the council of Nantes in the seventh century. In the Gallican church we still find panis benedictus, pain bénit, used for that offered for benediction, and afterwards distributed to pious persons who attend divine service in chapels. Consecrated bread is a piece of wax, paste, or even earth, over which several ceremonies have been performed with benedictions and other rites, to be sent in an Agnus Dei or relic-book, and presented for veneration. The use of Unleavened bread alone during the Jewish passover is commanded by the Mosaic law. The usage was introduced

in memory of the hasty departure of Israel from Egypt, when they had not leisure to bake leavened bread. Showbread was that offered to God every sabbath-day on the golden table in the holy of holies.

BREAD-Fruit. Among the more valuable products of the warmer climates is to be ranked the bread-fruit, or Artocarpus. The best varieties of this esculent are found in the Ladrone Islands, and in many of the groups of islands scattered throughout the Southern Pacific Ocean; but are not confined exclusively to these regions.

The natives of the South Sea Islands distinguish eight Different different varieties. European observers do not seem in species. general disposed to recognise these as essential distinctions, although they admit other species. The genus yielding this

valuable fruit is Artocarpus; of which Sprengel admits five distinct species, integrifolia, Champeden, Philippensis, pu-

bescens, and incisa.

The bread-fruit is a large tree, growing to the height of forty feet or more. It has a thick stem, and luxuriant foliage. The trunk is upright, the wood soft, smooth, and yellowish; and wherever the tree is wounded, a glutinous fluid exudes. The branches form an ample head, almost globular; the leaves are eighteen inches long and eleven broad, resembling those of the oak or the fig-tree, from their deep sinuosities. The younger leaves, like all the more tender parts of the tree, are glutinous to the touch. The male flowers are among the upper leaves, and the female flowers at the ends of the twigs. The fruit is a very large berry, according to botanists, with a reticulated surface, resembling a cocoa-nut or melon in size and form, nine inches in length. It is filled with a white farinaceous fibrous pulp, which becomes juicy and yellow when the fruit is ripe; and the edible portion lies between the skin, which is green, and a core in the centre, which is about an inch in diameter.

During a considerable portion of the year the bread-fruit Useas food. affords the chief sustenance of the Society Islanders, and is prepared after different fashions. It is slightly sweet, and has been compared to a cake made of flour, egg, sugar, and butter. In general it is cut in several pieces, and roasted or baked in a hole made in the ground, which is paved round with large smooth stones; it then resembles a boiled potato, but is not quite so farinaceous. The stones are previously heated by a fire kindled in the excavation, and the breadfruit, wrapped in a banana leaf, is laid upon them, and covered with leaves and hot stones. When thus baked it is considered to equal or surpass any kind of bread. Sometimes water or cocoa-nut milk is added; sometimes it is boiled or formed into a paste. This last is accomplished by taking the fruit before it attains maturity, and laying it in heaps covered up with leaves, when it undergoes fermentation, and becomes disagreeably sweet. The core being then drawn out, the fruit or pulp is thrown into a paved excavation, and the whole covered up with leaves, whereon heavy stones are laid: it thus undergoes a second fermentation, and becomes sour, after which it will suffer no change for a long time. In the island of Nukahiwa, an agreeable beverage is obtained from it; and in the West Indies it is baked like biscuit. The fruit is in the greatest perfection about a week before beginning to ripen, which is easily recognised by the skin changing to a brownish cast, and by small granulations formed of the juice. In the West Indies it is soft and yellow when ripe, and is in taste and smell like a very ripe melon. Hogs, dogs, and poultry then feed on it readily.

There is another species of the bread-fruit tree that has been long known in India and the eastern islands, the fruit of which contains from forty to a hundred farinaceous seeds. in appearance resembling chestnuts. These when roasted or boiled are found to be very palatable. The external characters of the tree are scarcely to be distinguished from those of the other, and the chief distinction lies in the fruit, which attains nearly the size of the bread-fruit proper, and

Breadfruit.

is covered with long prickles. It grows rapidly from the seed, and attains larger dimensions than the proper breadfruit tree.

Other uses.

Besides its value as a fruit-tree, the bark of the breadfruit furnishes the material for a species of cloth; the leaves are substituted for towels; and the wood is employed in the construction of boats and houses. A kind of cement and bird-lime is also prepared by boiling the juice exuding from the bark in cocoa-nut oil.

Its cultiva-

The bread-fruit tree is of easy cultivation in its native soil. It flourishes with the greatest luxuriance on rising grounds; and is particularly abundant in the steep declivities of the Sandwich Islands, though it is very generally found throughout the Great Pacific Ocean. It grows in Amboyna, the Banda Islands, Timor, and the Ladrones; but it is more especially the object of care and cultivation in the Marquesas, and the Friendly and Society Islands.

Attempts to transplant it to the West Indies.

The great utility of the bread-fruit as an article of food has, at different times, led to speculations on the possibility of naturalizing it in places where it is not of spontaneous growth. M. de Poive, the philosophic governor of the Mauritius, succeeded in introducing it there, and in the Isle of Bourbon, whither it was conveyed by M. de Sonnerat, from Luçon, in the Philippine Islands. Being found in the greatest luxuriance under the same latitudes as the British West India Islands, and in a climate not dissimilar, the British government decided on the importance of transplanting it to these colonies. An expedition was therefore fitted out with particular care, under the command of Captain (then Lieutenant) Bligh, who sailed in the Bounty store-ship for the South Seas in December 1787. The Bounty arrived in safety at Otaheite, and took on board 1015 breadfruit plants, besides a great variety of different species of other plants; and after remaining twenty-three weeks, set sail on the 4th of April 1789. This expedition, as is well known, was rendered totally abortive by the mutiny which ensued three weeks subsequently to its departure. On his arrival in England, Bligh was appointed to the command of two vessels specially fitted out as before for the same purpose. They sailed in August 1791, and anchored at Otaheite in February 1792. Here they remained above three months, and obtained even a greater store of plants than formerly. Bligh, in returning, made a dangerous voyage through Endeavour Straits, and anchored at Coupang in the island of Timor, where he substituted many other plants for those that had died. He then sailed for the West Indies, touching at St Helena, and reached the island of St Vincents in January 1793, where he committed 544 plants, of which 333 were bread-fruit, to the care of Dr Anderson, superintendent of the Botanic Garden, and substituted for them 467 of different species, designed for the Royal Garden at Kew. He next landed 623 plants, of which 347 were bread-fruit, at Port Royal in Jamaica, and replaced them with a further collection for the king, with which he arrived in England on the 2d of August 1793. Five years and eight months had thus been occupied in accomplishing the desirable purpose of these two expe-

The gold medal offered in 1777 by the Society for the Encouragement of Arts and Manufactures, to any one who should bring the bread-fruit plant from the South Sea Islands in a state of vegetation to the West Indies, was awarded, in 1793, to Captain Bligh. That society, with the laude ble design of promoting its culture, continued to offer further premiums for the greatest number of plants raised in the British settlements. A silver medal was awarded to Dr Anderson, superintendent of the Botanic Garden at St Vincents in 1798; and, in 1802, the gold medal to the Honourable Joseph Robley, governor of Tobago. From the course adopted by these two cultivators, the history of the bread-fruit has received much elucidation.

Result of these attempts.

Mr Robley received from Dr Anderson in June 1793, three plants which he planted in very deep rich soil. They flourished exceedingly, produced fruit in 1795, and continued to do so until autumn 1801. Being disappointed of obtaining suckers, Mr Robley applied to Dr Anderson, who advised him to lay bare some of the uppermost roots, and to wound them very deeply; and when this was done they almost immediately began to put forth shoots in abun-Mr Robley thus obtained 120 fine plants, which were deposited in baskets with rich loose soil, and placed in the shade in the vicinity of water. Baskets were preferred to pots, because when deposited in the place where the plants were ultimately to remain, the baskets would speedily rot, and not repress the growth of the roots. Encouraged by the success of these experiments, Mr Robley prepared a point of land of loose sandy soil, bounded by a salt lagoon and the sea. When the tide filled, brackish water was to be

found everywhere at the depth of two feet and a half from the sur- Breakers face. It had been observed in some of the South Sea Islands, that bread-fruit trees grew in full vigour though brackish water bathed their roots. The land being ploughed and harrowed twice, was divided into beds twenty-seven feet in breadth, and the plants were put into the earth in the middle of each. In August 1801, Mr Robley had 153 plants in a flourishing condition; and, in the course of the subsequent year, 319, some of them productive. He transmitted to England specimens of the fruit preserved in vinegar, as it will not keep above two days after being taken from the tree. Other correspondents sent excellent specimens of cakes made from bread-fruit flour; and communicated the fact that a dry nutritious food, resembling tapioca in appearance and quality, might be prepared from it. The vegetation of this plant is very rapid. Ten of those committed to the care of Dr Anderson in 1793 were about two feet in height and half an inch in diameter; while in 1798, most of the trees were above thirty feet in height, and the stem two feet above the ground was from three feet to three and a half in circumference. They bore fruit during the greater part of the year, but were less productive between November and March. A single tree would often bear clusters of five and six, so as to bend the lower branches to the ground. According to the variety, the fruit was of various shapes and sizes, weighing from four to ten pounds, some smooth, others rough and tuberculated. When taken from the tree before maturity, the juice appeared of the consistence and colour of milk, and in taste somewhat similar. It issued for above ten minutes in an uninterrupted stream, and thickened into a glutinous substance. Three months were required to bring the fruit to perfection. A species of fruit bearing considerable analogy to those above described is found on the Nicobar Islands, and is not less useful to the natives. The tree vegetates promiscuously with others in the woods, but prefers a humid soil. Its trunk is straight, thirty or thirty-five feet in height, and from ten inches to two feet in circumference. The roots spring from it above the surface, and do not penetrate deep into the earth. The leaves are disposed like the large calyx of a flower; they are three feet long and four inches broad, of a dark green hue and tenacious substance. A long time elapses before the tree produces fruit, not less than about the period of human life. It then forms at the bottom of the leaves, from which it proceeds as it is enlarged, and, when nearly ripe, its colour changes from green to yellowish. This is the proper period for gathering it, when its weight is between thirty and forty pounds. The exterior surface is cut off, and the fruit is boiled in earthen pots during several hours, over a slow fire; it is then exposed to the

BREAKERS, a name given to those billows that break violently over rocks lying below the surface of the sea.

air, and is next formed into a mass which, in taste, is not unlike

BREAKWATER is any obstruction of wood, stone, or other material, as a boom or raft of wood, sunken vessels, &c., placed before the entrance of a port or harbour, or any projection from the land into the sea, as a pier, mole, or jetty, so placed as to break the force of the waves, and prevent their action on ships and vessels lying at anchor within them. Thus the piers of the ancient Piræus and of Rhodes; the moles of Naples, Genoa, and Castellamare; the piers of Ramsgate, Margate, Folkstone, Howth, and the wooden dike de Richelieu, thrown across the port of Rochelle, may all be denominated Breakwaters. In French it is sometimes called Battre d'Eau; a name which appears to have been applied to the mole at Tangier, a work commenced in 1663, under the direction of Lord Tiviot, Sir J. Lawson, and Sir Hugh Cholmley, and finished, or rather discontinued in 1676, after having cost this nation the sum of L.243,897, 5s. $4\frac{1}{2}$ d. The term *Breakwater*, however, has of late years been considered as more peculiarly appropriate to large insulated dikes of stone, whether of regular masonry or sunk promiscuously in rough masses, so placed as to form an artificial island across the mouth of an open roadstead, and thereby, from obstructing and breaking the waves of the sea, to convert a dangerous anchorage into a safe and commodious harbour for the reception of ships of war or merchantmen.

Of this description of dike for creating an artificial harbour on a grand scale, fit for the reception of ships of war of the largest class, there are remarkable examples in the breakwater of Cherbourg, of Plymouth, Portland, &c.

Break. water.

Breakwater. Breakwater of Cherbourg.

operations, the progress, and the expense of constructing the breakwater of Cherbourg, up to the period of the Revolution. But the history of this great undertaking is summarily stated in a report made to the National Assembly in 1791, by M. de Curt, in the name of its Committee of Marine, concerning the marine establishment of Cher-

to the French (and more particularly since the demolition of the works and basin of Dunkirk, which cost them more regret than the useless and expensive projects for that port ever could be worth), that while the whole line of their coast bordering on the English channel presented only sandy shores with shallow water, or an iron-bound coast bristled with rocks, nature had lavished on their "eternal rival" of the opposite coast, the incalculable advantages of a succession of deep and commodious harbours, or of safe and extensive roadsteads, inviting their possessors to commerce and navigation, and placing in their grasp "the sceptre and the sovereignty of the seas." M. Curt observes, that " the misfortunes of La Hogue, which all the talents of Tourville could not prevent, taught Louis XIV. that, in completing the defence of his frontiers by land, he had too much neglected his frontiers on the sea; that this great prince, however, profiting by experience, soon discovered that England owed the superiority of her marine to the military establishments which she possessed in the Channel." With a view of securing to France similar advantages, the Maréchal de Vauban was directed to visit the coasts of Normandy, for the purpose of adopting measures for placing in security against hostile attacks all such bays, harbours, and inlets, as were favourable for the disembarkation of troops; and to furnish plans of such works as he might judge to be necessary, not only for military, but for naval purposes. Among other projects, he reported that the roadstead of Cherbourg possessed the means of attack, of defence, and of protection; that it was very capable of exerting an influence on maritime war, and in their commercial relations with the northern powers; that it was the spot on which the head-quarters should be established on the coast of the Channel; and, in short, that it was a central advanced post with regard to England. He moreover reported, that it might be made a port for the safe retreat of a squadron crippled by stormy weather, or beaten by an enemy, or even for the reception of a victorious fleet with its prizes. By thus converting the present exposed roadstead of Cherbourg into a safe and protected anchorage for a fleet of men of war, France, he said, would be able to watch the motions of England, to oblige her at all times to keep a corresponding fleet in the Channel, and to menace her shores with invasion, of which she at all times stood so much in

Opinions, however, being divided between the advantages of La Hogue and Cherbourg, Louis XVI., immediately after the conclusion of the American war, issued his directions to M. de Castries, secretary of state for the marine, to appoint a special commission to consider and advantages, and was in all respects preferable for constructing a port and naval arsenal capable of receiving and equipping from eighty to one hundred vessels of war of different descriptions. The commissioners had little hesitation in deciding upon Cherbourg, because, by means of a breakwater, it would be capable not only of admitting a fleet to ride securely at anchor when thus sheltered from

Breakwater of Cherbourg. In M. de Cessart's attempt of an enemy. It was added, that Cherbourg was Break-Description des Travaux Hydrauliques, will be found a an admirable place for watching Portsmouth; without apvery minute and laborious detail of all the preparatory pearing to have once recollected what an excellent anchor-

age Spithead was for watching Cherbourg.

Directions were accordingly given to M. de Caux, commanding officer of engineers at Cherbourg, to commence, as a preparatory measure, with the construction of a fort on the island of Peleé, and another on Du Homet, according to plans given in by Vauban in 1679. By these works the roadstead would be flanked on the right and Its history. It had always been a source of considerable annoyance left. The interval, however, being found too great to afford sufficient protection to all the ships that might require to be anchored in the roadstead, M. de Caux presented a plan to the minister at war for constructing an intermediate fort in the sea, which should be casemated, and sufficiently large to contain all the buildings necessary for a The surrounding walls were proposed to be sunk in caissons of 6000 feet square at the base, and fiftytwo feet in height. The top of the platform was to be eighty feet above the bottom of the sea, and the area of its surface 1000 square toises. This plan, however, was not considered as calculated to afford sufficient shelter to a fleet from the winds and waves, and new projects were

called for by the government. In 1777 M. de la Bretonnière, capitaine de vaisseau, one of the commissioners who had been named to report on the comparative merits of the two roadsteads of Cherbourg and La Hogue, had addressed a memorial to the minister of marine, in which he expatiated at great length on the numerous advantages held out by the former, and particularly with regard to the security of the anchorage. He proposed to construct, at the distance of a league in the sea, a stone dike of 2000 toises in length, leaving three open passages into the roadstead it was intending to cover, one in the middle, and one at each extremity. This dike, like that which was sunk before Rochelle, was proposed to have as its nucleus a number of ships filled with masonry, floated off and sunk in proper situations, and afterwards to be cased with large sunken stones to the height of fifty feet above the bottom of the sea. The reason assigned for sinking the stone vessels was the supposition, that an under current might cause so much motion at the bottom of the sea as would derange the level, and work away the loose stones; so little appears at that time to have been known of the increasing tranquillity of the waves of the sea in proportion to the increasing depth of water.

On this plan the commissioners observed, 1. That in order to construct a dike of 2000 toises in length, with sloping sides proportioned to its height, there would be required so great a number of old ships as could hardly be collected in all France in less than ten years; and if purchased from foreigners, the expense would be enormous. 2. That the assembling and employing the necessary number of seamen would be next to impossible, but, if possible, highly impolitic, when, just at the close of a maritime war, commerce felt a pressing want of their services; whereas it might be practicable, and would be advantageous, to employ the military for some time before disbanding them. 3. That no comparison would hold good between the roadstead of Cherbourg, with an opening to the sea of 3600 toises, and a depth of forty to forty-two feet of water at the report which of these two roadsteads combined the most lowest ebb, and the closing up of the entrance of the port of Rochelle, which is only 740 toises in length, and the depth of water only five or six toises. 4. That the upper part of the projected dike, being exposed to the violent action of the sea, the stability of that part could not be depended on; and besides, a dike covered at high springtides with eighteen feet water would not fulfil the two indispensable conditions,-smooth water, and protection the sea, but also of affording them protection against any against an enemy. These arguments were deemed con-

Break-

Break- clusive, and the plan of M. de la Bretonnière was aban- together by beams of wood pointing to the common cendoned.

In 1781 M. de Cessart, inspector-general of bridges and embankments, received directions to prepare a plan that should cover a fleet of from 80 to 100 ships of war in the roadstead of Cherbourg from the attack of an enemy, and protect them against the elements. M. de Cessart was fully aware, that to raise a barrier in front of this roadstead, and in the middle of the sea, capable of resisting the impetuosity of the waves, and repelling the enterprises of the enemy, was no easy task. "Nothing," says he, "that I had ever performed, or that I had ever read of in ancient or modern history, appeared to me to be worthy of being placed in comparison with the grandeur of this pro-He suggested, as the preferable and only mode of answering the purpose of producing smooth water in the roadstead, that, instead of one continued dike or mole, a number of large masses, separated from each other, of a circular form, with an elevation greatly inclined, should be substituted; in short, a series of truncated cones, which, touching each other at their bases, might present to the sea at the surface alternate obstacles and openings, and thus interrupt and break down the waves previous to their entering the harbour. He also considered that, as these openings at the surface would not exceed seventytwo feet, a sufficient barrier would be formed against the passage of an enemy's vessel; and that, if necessary, in time of war it might be rendered still more secure by placing strong chains of iron across the intervals. It was proposed to construct these conical caissons of wood, the number of which, to cover a front of 2000 toises, would amount to ninety, which, at 360,000 livres for each cone, would cause a total expense of 32,400,000 for the whole. The number, however, was afterwards reduced to sixtyfour, and the time estimated for completing the work thirteen years. Each cone was to be 150 feet in diameter at the base, and sixty feet in diameter at the top, and from sixty to seventy feet in height, the depth of water at spring tides in the line in which they were intended to be sunk varying from about fifty-six to seventy feet. They were proposed to be sunk without any bottoms in them, by which the upward resistance of the water, acting on a base whose surface was equal to 17,678 square feet, would be avoided. The caissons, floated off by casks attached to their inner and outer circumference, being towed to the spot where they were destined to be sunk, were then to be filled with stones to the tops, and left for a while to settle; after which the upper part, commencing with the line of low water, was to be built with masonry laid in pozzolana, and encased with stones of granite.

This plan of a stone dike or breakwater being laid in detail before the minister of marine, it was deemed proper, on a subject so entirely novel, and of such great national importance, to consult the ablest men in France before any steps should be taken for carrying it into execution. The details were accordingly submitted to the four commissioners, M. de Borda, a naval officer and member of the Academy of Sciences; M. de Fleurieu, capitaine de vaisseau, and director of ports and naval arsenals, afterwards minister of marine; M. Peronnet, member of the Academy of Sciences, chief engineer of bridges and embankments; and M. de Chezy, inspector and director of the school of engineers. They recommended that, in the first instance, an experimental cone should be constructed and floated off. Instead, however, of sixty feet in height, the cone made at Havre was only thirty-six feet; the circumference of its base 472 feet, and having a slope of sixty degrees; the upper circumference was 339 feet. Within the exterior cone, at the distance of five feet ten inches from it, was an interior and concentric cone, bound

tre, each being the section of the radius. The frame of water. each cone was composed of eighty large upright beams, twenty-four feet long and one foot square. On these were erected eighty more, of fourteen feet in length, making in the whole 320 of these large uprights; the machine was then planked, hooped, and firmly fixed together with iron bolts.

The cone at Havre being completed, the next operation was to tow it off to the particular spot where it was to be sunk. Being open at the bottom, it was found necessary to attach to the lower circumference 284 large casks, part to the exterior and part to the interior cone; besides fifty casks, attached by lines of equal lengths, from the bottom of the inner circle, to float towards the centre, and thus assist in keeping it upright and steady. It was easy enough, by these means, to float off a vessel of this kind. M. de Cessart observes, that the force of 7200 pounds produced by a capstan, was found sufficient to draw it on the water to a distance equal to the length of its own diameter, or about twenty-five toises, in two

" The success of the experiment made at Havre," says M. Curt, "had inspired such veneration for the conical caissons, that those persons who had been most disposed to object to the plan were now obliged to be silent." The result of the experiment at once decided the government to commence operations at Cherbourg. M. de Cessart was appointed director of the works, with four engineers to assist him. A permanent council, consisting of commanders in chief, directors, engineers, &c. was ordered to reside for six summer months at Cherbourg, and the other six in Paris; and a considerable body of troops were marched down to the neighbourhood, to furnish a competent number of artificers and labourers, to be employed on this great national undertaking.

In 1783 the buildings were commenced for lodging the principal officers of the civil and military departments, and their respective establishments; a naval yard was marked out and inclosed; roads of communication were opened with the forts; and at Becquet, about a league to the eastward of Cherbourg, a small harbour was dug out for the reception of about eighty vessels, which were to be employed in transporting the stones from thence by sea.

On the 6th June 1784 the first cone was floated off and sunk, and the second on the 7th July following, in presence of 10,000 spectators, assembled on the shores and quays of Cherbourg; but before the cavity of the latter could be filled with stones, a storm, in the month of August, which continued five days, entirely demolished the upper part of this cone. In the course of this summer the quantity of stones sunk within the cavities of the two cones, outside their bases, and in the intermediate space, amounted to 4600 cubic toises, or about 65,000 tons.

In 1785 three more cones were completed and sunk at irregular intervals; and, at the end of that year, the quantity sunk amounted to 17,767 cubic toises, or about 250,000 tons. In 1786 five additional cones were completed and sunk, one of them in presence of the king; and the quantity of stones thrown within them, and deposited on the dike connecting the cones, amounted, at the end of this year, to 42,862 cubic toises, or 600,000 tons. In 1787 five more cones were sunk and filled with stones, making, in the whole, fifteen; and the distance between the first and fifteenth cone was 1203 toises, and the quantity of stones deposited within these cones and the connecting dike, at the end of this year, amounted to 71,585 cubic toises, or more than 1,000,000 tons. The violent gales of wind that are frequent in November and December carried away all the upper parts of the five

Break- cones which were sunk this year. In 1788 three more were sunk, but the upper parts of the first two were carried away as the others had been; the height of the third was, therefore, reduced, so as to be, when sunk, on a level with low water; but this cone was upset and soon went to pieces.

The enormous expense, and the delay that had been occasioned, in completing and sinking these eighteen cones, exhausted the patience of the government, so that in the following year, 1789, it caused the three cones, then on the building slips, to be sold for whatever they would fetch.

The total quantity of stone that was sunk within the cones, and on the intermediate dike, from the year 1784 to the end of December 1790, being seven years, amounted to 373,359 cubic toises, or about 5,300,000 tons.

These eighteen cones being sunk at irregular distances from each other, some being 25 toises, and others 300 toises from centre to centre, occupied a line of 1950 toises in length. The distance of the first cone from the island Pelée, on the east, was 510, and of the eighteenth, to Fort Querqueville, on the west, 1200 toises; so that the whole entrance or opening of the roadstead of Cherbourg was originally 3660 toises, more than one-half of which was now imperfectly covered by the breakwater.

The expense of this great undertaking was not, we suspect, accurately known, and could not, probably, be ascertained. M. de Cessart estimates the eighteen cones alone at 6,231,407 livres, or about L.260,000; and the the 1st January 1791, he states as under:

Livres. 9 The value of the materials of the cones..2,462,369 The value of the workmanship......1,560,560 The conveyance and sinking of stones...14,880,074 Incidental expenses for buildings, magazines, &c...... 2,359,489 Contingent expenses 395,926 13

or L.900,000 sterling. In this estimate the extra pay to the troops and seamen employed would not appear to be included; for M. de Curt, in his report to the national assembly, states the total expense to have amounted to 32,000,000 livres, or L.1,300,000 sterling; and that a farther sum would be required of 879,648 livres, to bring the top of the dike to an uniform height, namely, a little above the level of the surface at low water of ordinary tides.

The number of people employed was prodigious. To enable M. de Cessart to complete and sink five cones a year, he found it necessary to employ 250 carpenters, 30 blacksmiths, 200 stone-hewers, and 200 masons; in all 680 artificers. The number of quarrymen and others employed in transporting 174,720 cubic toises of stone for the 64 cones originally intended, or 13,650 yearly, was estimated at 400 workmen, 100 horses, 30 drivers, 24 chasses-marées, each carrying seven cubic toises, or about 98 tons, with 100 seamen; making an aggregate for this service of 526 men, and for the whole operation from 1200 to 1500 artificers and labourers, to which were actually superadded about 3000 soldiers.

A very considerable part of the expense might have total estimate amounted to 6,856,250 livres. been saved by dispensing altogether with the cones, all of which burst, as might have been expected, from the superincumbent weight of a deep column of water pressing represents a section of a lighter on which it is erected. the stones within against their sides. The ninth cone, which was sunk in 1786, went to pieces in 1800, after standing fourteen years; another reached the duration of five years; six remained on an average about four years; and all the rest went in pieces within a year from the time of their being sunk.

The failure of the cones, and the breaking out of the Revolution, put an entire stop, for some time, to all operations at Cherbourg. The attention, however, of the national assembly was speedily called to what they considered to be an object of great national importance. In 1791 they directed their committee for the marine to make out a detailed report of the operations that had already been carried on. On this report being given in by M. de Curt, in the name of the committee, it was read and approved by the assembly, and funds to a certain extent decreed, to complete the undertaking on a new plan, proposed by M. de Cessart. The principal feature of this plan was that of casing over the surface of the dike as it then stood with large blocks of stone, and of carrying the height of the breakwater along the whole of its extent, so far above the high-water mark of spring tides as to render it capable of receiving batteries on the summit, at the middle, and at the two extremities.

The slope of the side next to the roadstead was found on examination to sustain itself unaltered at an angle of forty-five degrees, but the slope on the side next to the sea, whose base was three for one of height, had given way to the depth of fourteen feet below the low-water mark; and the materials being composed of small stones, were washed away, and had formed themselves into a prolonged slope of one foot only in height for ten feet of base, which was therefore concluded to be the natural slope made by the sea when acting upon a shingly shore; a total expense incurred between the 1st of April 1783 and conclusion, however, too vague to be correct, as the slope occasioned by the action of the sea must depend on the nature of the materials against which it acts, and the force and direction of the acting power. A sandy beach, for instance, has invariably the most gradual slope, gravel the next, shingles the next, and large masses of rock or stone the most precipitous. At the present time the stones of the breakwater, by constant friction, have worn away the sharp angles, and it has been found that the base on the side next to the sea is on the average fully eleven

for one of perpendicular height.

It was proposed, therefore, to cover the side with a coating of stone twelve feet thick, to consist of blocks of twelve, fifteen, twenty, and thirty cubic feet, or from one to two tons each, which casing was to be carried to the height of twelve feet above the high-water mark of the highest spring-tides; the size of the stones to increase to. wards the summit, so as to be capable of resisting the percussion of the waves, which is there the strongest. It was calculated that this covering of twelve feet thick on both sides would require for each toise in length seventy cubic toises of stone, and that the whole length of the dike would consequently require 136,500 cubic toises, which, by deducting for the vacant spaces between the stones, would be reduced to 113,750 cubic toises of stone, or about one million and a half of tons. It was further calculated, that the expense of quarrying, the transport to the quays, the loading, conveyance, and discharging machinery, together with the commissioners, clerks, &c. would cost for each cubic toise deposited on the dike the sum of fifty-five livres, which for 113,750 cubic toises would amount to 6,256,250 livres, and, adding for contingencies 600,000 livres, the

The machinery employed for thus casing the breakwater may be seen in Plate CXXXIX., in which fig. 4

AZX is an elevated deck or platform. Y, three rollers of six inches diameter.

TK, two beams or sheers, moving on trunnions in grooves at T.

S, hooks to hold the sheers at the proper angle of inclination.

Breakwater. the rope of the pulleys passes. The wheels are 12 feet in

Fig. 5, a chasse-marée laden with blocks of stone. E, the block and its hook laying hold of an iron chain

round a stone.

F, the stone hoisted to the platform AZ (fig. 4), when the brace is unhooked at S; the hoisting continued until the summit K of the sheers is brought to V, when they rest against the frame which supports the windlass; the stone F is then lowered upon the rollers as at M, from whence it is pushed forward by men to the inclined plane, off which it is rolled into the water upon the side of the dike.

It was calculated that, by employing a certain number of these machines, 34,090 toises might be deposited in one year, reckoning only six working months, or 5682 toises per month, or that 487 superficial toises of the dike might be covered in one season, and the whole completed in four years. Very little progress, however, had been made at the commencement of the war in 1803. At that period the centre of the dike only had been brought above the high-water mark, in which was placed a battery and a small garrison of soldiers, the whole of which were swept away by a heavy sea, occasioned by a tremendous gale of wind in the year 1809, when all the buildings which had been erected on this part of the breakwater, the men, women, and children which composed the garrison, together with several workmen, were washed away; at the same time two sloops of war in the roadstead were driven on shore and dashed in pieces. This disaster was such as might have been expected. The effect of sinking large stones upon the small ones, already rounded by constant attrition, could not be otherwise; the latter acting as so many rollers, carried out the former even beyond the extremity of the base, to which the breakwater had naturally been brought by the action of the sea.

At present small spots only are visible above the surface of the sea at low water of spring-tides, and nowhere such spots exceed three feet in height; the intermediate spaces are from three to fifteen feet below the surface; and, taking the average, the whole dike from one end to the other may be about four feet below the surface of low water at the spring-tides. Near the middle, however, there is about 100 yards where the height rises to eighteen or twenty feet above high water, but it exhibits only a shapeless mass of ruins. In one spot a large heap of stones has been accumulated, as if to try how much weight might safely be trusted upon it, before the attempt be made to rebuild the fort. The largest of the stones in this mass may be about four tons, and they descend to the size of 200 or 300 pounds.

Of the remainder of the dike very few parts are visible at low water; and at this moment the greater part is four feet below the surface of low water. It is sufficiently high, however, to break the force of the waves, and to make the port of Cherbourg a safe anchorage in some winds for

about forty sail of the line.

On the renewal of the war after the rupture of the treaty of Amiens, Bonaparte began to bestow a greater share of attention on the navy of France; and though for a time the unparalleled victory of Trafalgar checked his were vast, and at the period of his fall were in rapid progress towards their completion. He had determined on a fleet of 200 sail of the line, and the noble port of Antwerp gave him every facility for ship-building. For the better security in forming a junction of his two great fleets of Brest and Antwerp, Cherbourg now became more valuable as a convenient port of retreat in case of acci-

L, the axle of the windlass or wheels B, round which dent; but it had no dock-yard, nor means of giving to a Breekship a large refit or repair. He might have thought too, as we believe most of our naval officers do, that a fleet of ships riding at anchor behind the breakwater are easily attackable by fire-ships, as the same wind which carries a vessel in at one entrance will carry her out at the other, and the course would lie directly through the centre of the fleet at anchor. Besides, it might be possible, in certain winds, under the lee of the centre part of the breakwater, to bombard a fleet at anchor in the roadstead within it.

> He determined, therefore, to establish a large dockyard at Cherbourg, not merely for repairing, but also for the construction of the largest class of ships of war; to dig a basin that should contain fifty or sixty sail of the line; to construct dry-docks and slips for building and repairing; and to make it a naval port of the first rank. In 1813 this basin was completed at an expense, as Bonaparte is said to have asserted when on board the Northumberland, and which has since been confirmed, of L.3,000,000 sterling. A wet-dock of the same magnitude

communicating with it was then begun.

The only description that we have been able to find in print of this great work, which took ten years in carrying into execution, is contained in a short letter from M. Pierre-Aimé Lair, secretary to the Society of Agriculture and Commerce of Caen, who was present at the ceremony of opening and consecrating the great basin, in presence of the Empress Maria Louisa, on the 27th August 1813. He describes this basin as excavated out of a rock of granite schist, or gneiss, the density and hardness of which increased as the workmen descended from the surface. He compares it to an immense trough dug out of a single stone, and capable of containing many millions of cubic feet of water. We now know, however, that M. Lair is mistaken; that it is not one mass of rock, but rock and gravel mixed; that the whole of the sides are cased with a well-constructed wall of red granite; and that a noble quay, built of the same material, and extending between the two forts of Galet and Homet, separates the basin and wet-dock from the sea.

The dimensions of the new basin he states to be about 900 feet in length by 720 in width, and the average depth fifty-five feet from the edge of the quay; and as this edge is five feet above the high water mark of the equinoctial spring-tides, the depth of water in the basin is then fifty feet, and the mass of water, after making allowance for a slope of the solid sides inward in an angle of forty-five degrees from the height of about twenty-five feet, amounts to about thirty millions of cubic feet; and that it is calculated to contain about thirty sail of the line. We have reason to think that it is considerably larger, about 1000 feet by 770 feet, and consequently contains a surface of about eighteen acres, which, at three per acre, will contain fifty-four sail of the line, and the adjoining wet-dock, when finished, an equal number. The dike or breakwater seems to be abandoned, the works having long been stopped, and the stone vessels going rapidly to decay. The French officers say indeed that it has occasioned the roadstead to become shallower, by the deposition of sand that has taken

The entrance canal leading from the outer harbour into efforts, it did not induce him to abandon them. His plans the basin is at right angles to the latter, and its direction east-north-east. Its dimensions are as under:

> Width between the two moles in the direction of their axis......196 Width at its opening into the basin......308 Length from the axis of the moles or piers to the

line of wall forming the side of the basin......274

Break-

ed to the depth of nine feet below the bottom of the canal; the former having, as before mentioned, fifty feet water, and the latter only forty-one at high spring-tides, which, as they ebb twenty feet, would leave only twenty-one feet in the passage or canal at low water. This inequality, we presume, is intended to keep the ships affoat in the basin at low water, when the depth in the canal is not sufficient for that purpose; but after so much expense incurred in digging the basin, one would suppose a little more might have been expended in digging the canal to the same depth, so as to let ships pass into and out of the basin in all states of the tide; an advantage of the utmost importance for speedily securing the ships in the basin, when in danger of an attack from the enemy in the roadstead, or for speedily putting to sea and escaping the vigilance of a blockading squadron. No reason is assigned for leaving the basin without gates; but we suspect that M. Lair is again mistaken, and that the passage has depth of water sufficient for ships of the largest class to run into the basin at all times of the tide. But even here they do not lie in safety; for the wide entrance facing the northeast is covered only in that direction by the isle of Peleé, so that the water in the basin partakes of the swell in the road, which is sometimes so great as to make it necessary to apply ten or twelve cables to hold ships steady in the basin.

Another serious inconvenience likely to arise from this particular construction of the basin is, that whatever silt or mud is carried in by the tides must be deposited there, and cannot possibly escape. The quantity is probably not very great in the water of the Channel opposite to Cherbourg, but higher up towards Ostend it is very considerable. When we took possession of that port, it was found that, in the course of the revolutionary war, the harbour, by neglect, had been filled up with six or seven feet of mud.

Several pieces of cannon are intended to be mounted on the two piers, to protect the entrance into the basin. On one of them is likewise placed a light-house, and on the other a Semaphoric telegraph. Four slips of granite, for building large ships, were at this time constructed on the southern side of the basin, and on each of them was a ship of the line in progress; L'Inflexible of 118 guns, Le Centaure of eighty, Le Jupiter and Le Généreux of seventy-four guns each. Two other ships of the line were on the stocks without the dock-yard, nearly ready for launching, Le Zélandais of eighty, the first line-of-battle ship laid down at Cherbourg, and the Duguay-Trouin of seventy-four guns: and in the roadstead were Le Polonais and Le Courageux. In the centre of the same side of the basin, with two slips on each side of it, a noble dry-dock was cut out, or rather built, of solid granite, in which ships of the largest class might be built or repaired. Its dimensions were,

	Feet.	In.
Length	.230	0
Width	74	0
Depth	26	6

Cherbourg is unquestionably one of the first naval arsenals in Europe. The fortifications for the protection of the anchorage in the roadstead, and the new naval arsenal, are-1. Fort de Querqueville, mounts 46 guns; 2. Fort de la Roche Chavaignac; 3. Fort St Anne; 4. Fort du Homet, mounts 52 guns; 5. Fort du Galet; 6. Fort des Flamands; 7. Fort Royal, Ile Pelée, mounts 90 guns. Three forts are also in course of construction on the breakwater. The roadstead is chiefly protected by the forts on the island of Pelée, du Homet, and Querqueville. Many of the forts have circular faces towards the sea, with each two tiers of guns and turrets above them. On the landside Cher-

The basin, having no gates, is said to have been excavat- bourg is entirely surrounded by detached forts, redoubts.

The principal channel from the road to the sea is at the western end of the breakwater, which, for large ships, is not more than half a mile in width; and this want of space will always make it difficult for ships of the line to work out: but, on the other hand, a fleet may push out to the westward in southerly winds, which lock up the English ports in the Channel.

The eastern channel is a very indifferent one, and, from the position of the isle of Pelée and the main, it is likely to become worse, from the accumulation of sand, which the

French officers say is actually the case.

Such, then, were the mighty preparations of the extraordinary man who ruled France, for the destruction of the naval power of Great Britain, and with it of our national glory, pride, and prosperity, which, whether elated with success or depressed by reverses, he never ceased to devise

schemes for humbling.

To give the greater eclat to this grand undertaking, he sent the Empress Maria Louisa to be present at the opening of the basin. When the time arrived for the water to be let in, and the dam broken down, her approach was announced by flourishes of warlike music and numerous discharges of artillery. "Cries of joy," says M. Lair, "were mingled for a long time with the thunder of the batteries. Her Majesty took her place in the pavilion which had been repared for her, when the Bishop of Contances, surrounded by his clergy, advancing towards her, pronounced an address suitable to the occasion. After the ceremonies and customary prayers, he turned round towards the basin, and blessed this work of man. It is delightful to see a nation consecrating by religious rites an event so memorable, and causing the Divinity to intervene in all its grand undertakings." He speaks with rapture of the gratification he derived from seeing men born on the shores of the Tiber, and on the banks of the Guadalquiver, working under the direction of French engineers, at the establishment of a port in the Channel, formidable to the English navy; and he suffers no expression of regret to escape him at the idea of these poor Italian and Spanish prisoners of war being compelled to labour in chains at a work for which they were not paid, and in which they could not take the least possible interest.

The Breakwater in Plymouth Sound is a work of a Breaksimilar nature to that of Cherbourg, but constructed on water in sounder principles, with less machinery and fewer people. Plymouth Compared in extent and dimensions with that of Cherbourg, Sound. it is only in the ratio of about one to four. The gross sum expended upon it is L.1,528,639, and a further vote of

Break-

water.

L.13,000 has been taken for the year 1854-55. There is no port and harbour on the S.W. coast of England possessing so many advantages as Plymouth; none so well situated for assembling and equipping a fleet to watch the movements of the enemy in the harbour of Brest. Its dockyard may be considered as the second in the kingdom in point of size, convenience, and effective strength, and to it a steam factory has recently been added at Keyham, situated on the left bank of the Tamar, with extensive workshops, smithery, docks, caissons and basins capable of admitting the largest ships of the line. These two yards will be connected by means of a tunnel. The estimated cost of these great works at Keyham is as follows, viz. for constructing the south basin and two docks, cofferdam in front of the basins, and clearing the ground for buildings and purchase of ground for magazines, &c.....L.675,000 Constructing the north basin 170,000 Factory buildings 210,000 Remainder of works to complete the establishment, 170,000

the tunnel.

To which must be added L.35,000, the estimated cost of

Total..... ...L.1,225,000

Break-

Breakwater.

Of this sum there has been already expended the sum of however, was done or attempted, notwithstanding the in-L.900,389 up to the end of the year 1853, and a further vote of L.60,000 was taken for the year 1854-55.

The south basin and greater part of the north basin, with their docks and various other works are completed; and on the 7th October 1853, H.M. ship Queen, of 116 guns, was safely docked and undocked the following day. magnificent harbour of Hamoaze is nearly land-locked, and of a capacity sufficient for mooring safely a hundred sail of the line in excellent anchorage, and in water that carries its depth to the very quays of the yard. On the opposite or eastern side of the Sound, and at the distance of about three miles from Hamoaze and the dockyard, is another sheet of water at the mouth of the river Plym, called Catwater, not quite so deep, nor so well sheltered, as Hamoaze, but, since the progress made in the breakwater, forming a safe and commodious harbour for merchant vessels of every description. These two harbours open into Plymouth Sound and Cawsand Bay, in which ships employed in the blockade of Brest, or those refitted in Hamoaze, were accustomed to assemble and prepare for putting to sea. But the very exposed situation of Plymouth Sound, and the heavy swell that almost constantly rolled in, especially when the wind blew fresh from the S.W. to the S.E., made it so inconvenient and so unsafe an anchorage for ships of the line, that, during the late war, the fleet employed in blockading Brest had been in the practice of bearing up, when driven from its station, for the more distant anchorage of Torbay, though little better with regard to security, and worse in every other respect, than Plymouth Sound. It was, for instance, a more ineligible rendezvous for the western squadron, from the chance of the fleet being caught there by an easterly wind, and unable to get out, when it was the most favourable wind for the enemy to put to sea; from the danger to which the ships were liable when so caught in an anchorage thus open and exposed; and from the inconvenience, delay, and expense of obtaining the necessary supply of stores and provisions from the other ports, there being none at Torbay. In short, this open and exposed bay bore so bad a character among naval officers, that Lord Howe used to say it would one day be the grave of the British fleet.

It was, besides, an object of the first importance then, as it is now, to the efficiency of every naval arsenal, to have a safe and commodious roadstead in its neighbourhood, like that of Spithead to the harbour and dockyard of Portsmouth. Here those ships which might have gone through a course of repair or refitment, or those new from the stocks, might assemble and complete their final equipment for sea; and here, also, ships returning from sea might safely lie at anchor till the wind and tide might serve them to go into harbour. But in Plymouth Sound, ships coming out of Hamoaze, or ships going into that harbour, had no such security. By the rolling sea that set in, they were exposed to the double danger of parting their cables, or striking against the hard and rocky bottom, either of which would be almost certain destruction. The introduction of steam has, however, in a great measure lessened these delays as well as the dangers.

It was most important, therefore, to render Plymouth Its history Sound, if possible by any means, and almost at any expense, a safe roadstead for ships of war. To ascertain the practicability of this measure, Mr Rennie the civil engineer, and Mr Whidby the master-attendant of Woolwich dockyard, were sent down to Lord Howick, now Earl Grey, at the suggestion, we believe, of Lord St Vincent, in the year 1806, with directions to examine and report, whether by any and by what means a sufficient shelter might be given to insure a safe anchorage for a fleet of ships of the line. The report was favourable; and several plans were offered for sheltering this sound, so as to render it capable of containing in safety above fifty sail of the line at their anchors. Nothing,

creased and mighty preparations of the enemy, till Mr Yorke presided at the Board of Admiralty, when one of his first measures was to carry into execution this grand and important national object; the most important that perhaps was ever undertaken for the glory and the safety of the British navy. The delay that took place can only be explained by the frequent changes of the Board of Admiralty, which, we believe, have been fatal to many important measures for the benefit and advantage of this great bulwark of

Of the plans proposed for sheltering the Sound, one was to throw a pier from Staddon Point to the Panther Rock, a distance of 2650 yards; another, to construct a pier from Andurn Point to the Panther, a distance of 2900 yards; and a third, to carry a pier from the same Point to the

Shovel Rock, being only 900 yards.

The objection urged against throwing out piers from either of these Points, and abutting against the shore, was principally grounded on the certain effect they would have of changing the current of the flux and reflux of the tide to the opposite side of the Sound, and of increasing its strength and velocity on that side, while it left all calm on the other; the inevitable consequence of which would be a deposition of mud or silt in the calm part or eddy, which, in process of time, would shallow the water, already not too deep, to such a degree as to unfit it for the reception of large ships of war.

Besides, of the three passages for large ships into Plymouth Sound from the sea, the two best are those on the two sides, while the worst was that in the middle. Either of the plans, therefore, which proposed piers to be thrown from the mainland, must have destroyed one of the best passages, and left the worst open, which was nearest to the anchorage behind the proposed pier. The middle passage might, in fact, be almost considered as shut up against very large ships by the St Carlos and the Shovel Rocks; whereas, if this middle passage should be shut up altogether, it would rather serve to deepen, by giving an increased velocity to the tide, which would scour out the bottom, than to shallow the two side passages.

On these considerations, Messrs Rennie and Whidby proposed that an insulated pier or breakwater should be thrown across the middle of the entrance into the Sound, having its eastern extremity about sixty fathoms to the eastward of St Carlos Rock, and its western end about 300 fathoms west of the Shovel, the whole length being about 1700 yards, or close upon a mile. They stated with confidence, that such a breakwater might, with every chance of success in its favour, be constructed; and that it would give shelter to ships in the Sound, without any danger of

lessening the depth of water.

The middle part of the breakwater was proposed to be carried in a straight line for the length of 1000 yards; but they recommended that the length of 350 yards at each end should incline towards the straight part at an angle of 120°. See the figure, Plate CXL. These inclined ends would not only give shelter to a greater extent of the Sound, but would, in a greater degree, prevent the rushing in of the tide from agitating the water at the anchorage, than if the two extremities were left in the same straight line, and at right angles with the direction of the current into the Sound.

It was also proposed, in order to cover the Sound more effectually, that a pier should be thrown from Andurn Point towards the principal breakwater, of about 800 yards in length, with the same inclined point of 120° as the head of the breakwater. This pier, however, does not appear to have been thought necessary, and might have been in some respects injurious to the Sound. It might, however, have made Bouvisand Bay a good anchorage for frigates and smaller vessels, and given them the advantage of a fine stream of fresh water, which falls into that bay.

Breakwater.

It was recommended, as the most practicable and best mode of constructing this great work, to heap together promiscuously large blocks of stone, which were to be sunk in the line of the intended breakwater, leaving them to find their own base, and take their own position; and it was conceived that stones of the weight of from one and a half to two tons each would be sufficiently large to keep their places, without being rolled about by the tremendous swell which, in stormy weather, is thrown into Plymouth Sound; and thus avoid the inconvenience as well as loss of time and labour which the French had experienced at Cherbourg by throwing down small rubble stones. It was thought, that, in those places where the water was five fathoms or thirty feet deep, the base of the breakwater should not be less than seventy yards broad, and the summit ten yards, at the height of ten feet above the low water of an ordinary spring-tide; in other words, that the dimensions of the breakwater in those places should be forty feet high, thirty feet across the top, and 210 feet wide at the foundation.

The surrounding shores of Plymouth Sound and Catwater were next examined, with a view to determine from what quarter materials for this great undertaking could most conveniently be obtained, as to quality, cheapness, and celerity of conveyance. On the west or Cornish side of the Sound, nothing appears but hard granite; at the head of the Sound, and in Catwater, on the Devonshire side, all is marble and limestone. In Catwater alone, it was estimated, on a rough calculation, that 20,000,000 of tons might be procured in blocks fit for the work, which was about ten times the quantity that would probably be wanted. The time required for the completion of the work depended on a variety of circumstances. It is obvious that, if the two sides of the Sound had furnished proper materials for the purpose, the time would have been considerably abridged, as, in that case, when the wind was easterly vessels might deposit stones on the eastern end of the breakwater, and in westerly winds on the western extremity, and the work would thus be proceeding with an uninterrupted progress; whereas, if the stones were to be brought from one point, and that point was on the shore of Catwater, a strong southerly and south-westerly wind, those most prevalent in this country in the winter months, would generally impede and frequently render it impossible for vessels to go off with their

Catwater, however, having many advantages, especially for the convenience of loading the vessels, and the facility of procuring blocks of any size from the quarries, was considered, on the whole, as entitled to the preference over any other place. Besides, the quarries here being in the neighbourhood of villages, lodgings and conveniences would be afforded for the workmen; and, on the whole, it was calculated that the work might be completed from hence at a cheaper rate, and perhaps in less time, than from situations much nearer to it, but much more exposed to the wind and waves.

An estimate of the expense could not be made with any degree of accuracy, as no correct section of the bottom had been taken. Supposing, however, the great breakwater to be 1700 yards in length, thirty feet in width at the top when carried ten feet above low water of spring-tides, with a slope on the southern or sea side of three feet horizontal to one foot perpendicular, and on the Sound or land side of one foot and a half horizontal to one perpendicular, it was calculated that the whole mass of stone required would be about 2,000,000 of tons. If then a hundred sail of vessels of fifty tons burden each were employed in carrying stone, and each vessel carried only 100 tons a-week, the quantity deposited in one week would amount to 10,000 tons, or 500,000 tons a-year, and at this rate the breakwater would be completed in four years; but making allowance for time lost in preparations, contingent delays, unfavourable weather,

and deductions in the quantity of stone for the shallow parts over which the line of the breakwater was carried, the completion of the work might safely be calculated within the period of six years.

Nor would the building of the pier from Andurn Point, if so determined, protract the time of completion. If carried from the shelving rocks within the Point, leaving a passage between them, the pier would require about 360,000 tons of stone, which, by employing about thirty vessels, might be deposited in three years.

It was recommended by the gentlemen above mentioned, that the great breakwater should be begun on the Shovel and extended on both sides of it, as, by so doing, the effect produced on the Sound would be observed as the work proceeded; and that buoys should be placed along the line, so that the whole of the vessels employed might, if necessary, deposit their cargoes at the same time without interrupting each other.

The original rough estimate for completing this great national work, made on the grounds above stated, was as follows:—

Estimate of the Probable Expense of a Breakwater and Pier for the Sheltering of Plymouth Sound and Bouvisand Bay.

2,000,000 tons of limestone, in blocks			
from $1\frac{1}{2}$ to 2 tons weight each, for			
the great breakwater, at 7s. 6d. per			
ton	L.750,000	0	0
360,000 tons in the pier proposed to be			
built from Andurn Point, at 7s	126,000	0	0
Contingencies, say at 20 per cent. on the			
whole	175,200	0	0
	· · · · · · · · · · · · · · · · · · ·		

Estimate of the Probable Expense of a Cut-Stone Pier and Two Lighthouses to be built on the top of the Great Breakwater.

Total for the great breakwater.....L.1,051,200 0

42,000 cubic yards of masonry, in the out and inside walls of the pier, at			
27s	L.44,700	0	0
62,000 cubic yards of rubble filling be-	·		
tween the out and inside walls, at 6s.	18,600	0	0
Paving the top of the pier with large	00.00		
blocks of stone, 8500 square yards Two lighthouses, with reflectors and	22,90	0	0
argand lamps	5,000	0	0
Contingencies 20 per cent	28,650		0
osine-gonoros no por constituini	20,000		_
	L.119,900	0	0
Breakwater,	1,528,639	0	0
•			

Total estimate of completing the works..L.1,171,100 0

The estimate for the works of Plymouth Breakwater now					
stands thus (1854):—					
Total estimate for the workI	1,524,000	0	0		
Gross sum already expended	1,528,639	0	0		
Sum voted for the years 1854-5	13,000	0	0		
Further estimate for completing the work	21,000	0	0		

It was not until the opinions of the best engineers, men of science, and naval officers eminent in their profession, had been collected, compared, and seriously considered, that Mr Yorke determined to carry into execution this great undertaking; one of the chief supporters of which was Sir John Barrow, then secretary of the Admiralty. The principal objection started against it was, that it might cause the anchorage in the Sound to be destroyed in the course of time by the deposition of mud and silt along the whole eddy within it. But there does not appear to be any

Break-

solid ground for this objection. The water brought by the tides from the sea is at all times perfectly clear and transparent, and that which proceeds from Hamoaze, and is supplied by the Tamar and the Tavy, is almost wholly free from any alluvial matter, these rivers holding their course through a fine granite soil. The fact is sufficiently proved by the circumstance of no deposit being made in the recesses of Hamoaze along the dockyard wall leading into the docks, nor in the numerous eddies that are caused by the projecting jetties and salient angles of that wall. Another objection started against the undertaking was, that by the diminished quantity of water thrown by the tide into Hamoaze and Catwater, the Sound would gradually fill up, and these harbours be destroyed. But no perceptible alteration has as yet taken place in the height of the water in Hamoaze, or in the strength or set of the tides.

work.

Commence- A rock of limestone, or rather gray marble, situated at ment of the Oreston, on the eastern shore of Catwater, consisting of a surface of twenty-five acres, was purchased from the Duke of Bedford for the sum of L.10,000. Quays for shipping the stone were erected in front of it; iron railways leading from the quarries to the quays were laid down; ships were hired by contract to carry off the stone, and others built at the dockyard. Mr Whidby was appointed to superintend the work. The quarries were opened on the 7th August 1812; the first stone was deposited on the 12th of the same month; and, on the 31st March 1813, the breakwater made its first appearance above the surface of the Sound at low water of the spring-tide. The system of quarrying the stone was conducted with admirable skill, and stones of the proper size were obtained with less waste of small rubble than might have been expected. In working these quarries an extraordinary phenomenon was discovered in the very body of the great mass of this old marble rock. At the depth of sixty-five feet from the summit of the rock, and twenty-five from the margin of the sea, a cavity, or rather a nodule of clay, was discovered, of twenty-five feet long and twelve square, or thereabouts, in the midst of which were found several bones of the rhinoceros, in a more perfect state, and containing less animal matter in them than any fossil bones that have yet been dug out of rock or earth.

Machinery employed.

The vessels employed for conveying the large blocks of stone were of a peculiar construction, adapted to carry with ease masses of marble weighing from three to five tons each. These great blocks of marble were placed on trucks at the quarries, and run down thence on iron railways to the quays, against which the vessels lay with their sterns. The two stern ports were made sufficiently large to receive the trucks with the stones upon them. Each truck was passed separately through the port-hole on an inclined plane, and run to the fore-part of the vessel in the hold on an iron railway. The two sides of the hold of the vessel were calculated each to contain eight of these loaded trucks, which, at five tons on each truck, gave eighty tons of stone for one cargo. The stones thus placed on the trucks remained till the vessel arrived at the point in the line of the breakwater where they were to be deposited. By means of a crane on the deck of the vessel, the two trucks nearest to the two stern ports were then drawn up the inclined plane, and run upon a frame on movable hinges, called the typing-frame; by the falling of this frame in the manner of a trap-door the stone or stones were discharged from the trucks on the slope of the breakwater; but the typing-frame remained, by means of a catch, in the position in which it was left at the moment of discharging the stones, until the empty truck was pulled up by the crane to the after-part of the deck, whence it was run forward to make room for the second pair of loaded trucks in the hold. The catch being now disengaged, the typing-frame returned to its former position, ready to receive the next pair of loaded trucks, and so on it to the breakwater 2s. 10d. per ton; but the former was

till the whole sixteen were discharged; and the light trucks ran upon the deck of the vessel, ready to be run out at the quay, and thence to the quarries, to take in fresh loads of stone. In this manner a cargo of eighty tons was discharged in the space of forty or fifty minutes. The vessels were placed in the proper places for depositing the stones by means of buoys, and the exact line of the breakwater was preserved by observing lights or staves placed at a distance on the shore.

The following description, referring to Plate CXXXIX., will convey an accurate idea of these excellent vessels for

the purpose for which they were constructed.

Fig. 1 shows the stern of the vessel in the act of depositing the stones. The runner R being hooked to the forepart of the truck, raises it up, and by that means tips the stone overboard. When the stone is in the act of being drawn up out of the hold on the inclined plane B (fig. 3), the runner is hooked to the fore-part of the truck, and lashed down to the after-end over the stone, which prevents the latter from sliding off the truck in its progress up the inclined plane. The empty trucks are for the most part lodged on the fore-part of the deck, and some placed on edge against the side of the vessel.

Fig. 2 shows the stern of the vessel when loaded, with

the ports up or closed.

Fig. 3 is a longitudinal or sheer-section of the vessel when loaded, with the trucks on one side of the hold and deck, showing the number which the vessel usually stows on each side. The stones being frequently longer than the trucks, the number carried in the hold must be proportioned accordingly. In bad weather it is unsafe to send many trucks on deck; and, in general, not more than four are sent into the Sound in that way at one time; the amount of the cargoes, therefore, vary, according to circumstances, from forty to sixty-five tons; the largest stone hitherto deposited being about eight tons.

The after-part of the deck under the tiller is divided into two parts lengthways, and made to move up and down; the fore-parts are secured to a beam by hinges. This movable deck, when raised as at X, allows the stones to come out of the hold, and when down, as at Y, serves to convey the empty truck from the port to the deck, in order to make

room for another stone.

D is a common windlass for heaving the trucks out of the hold up the inclined plane B.

C, the hinges of the typing-frame.

Ten vessels of this construction, for carrying large masses of stone, built in the King's Yards, and forty-three hired by contract, averaging about fifty tons each, were employed in conveying stones from the quarries. The contractors' vessels were not of the same construction as those in the immediate employ of government; they carried stones of less weight, which were hoisted out of the hold by a chain and windlass, and thrown overboard. A load of fifty tons was discharged from one of these vessels in about three hours. By all these vessels the quantity of stone deposited in 1812 was 16,045 tons; in 1813, 71,198 tons; in 1814, 239,480 tons; in 1815, 264,207 tons; and in 1816, up to 12th August, 206,033 tons, at which time the total quantity of stone sunk amounted to 896,963 tons; and at the conclusion of the year to upwards of 1,000,000 tons.

Of this quantity the proportions of the different sizes of the blocks deposited were nearly as follow:

Of one ton each stone, and under423,904 Of one to three tons each309,706 Of three to five tons each150,593

The original contract price for quarrying the stone was 2s. 9d. per ton, and the original contract price for conveying Break-

reduced to 2s. 5d., and the latter to 1s. 10d. per ton. The cost of each ton of stone sunk in the breakwater, including the building of quays, purchase of land, salaries, and every other expense, according to the nearest calculation that can be made, amounted to about 8s. 11d., which, upon the whole quantity deposited, gave a total sum expended up to 12th August 1816 equal to L.364,000. And as the work might be considered as more than half completed, it would have been finished considerably within the original estimate, and, if parliament had thought fit to grant the money, within the time.

The greatest quantity of stone sunk in any one week was 15,379 tons; and the part of the breakwater at the date just mentioned, above the level of low-water springtides, was in length 1100 yards. The length completely finished to the height of three feet above the level of the highest spring-tides, and thirty feet wide at top, was at the same time 360 feet. The large stones of the upper part of the breakwater were deposited to any nicety by means of a vessel constructed for the purpose, having the same sheer or slope at the bow with the side of the work, so that by a projecting beam or mast the largest stones could be taken out of the vessel, and placed on the opposite side, or middle, or any other part of the breakwater.

The whole establishment for carrying on the Plymouth breakwater was as follows:

	~~~
A superintendent, with proper officers and clerks, to keep and control the accounts	10
Warrant officers and masters of the ten stone vessels in the immediate employ of the public	21
Seamen and boys to navigate these vessels	90
Seamen employed in the superintendents' vessels; the light vessel, boats' crews, &c	45
Masons, blacksmiths, carpenters, sail-makers, and la- bourers, employed at Oreston	39
In the immediate pay of government	205
Seamen employed in the contractors' vessels	170

Quarrymen, labourers, &c. employed at Oreston by the

contractors...... 300 

Beneficial results of work.

The result of this great work has completely answered the expectation of its warmest advocates. The good effects of it were, indeed, very sensibly felt at the end of the second year, when about 800 yards of the central part, where the water was shallowest, were visible at low-water spring-tides. The swell was then so much broken down and destroyed at the head of the Sound, that the fishermen were no longer able as heretofore to judge of the weather outside the Sound; and ships of all sizes, and among others a French three-decker, ran in with confidence, and anchored behind the breakwater. Since that time near two hundred sail of vessels of all descriptions, driven in by tempestuous weather, have, at one time, found safe shelter within this insulated mole, where a fleet of twenty-five to thirty sail of the line may at all times find a secure and convenient anchorage, with the additional advantage of having a stream of excellent water from a reservoir constructed above Bouvisand Bay, capable of containing from ten to twelve thousand tons, or a quantity sufficient to water fifty sail of the line. This water is brought down in iron pipes to Staddon Point, opposite to the anchorage, where a jetty has been completed, from which the water descends through the pipes into the ships' boats. The whole expense of this most useful appendage to the breakwater was calculated at about L.16,000.

During the winter of 1816-17 the gales of wind were more frequent and tremendous than had been known for many years; and, on the night of the 19th January, such a hurricane came on as had not been remembered by the

oldest inhabitants. The tide rose six feet higher than the usual height of spring-tides. The Jasper sloop of war, and the Telegraph schooner, being anchored without the cover of the breakwater, were driven to the head of the Sound, and both lost; but a collier deeply laden, and under its cover, rode out the gale. No damage was sustained by any of the shipping in Catwater; but it was the general opinion, from former experience, that, if no breakwater had existed, the whole of the ships there must have been wrecked, and the storehouses and magazines on the victualling premises, and most of the buildings on the margin of the sea, must have been entirely swept away. Till this tremendous gale the breakwater had not sustained the slightest damage from the heavy seas that, through the winter, had broken against it with unusual violence, not a single stone having moved from the place in which it was originally deposited; but after the hurricane above-mentioned, and the high tide which accompanied it, it was found that the upper stratum of the finished part, extending about 200 yards, and thirty yards in width, had been displaced, and the whole of the huge stones, from two to five tons in weight each, had been carried over and deposited on the northern slope of the breakwater. In no other part could it be discovered that a single stone had been displaced. Since that time a considerable portion of the sea-front has been cased with masonry of immense masses of stone, but smoothly and beautifully laid; and the better to protect this, the foot of the slope has been extended seaward, in order to protect the foot of the masonry, by throwing in a great quantity of large and rubble stones.

The want of a harbour, or any place of safety to which Propriety ships can resort in bad weather, or in distress, between the of a breakports of Plymouth and Portsmouth, led to the suggestion of water in Portland Roads being converted into a secure harbour by Portland means of a breakwater. It was estimated that the constructional Roads.

tion of such a stone dike, extending from the north-east part of Portland Island, about two miles and a quarter in length, covering an anchorage of about four square miles, and completely sheltering the pier, harbour, and bathing place of Weymouth, would require about four millions of tons of stone, five years to complete it, and an expense of about six hundred thousand pounds sterling. The capstone alone, which covers the Portland stone, and which, being unmarketable, is not only useless, but a great incumbrance, would be sufficient to complete this great undertaking. Such a secure anchorage in this situation, in which the largest fleets, either naval or mercantile, might ride at anchor in all winds and the most stormy weather in perfect security, was not unworthy the consideration of the public; and, perhaps, in the present increased state of our population, there can be no truer policy than that of carrying on great national works of public utility. Many years have elapsed since the propriety of a breakwater in Portland Roads was first under discussion; but it is only recently that this magnificent work has been taken in hand, together with other noble breakwaters or harbours of refuge, such as those at Harwich, Dover, Holyhead, the Channel Islands, &c.

The estimated cost of these magnificent harbours of refuge, formed by the construction of breakwaters, is as follows, viz:-Dover (estimate for a pier 800 feet long at Cheeseman's Head), L.245,000; Harwich, L.110,000; Alderney, L.620,000; Jersey, L.700,000; Portland (harbour and breakwater), L.588,959. (J. B—W.)

BREAM. See Brama, and Ichthyology.

BREAMING, or Brooming, the cleansing of a ship's bottom by applying lighted straw or the like, in order to loosen the pitch and adhering sea-weeds, shells, &c., which are then removed with scrapers.

BREAST, in Anatomy, the fore-part of the thorax. Smiting the breast is an expression of penitence. In the

Bream Breast. Breasthooks || Brechin. Romish church the priest beats his breast in rehearsing the general confession at the beginning of the mass.

BREAST-Hooks, in Ship-Building, are thick pieces of timber incurvated into the form of knees, and used to strengthen the fore-part of the ship, where they are placed at different heights directly across the stem, so as to unite it with the bows on each side.

Breast-Plate, a piece of armour for the breast, originally formed of hides, horn, linen, or hemp twisted into small cords; but afterwards made of brass, iron, silver, or other metals, which were sometimes hardened so as to be bullet-proof.

Breast-Plate, in Jewish Antiquity, a part of the vestment of the high priest. It was ten inches square, and consisted of a doubled piece of the same rich stuff of which the ephod was made; and it was set with twelve precious stones, on which were engraved the names of the twelve tribes. They were divided from one another by little golden squares or partitions, in which they were set. The names of these stones, and those of the tribes engraven on them, as also of their disposition on the breast-plate, were as follows:



The breast-plate was fastened at the four corners; above, to each shoulder by a golden hook or ring at the end of a wreathed chain; and below, to the girdle of the phod, by two strings or ribbons, which had likewise two rings and hooks. This ornament was never to be severed from the priestly garment; and it was called the Memorial, to remind the high priest how dear those tribes ought to be to him, whose names he wore on his breast. It is also called the Breast-plate of Judgment, because it had the divine oracle of Urim and Thummim annexed to it.

BREAST-Plough, a kind of spade with a cross-piece at the extremity of the handle, which the operator holds against his breast. It is used for cutting thin slices of turf, chiefly for the purpose of thatching.

Breast-Wheel. See Hydrodynamics.

BRECCIA, a rock composed of angular fragments of various pre-existing rocks or fossils imbedded in some matrix—as marble breccia, ossiferous breccia.

BRECHIN, a parliamentary burgh and parish of Scotland, in the county of Forfar, on the South Esk, 71 miles west of Montrose, with which, and with Forfar, Perth, and Aberdeen, it is connected by railway. It is situated on an abrupt declivity on the north bank of the river, which is here crossed by two bridges. Some of the streets are well built; and among the principal public buildings and institutions are several churches and chapels, the town-house, academy, mechanics' institute, hospitals, and dispensary. Besides the academy, there are four public and several private schools. Brechin unites with Montrose, Arbroath, Forfar, and Bervie, in returning one member to parliament. Electors 172. It is governed by a provost, two bailies, a dean of guild, a treasurer, and eight councillors. The principal manufacture is linen. There are also two distilleries and a paper-work. Market-day Tuesday. Pop. (1851) of parliamentary burgh 6637, of municipality, 4515.

This town is said to have been the capital of the Pictish kings; and the hill of Caterthun (about four miles north of the town), surrounded with an immense coronal of loose stones, is supposed to have been a fortification belonging to that people. The Culdees

had a convent here; and their abbot Leod was witness to the grant Brecon. made by King David to his new abbey of Dunfermline.

Brechin was erected into a bishopric by David I. about 1150. In 1672 James VI., with consent of the Regent Morton, gave a grant for founding an hospital in the burgh. "Mr George Buchanan, pensioner of Corsragwell," is one of the witnesses to the grant, which was ratified in 1587. The magistrates and council are partners of this charity forms with the street and council are partners of this charity forms. trons of this charity, from which they give a small weekly allowance to poor burgesses, no hospital apparently having ever been erected. William de Brechin, in 1256, founded a chapel called Maison Dieu. Parts of the walls of the chapel still remain in the Maison Dieu Vennel, and prove that the chapel had originally been an elegant little building. Its funds are now appropriated to salary the rector of the academy, who hence takes the title of preceptor of Maison Dieu. The cathedral, which is now used as the parish church, was originally a handsome Gothic building; but its appearance has been much injured by modern "improvements." The steeple attached is a noble-looking square tower, with an octagon spire, rising to the height of 128 feet. Close to the church stands the round tower, one of those singular structures, the real use of which has so long baffled the research of antiquaries. These towers are peculiar to North Britain and Ireland: in the latter they are frequent; in the former only two at this time exist, one at Brechin and another at Abernethy. There is no stair in the Brechin tower, and the only access to the top is by means of ladders placed on wooden semicircular floors, which rest on circular projections within the tower. The height from the ground to the roof is 85 feet, the inner diameter within a few feet of the bottom is 8 feet, and the thickness of the wall at that part about 4 feet; the circumference is very near 50 feet; the inner diameter at top is 6 feet 7 inches, the thickness of the wall 2 feet 10 inches, and the circumference These proportions give the building a high 38 feet 8 inches. degree of elegance. The top is roofed with an octagonal spire 18 feet high, which makes the whole height of the building 103 feet. During strong winds this tower has often been observed to vibrate. A stone built into the wall of the churchyard, evidently modernized, but most probably copied from an older stone, records, in not inelegant Latin, that during 1647 six hundred persons died of the plague in Brechin in the course of four months

Brechin was burnt by the Danes in 1012, and by the Marquis of

Montrose in 1645.

Within the burgh there is a house said to have been a Hospitium of the knights templars, till recently appropriately used as an inn. These knights seem to have had some lards in the neighbourhood, as there is a piece of ground near Brechin bearing the title of Temple Hill of Bothers. In the vicinity is Huntly Hill, where a battle was fought between the Earls of Huntly and Crawford in 1452.

Brechin Castle, the seat of Lord Panmure, stands on the brink of a perpendicular rock overhanging the South Esk, a little to the south of the town. This castle was besieged by the English under Edward I. in 1303, and was for twenty days gallantly defended by Sir Thomas Maule, ancestor of the family of Panmure, who was slain by a stone thrown from an engine placed on the opposite rising ground, when the castle was instantly surrendered.

Gavin Douglas, Maitland the topographer, Gillies the historian of Greece, and James Tytler, a contributor to the early editions of this work, were natives of Brechin. See Black's *History of Brechin*.

BRECON, or BRECKNOCKSHIRE, an inland county in South Wales, is bounded on the north by Radnor; on the east by Hereford and Monmouth; on the south by Glamorgan, and on the west by Caermarthen and Cardigan shires. Its greatest length from south to north is about 53 miles, and its greatest breadth from east to west about 46 miles. It possesses an area of 719 square miles, or 460,158 acres, and is thus the fourth largest county in Wales. It is supposed to have derived its name from Brychan, a Welsh prince, who flourished in the fifth century.

The old red sandstone is the principal geological formation in this county, and occupies the whole of the central portion from east to west. Along the southern boundary there extends a narrow belt of carboniferous limestone, millstone grit ("farewell rock" of the miners), and the outcrop of the coal beds; together forming the northern rim of the coal measures in the great South Wales coalfield; but no part of the county is sufficiently within the measures to yield valuable mines. Brecon therefore does not occupy an important position as a mining county. The narrow projecting part of the county to the north, lying between Radnor and Cardigan, is occupied by the Upper and Lower Silurian beds; and there is a somewhat singular narrow pen-

Brecon. insula of the former projecting into the red sandstone for a distance of ten miles, in a S.W. direction, and terminating at about five miles north of the town of Brecon. A belt of limestone extends from the town of Hay on the east, and passing in a S.W. direction through the town of Brecon, terminates on the west at the Brecknockshire Van. Another and more prominent band extends along the border of the old red sandstone on the N.W., where it joins the Silurian

The general aspect of the county is mountainous, and the scenery is marked by great beauty and wild grandeur. A chain of the loftiest mountains in South Wales completely encircles the south, composed in the east of the Black mountains, 2545 feet in height, and the curious Sugar Loaf rising to the height of 1760 feet. On the west of Brecknockshire are the Van and Talsarn mountains 2596 feet, and Mount Capellante 2394 feet in height; while the centre of the crescent is occupied by the masses of the Brecknockshire Beacons, towering with their lofty summits to a height of 2862 feet. In the north, a range of barren hills, called Mynydd Bwlch Groes, at the most westerly end, and Mynydd Epynt towards the east, enters the boundary of the county at a short distance from Llandovery in Caermarthenshire, and extending in a N.E. direction, terminates near the town of Builth.

Some of the valleys are distinguished by great beauty. The vale of the Usk, stretching from east to west, and dividing the county into two nearly equal portions, is hardly surpassed as a piece of romantic woodland scenery by any part of the British islands.

There is a considerable number of rivers in this county. The Wye, which is the chief, forms the boundary on the N. and N.E. from Rhayader to Hay, a distance of upwards of twenty miles; while the Towy, the Afon Claerwen and Elan separate the county from Cardigan and Radnor on the N.W. and N. The Usk rises in the Caermarthenshire Van on the west, and flowing in a direction nearly due east through the centre of the county, collects the waters from the range of the Beacons in the south, and from Mynydd Bwlch Groes and Mynydd Epynt in the north, by means of numerous smaller streams (of which the Tarell and the Honddu are the most important), and enters the county of Monmouth near Abergaveny. The Taff, the Hepste, and the Tawe, all rise on the south of the Beacon range, and passing through Glamorganshire, flow into the British Channel.

Of its several lakes, that of Llyn Safaddu is one of the largest in South Wales. The more important of the others are Llyn Fa Fawr, Pwll Bivery, and Llyn Carw.

The climate is moist, but temperate and salubrious; and the soil of the valleys, consisting as it does in many of them of rich alluvial deposits, is very fertile. The cultivated crops consist of wheat, oats, barley, rye, turnips, pease, potatoes, and vetches; of these the greater part is consumed within the county. The uplands are chiefly in pasture, and are stocked with sheep, cattle, and ponies, which, with wool, butter, and oak-bark, form the staple of a considerable trade with the adjoining English counties, and with the iron districts lying to the south. The farms are generally small, but are well cultivated in the lower parts of the county. The highland occupiers are a very humble hard-working class of men. It is calculated that about two-thirds only of the lands in the county are inclosed.

There are several tramways in the county, one of which extends from Brecon to Hay and Kington, and another from Devynock, between Brecon and Trecastle, to join the Swansea canal at Ystradgynlais. There is also an excellent canal from Brecon by Crickhowel and Abergavenny to Newport. Brecknockshire does not possess a railway; but the Hereford, Abergavenny, and Newport line skirts the east side of the county; while the Vale of Neath and Taff Vale railways

pass for a considerable distance along the county boundary Brecon. on the south.

The principal towns are Brecon, Builth, Crickhowel, and Hay. The county returns one member to parliament, and has done so since 1536. The political influence is chiefly in the hands of the Marquis of Camden, and Sir Charles Morgan of Tredegar. Constituency in 1852, 2779. The average gross rental of the county is estimated at 5s. 9d. per acre. The annual value of real property paying incometax is L.198,472.

The population of the county by the last census was 61,474, giving an average of 188 persons to a square mile, or 7.5 acres to each person. Of the total number, 31,314 were males, and 30,160 females. The number of inhabited houses was 12,221, uninhabited 731, and building 74, giving an average of 17 inhabited houses to a square mile, and 5 persons to each house. The following table gives the census returns for the last 50 years.

Years.					Increase of popu-		
1801.	1811.	1821.	1831.	1841.	1851.	lation per cent. in fifty years.	
32,325	37,735	43,826	<del>1</del> 7,763	55,603	61,474	90	

It is calculated that about one-fourth of the whole population are in the condition of labourers, servants, &c. About ten per cent. live by agriculture, and an equal number by trade; while upwards of thirteen hundred persons possess independent means, and about four hundred follow professions.

In 1847 the total number of children of the working-classes at day schools within the county was 3985. The total number of schools was 96, of which 38 were church or national, with 1873 scholars; 33 adventure or private, with 1249 scholars; 5 British and foreign, with 443 scholars; 2 dissenting, with 79 scholars; and 18 dame schools, with 341 scholars. It appears that the average annual income of each school was only L.24, 8s.  $1\frac{3}{4}$ d., and the average annual incomes of the teachers from all sources only L.23, 15s. 21d. The total number of scholars attending Sunday schools was 13,654. The total number of Sunday schools was 181, of which 40 were Church of England, with 2409 scholars; 30 Baptist, with 2132 scholars; 45 Calvinistic Methodist. with 3742 scholars; 51 Independent, with 4080 scholars; 10 Wesleyan, with 523 scholars; other denominations 5, with 768 scholars. In 69 of these schools instruction was given in the Welsh language only; in 46 in the English language only; and in 66 in both tongues. From the foregoing statistics it will be seen that dissenting sects are in a great majority in this county; and also that the Welsh language is still much employed. It is calculated that one-half of the population use Welsh habitually.

Brecon, or Brecknock, the capital of the county of the same name, a market and borough town, 145 miles N. by W. from London, picturesquely situated in a fine open valley, at the confluence of the Honddu the Tarell and the Usk, and nearly in the centre of the country. There are three main streets, with several smaller ones. The houses are for the most part constructed of stone, and are generally well built. Brecon has a fine old church, partly of the Norman period. There are two other churches, and two Independent, two Baptist, and one Calvinistic Methodist chapel.

The corporation consists of a mayor, recorder, four aldermen, and twelve councillors. The borough has returned one member to parliament since 1536. Constituency in 1832, 336. The assessed taxes yield annually L.1259, and the annual value of real property paying income-tax is L.24,941. There are weekly markets, and several fairs in the course of the year. The quarter-sessions and assizes are held here.

Brecon has a foundation called the College of Christ Church, of which the Bishop of St David's is ex officio dean. This has hitherto been entirely inefficient, but there is now

Breeze

Breislak.

Breda

(1854) some prospect of reformation in the management. It is proposed also to transfer the college of St David's at Breenberg Lampeter to this town. The ruins of the ancient castle are unimportant: they are inclosed in the beautiful grounds of the Castle Hotel. There are some fine Roman and other remains in the immediate vicinity. Pop. of municipality (1851) 5673. Inhabited houses, 1147. (J. G-W-D.)

BREDA, a town of Holland, in the province of North Brabant, and capital of a circle of the same name, is situated in a marshy plain on the Mark, 24 miles S.W. of Bois le Duc, and 30 N.N.E. of Antwerp. It is strongly fortified, and defended by a citadel (rebuilt by William III. of England), and the surrounding district may be laid under water when required. The town is well built, with wide and well paved streets, is intersected by several canals, and has a fine quay, town hall, arsenal, observatory, orphan asylum, and several Roman Catholic and Protestant churches, one of the latter having a spire 362 feet in height. It has also a Latin school, military academy, and manufactures of linen and woollen goods, hats, beer, and musical instruments. Pop. (1850) 14,689.

Breda was taken by prince Maurice in 1590, retaken by the Spaniards under Spinola in 1625, and finally ceded to Holland by the treaty of Westphalia in 1648.

BREDA, Jan Van, an eminent Dutch painter, was the son of Alexander Van Breda, an artist of considerable merit, and was born at Antwerp in 1683. He imitated the style of Wouvermans and other great masters with such dexterity, that even connoisseurs are often unable to distinguish between his copies and the originals. He visited England, where he was so well employed, that in a few years he was able to retire to his native country with a competency. He died at Antwerp in 1750.

BREDOW, GABRIEL GOTTFRIED, an eminent Prussian professor in the university of Breslau, was born at Berlin in 1773. He is well known in England by his Manual of Ancient History, which was translated into English in 1827; Researches on History, Geography, and Chronology; and his valuable Historical Tables, which come down to 1811. This last work was translated into English by Major J. Bell, who has continued the tables down to 1820, and produced a very useful and popular work. Bredow died in 1814.

BREECHES, or Trowsers, a garment which extends from the waist to the knee or to the ankle, encircling the limbs. The Romans, during the times of the republic, had nothing corresponding to the modern trowsers, but sometimes bound their thighs and legs with fascize or bands of cloth. This article of dress appears to have been peculiar to barbarous nations; and hence Tacitus calls it barbarum tegmen. It was, in fact, in general use among all the nations which encircled the Greek and Roman people, from the Indian Ocean to the Atlantic. We are told, in particular, that trowsers were used by the following nations—the Medes and Persians, the Parthians, the Phrygians, the Sacæ, the Sarmatæ, the Dacians and Getæ, the Teutones, the Belgæ, the Britains, and the Gauls. Braccæ or trowsers were eventually introduced into Italy, some say as early as the time of Augustus; but the breeches of that emperor, mentioned by Suetonius, were apparently only swathes tied round his thighs. Later, however, braccæ became so much in fashion, that it was judged necessary, under Honorius, to prohibit their use, and the bracarii or breeches-makers were expelled from the city, it being considered unworthy of a nation that commanded the world to wear the apparel of barbarians.

BREECHING, or BREECHBAND, that part of a horse's harness passing over his hinder quarters and attached to the shafts, so as to enable him to push back the vehicle to which he is harnessed.

BREENBERG, BARTHOLOMEW, a painter, born at Utrecht in 1620. In early life he went to Rome, where he VOL. V.

was distinguished by the name of Bartolomeo, an appellation bestowed upon him by the society of Flemish painters called Bentvogels. He particularly excelled in landscapes, which he enriched with figures and animals drawn in a very spirited and masterly manner. His best works are views of Albano, Frescati, and Tivoli. He generally painted on a small scale; and his smaller pictures are most esteemed. He died in 1660. Breenberg also etched from his own designs a set of twenty-four views and landscapes with ruins.

BREEZE, a gentle gale. It is applied in a more restricted sense to a shifting wind that blows from sea or land during certain hours of the day or night. It is common in Africa and some parts of the East and West Indies. Breezes differ from etesiæ or trade-winds, inasmuch as the former are diurnal, or have their periods each day, whilst the latter are annual, and blow at a distance from land. The seabreezes prevail by day, and the land breezes by night, so that they remain as constant as the seasons of the year, or the course of the sun, on which they seem to depend, although they come on sooner or later, stronger or weaker, in some places than in others, and vary according to latitude and other circumstances.

BREGENTZ, the capital of the circle of Vorarlberg, in the Tyrol, stands on a hill at the S.E. end of the Lake of Constance. Pop. about 4000, occupied in silk and cotton manufactures, and in an active transit trade.

BREHAR, BRYHER, or BRYER, one of the Scilly isles, 30 miles west of Land's End, Cornwall. It is about 11 mile in length, with an average breadth of half-a-mile, and a considerable portion of it is under cultivation. There are several barrows and Druidical remains in the island. On the east is New Grinsey harbour. Pop. (1851) 118.

BREHONS, the hereditary provincial judges among the cient Irish. The nature of their laws, which continued ancient Irish. in force till the introduction of the English system of law in the reign of Edward III., has not yet been satisfactorily determined. There are, it is said, in Ireland ancient MSS., the publication of which would throw light on this curious and interesting subject. Till such elucidation be afforded. of which some prospect is held out, it were useless to hazard opinions on the character and value of the Brehon laws as a system of jurisprudence.

BREISGAU, a fertile district of Baden, on the eastern side of the Rhine, and now reckoned in the circles of the Upper and Middle Rhine. It extends over 1260 square miles, contains 17 towns and 440 villages. Pop. 150,000.

BREISLAK, SCIPIONE, an eminent geologist, was born at Rome in 1748. He early distinguished himself as professor of mathematical and mechanical philosophy in the college of Ragusa; but after residing there for several years he returned to his native city, where he soon became a professor in the Collegio Nazareno, and began to form the fine mineralogical cabinet in that institution. His leisure was dedicated to geological researches in the papal states, which he prosecuted with an industry and zeal then rare in Italy, and pointed out how his researches were applicable to local improvements. His examination of the aluminous district of Tolfa and adjacent hills appeared in 1786, under the title Saggio d'Osservazioni sulla Tolfa, Oriuolo e Latera, and gave him such reputation, that he was invited by the king of Naples to inspect the mines and similar works in that kingdom, and appointed professor of mineralogy to the Royal Artillery. The vast works for the refining of sulphur in the volcanic district of Solfatara were erected under his direction. He afterwards made many journeys through the ancient Campania, to illustrate its geology, and published his remarks in his Topografia Fisica della Campania (Florence, 1798), which contains much accurate observation, with some hypothetical speculation on the cause of volcanic action, that will now scarcely be generally received as satisfactory. The French translation

Breislakite of this work by General Pommereuil in 1801, is rendered comparatively useless by the conversion of the somewhat indefinite measures and weights of Breislak into mêtres and centimêtres, grammes and centigrammes, while the dates are reduced to the republican nomenclature of France, and the reader is unable to distinguish what additions have been made to the original.

Breislak also published an essay on the physical condition of the seven hills of Rome, which he decides to be the remains of a local volcano. The more recent investigations of Brocchi and Daubeny have proved that the soil of Rome consists of alternate beds of sandy and calcareous matter, with volcanic tuffa, which, however, does not seem to have been produced by any volcano on that site, but by one that evidently once existed in Monte Albano, 12 miles south of Rome, or by Monte Cimini to the north of the city, the tuffas of which are continuous with those of Rome.

The political convulsions of Italy in 1799 brought Breislak to Paris, where he remained until 1802; when he received the appointment of inspector of the salpetrière and powder manufactory near Milan; and in that place he took up his future abode. His valuable labours were appreciated by the successive governments that ruled over that part of Italy till his death, which happened on the 18th of February 1826. During this latter part of his career he published the following works :- Del Salnitro e dell' Arte del Salnitraio; Memoria sulla Fabbricazione e Raffinazione dei Nitri; Instruzione pratica per le piccole Fabbricazione di Nitro, da farsi dalle persone di Campagna. His valuable Introduzione alla Geologia appeared in 1811; of which a French edition with additions was published in 1819. Finally, the Austrian government, in 1822, took on itself the expense of publishing his Descrizione Geologica della Provincia di

BREISLAKITE, reddish-brown acicular crystals, a silicate of alumine and iron, discovered by Breislak in the crater of Solfatara, and afterwards at Capo di Bove near Rome.

BREMEN, one of the four free cities of Germany, is situated upon both sides of the Weser, 46 miles from the sea and 60 miles S.W. of Hamburg. Lat. of observatory 53. 4. 36. N. Long. 8. 48. 54. E. As early as 788, Bremen was made the seat of a bishopric by Charlemagne; and about 60 years afterwards, Hamburg having been attacked and taken by the Normans, the archbishop removed his seat thence to Bremen. This city became early of considerable mercantile importance, and in 1283 joined the Hanseatic league. About the middle of the sixteenth century the archbishop of Bremen and most of the inhabitants declared for the Protestant religion, which occasioned the separation of the city from the rest of the diocese. The former became independent: the latter was secularized; and by the peace of Westphalia, in 1648, was ceded to Sweden as a duchy. In a war between Denmark and Sweden in 1712, it was conquered by the former, and along with the duchy of Verden sold to Hanover. After much negotiation the purchase was confirmed by the imperial diet of 1732. It now forms part of the Hanoverian province of Stade. In 1640, Bremen was made an imperial city. It was taken by the French in 1806; and from 1810 to 1813, was the capital of the department of the Mouths of the Weser. In 1815 it was restored to independence by the Congress of Vienna. It subsequently became a member of the German confederation, and now furnishes 485 men to the federal army. The old town is situated on the right, and the new town on the left, bank of the river. In the former, which is the larger and more populous portion, the streets are generally narrow and crooked; but the streets of the new town are more regular and the houses more elegant. The river is lined on both sides by extensive and commodious quays, and crossed by two bridges, the larger of which was opened in 1842. The old ramparts have been converted into beautiful pro-

menades. Among the public buildings are the cathedral, Brennage built in 1160; the church of St Ansgarius, with a handsome spire 325 feet high; the town hall, a fine old Gothic build- Brentford. ing, formerly the archiepiscopal palace, and which has recently been restored; the exchange, with a library of 25,000 volumes; museum, theatre, the observatory of Dr Olbers, a public library of 20,000 volumes; gymnasium, navigation school, and a deaf-mute institution. The manufactures are considerable, particularly tobacco, snuff, and cigars. There are also sugar refineries, breweries, distilleries, tanneries, paper works, and manufactures of woollen, linen, and cotton goods. Ship-building is extensively carried on. Bremen is the principal emporium of Brunswick, Hesse, and Hanover, and carries on an active trade with North and South America, the West Indies, Russia (particularly Archangel), France, England, &c. Its chief imports are tobacco, sugar, coffee, and other colonial products, iron, timber, wines, &c.; exports, linen and woollen goods, snuff, cigars, sugar, soap, leather, vitriol, &c. In 1827 it had only 74 merchant vessels; it 1850 it had 236 vessels, of the aggregate burden of 92,870 tons. In 1851 the arrivals were 2518 vessels, of 171,603 tons, the departures 2934 vessels, of 181,124 tons; the imports in that year by sea amounted to L.2,904,593, by land, L.3,196,650; exports by sea, L.2,743,095, by land, L.2,598,108. Vessels drawing more than seven feet cannot come up to the town, and, accordingly, an excellent harbour with a magnificent dock and floodgate, capable of admitting at high water vessels of 25 feet draught, has been formed at Bremerhaven on the Weser, 30 miles below the city, a small territory obtained by Bremen from Hanover in 1827. Vessels drawing from 13 to 14 feet can ascend the river as far as Vegesack, 13 miles below Bremen.

The entire territory of Bremen has an area of 74 square miles. Pop. in 1849, 79,047, of whom 53,478 were inhabitants of Bremen, 3538 of Vegesack, and 3618 of Bremerhaven. With the exception of about 2000 Catholics, the inhabitants are Lutherans or Calvinists. No Jews are allowed to live in the city. According to the new constitution, adopted March 5, and published April 8, 1849, the senate, which has the executive power, is composed of 16 members, nominated for life by the senators and the bourgeoisie in common. Of these, eight, of whom five must be lawyers, are chosen by the liberal professions, five from the commercial, and three from the working classes. Two of the senators are nominated by their colleagues as burgomasters, who preside in succession, and hold office for four years, one retiring every two years. The assembly of the bourgeoisie consists of 300 representatives, holding office for four years, one-half going out every two years. In the budget of 1852, the revenue is given at L.160,827, and the expenditure at L.158,970.

BRENNAGE, BRENNAGIUM, in the Middle Ages, a tribute or composition which tenants paid to their lord in lieu of bran, which they were obliged to furnish for his hounds. It is also written brenage, brenagium, and brenaige, brenagium, brenaticum, and brennaticum.

BRENNUS, a famous general of the Senonian Gauls. who, in B.C. 390, overran Italy with a powerful army, defeated the Romans at the river Allia, and sacked Rome. After blockading the capitol for six months, Brennus was bribed by a thousand pounds weight of gold to depart from the city. In the popular legends it was related, that while the gold was weighing, Camillus suddenly appeared with an army, and slew Brennus and his followers to a man. See ROMAN HISTORY.

There was another Gallic leader of this name who invaded Macedonia and Greece about B.C. 280. After sustaining a severe defeat near Delphi, he put an end to his own life.

BRENTFORD, a town of England, in the county of Middlesex. eight miles west from London, in Lat. 51. 28. N. Long. 0. 20. W. It is divided by the river Brent into Old and New Brentford, the former in the parish of Ealing and

Breslau

Brest.

Brescia.

Brerewood hundred of Ossulston; the latter an independent parish. It is the seat of a poor-law union, comprising ten parishes and townships. Brentford, being on the great western highway to London, has a considerable trade. In the town and neighbourhood there are several distilleries and breweries, a soapfactory, brick and tile-works, and the West London waterworks. There are numerous market gardens in the vicinity. which employ many of the inhabitants. Brentford is famed for its pig-markets, held every Tuesday. The town consists principally of one long narrow street. It has a small parish church, and Baptist, Independent, and Methodist chapels; three national schools in New Brentford, and one British, one national, and one infant school in Old Brentford. Sion House, the seat of the Duke of Northumberland, and Osterley Park, that of the Earl of Jersey, are in the immediate

vicinity of the town. Pop. (1851) 8870.
BREREWOOD, EDWARD, a learned mathematician and antiquary, was born at Chester in 1565, and at the free school there he received the rudiments of his education. In 1581 he was admitted of Brazen-nose College, Oxford; and in 1596 was elected the first professor of astronomy at Gresham College, London, an office which he held till his death in 1613. His works, of which the following is a list, were all posthumous publications.—1. De Ponderibus et Pretiis veterum Nummorum eorumque cum recentioribus Collatione, 1614, 4to; 2. Inquiries touching the Diversities of Languages and Religion through the chief parts of the world, London, 1614, 4to; 3. Elementa Logicæ in gratiam studiosæ juventutis in Academia Oxon. London, 1614, 8vo, and Oxford, 1628, 8vo; 4. Tractatus quidam Logici de prædicabilibus et prædicamentis, 1628, 8vo; 5. Two Treatises on the Sabbath, 1630 and 1632; 6. Tractatus duo, quorum primus est de Meteoris, secundus de Oculo, 1631; 7. Commentarii in Ethicam Aristotelis, Oxford, 1640, 4to; and, 8. The Patriarchal Government of the Ancient Church, Oxford, 1641, 4to.

BRESCIA (Bresciano), a delegation of Venetian Lombardy, bounded on the N.W. by Bergamo, on the N.E. by the Tyrol, on the E. by the Lake of Garda, on the S.E. by Mantua, on the S. by Cremona, and on the S.W. by Lodi. Area 1306 sq. miles. Pop. (1850) 356,225. The northern part, or one-third of the delegation, consists of a chain of mountains, which belong to the Rhætian Alps; the remainder is part of the great plain of Lombardy. The latter division is highly productive in corn and in mulberry trees, as well as in flax, hemp, and oil. The wine is considered good, but is not sufficient for the domestic consumption. The mountain districts yield iron, lead, copper, marble, granite, and charcoal. The manufactures consist principally of silk, woollen, linen, and cotton goods, iron, steel, glass, and paper wares.

Brescia (the ancient Brixia), the capital of the above delegation, is situated on the Garza, 60 miles E.N.E. of Milan, at the foot of a hill, on the summit of which is a fine old castle, once so strong as to be called the Falcon of Lombardy. The town is well built and flourishing, containing many magnificent buildings, among which are the new cathedral of white marble, begun in 1604 and finished only in 1825, the episcopal palace, palace of justice, many churches richly adorned with works of art, a large theatre, and numerous public fountains. It has also a fine museum of antiquities, public library, college, high-school, athenæum, and numerous charitable institutions. In the vicinity are extensive iron works; and the arms and cutlery made here have long been celebrated as the best in Italy, whence the epithet armata. It has also manufactures of silk, woollen, and linen goods, paper, &c. with numerous oil mills and tanneries. In 1822, a beautiful Roman temple of marble was excavated here. Pop. 35,000.

Brescia is supposed to have been founded by the Etruscans. It was afterwards a town of the Libni, then of the Cenomani, and, finally, a Roman free town. After the fall of the empire it was

several times pillaged by the Goths. From the Lombards it passed to the Franks. It was made a free imperial city by Otho the Great. and shared and suffered in the contests between the Guelfs and Ghibellines. It then fell into the power of the Signiors of Verona, and in 1378 into the hands of the Milanese. It was taken in 1426 by Carmagnola; besieged by the Milanese general Picinino in 1438: surrendered by the inhabitants to the French after the battle of Agnano (1509); taken in 1512 by the Venetian general, Andrea Gritti; delivered by Gaston de Foix; besieged again in 1573, 1575, and 1576. From that time it remained under the Venetian dominion till the dissolution of the republic. It was the capital of the department of Mella during the existence of the Cisalpine republic and the Napoleonic kingdom of Italy, and fell in 1814 under the yoke of Austria. In the revolution of 1849, the inhabitants rose in arms, but were overpowered, after a destructive siege, by the troops of Haynau. Brescia has at various times suffered severely from pestilence and epidemics. It was the birthplace of Tartaglia the mathematician, and the writer Mazzuchelli.

BRESLAU, a government in the Prussian province of Silesia, between the governments of Liegnitz and Oppeln. It is divided into 22 circles, having 56 cities, 7 markettowns, and 2224 villages. Area 5252 square miles. Pop. in 1849, 1,174,679, of whom 698,436 were Protestants, 464,178 Roman Catholics, and 12,059 Jews.

Breslau, the capital of the above government, as well as of the government of Silesia, is situated on the Oder, at the influx of the Ohlau, and on the railway from Berlin to Vienna, 190 miles S.E. of the former. Lat. of observatory 51. 6. 57. N. Long. 17. 2. 33. E. With the exception of Berlin, it is the most populous city of Prussia. Pop. in 1849, 110,702, of whom 68,514 were Protestants, 34,801 Roman Catholics, and 7384 Jews. It consists of the old and new towns, with several suburbs and islands in the Oder connected together by numerous bridges. The old fortifications have been converted into beautiful promenades. The streets in the old town are mostly narrow, but otherwise generally good, with numerous handsome public buildings and magnificent squares. Among the principal buildings are the old cathedral, founded in the twelfth century, the collegiate church, St Elizabeth's church, built in the thirteenth century, with a spire 364 feet in height, and one of the finest organs in Silesia, several other churches richly ornamented, the palace, now the government house, built by Frederick the Great, the episcopal palace, townhouse, mint, exchange, university buildings, barracks, new theatre, and market. In one of the squares is a colossal bronze statue of Blücher.

Breslau is celebrated for its educational and literary institutions. The university, founded in 1702, had, in 1849, 819 students, of whom 21 were foreigners. It has faculties of arts, law, medicine, and Protestant and Roman Catholic theology. The library contains upwards of 200,000 volumes. In 1849 Breslau had 40 elementary schools, with 8512 scholars; a higher girls' school with 344 scholars; 2 higher burgh schools with 1099 scholars; 4 gymnasia with 2028 scholars; and a normal school with 202 scholars. It has also a deafmute and blind institution, 4 public libraries, botanic garden, school of arts and manufactures, and numerous literary and scientific societies, observatory, 5 orphan asylums, 10 hospitals, and numerous other charitable institutions. It is the seat of various provincial courts, a council of the mines, a Roman Catholic bishopric, and a Protestant consistory. It has numerous and extensive manufactures, among which are linen, cotton, woollen, and silk goods, soap, plate, jewellery, earthenware, &c., with numerous breweries and distilleries. It forms the principal mart for the linen and cotton products of Silesia, and for wool; and has four great annual fairs of eight days each; one of these, that for wool, is the greatest of its kind in Germany. The produce of the mines, timber, flax, hemp, corn, wines, are brought here in large quantities from other parts.

BREST, a strongly-fortified maritime town of France, capital of an arrondissement in the department of Finisterre, in Lat. 48. 22. N. Long. 4. 32. W. It is believed by some authors that Brest is the ancient Brivates Portus; by others that it is Gesocribates. Nothing definite, however, is known concerning the town till the year 1240, when it was ceded by the Comte de Léon to the first Duke of Bretagne. In

Bret || Brethren.

1372 Jean IV., Duke of Brittany, gave up the town and castle to the English, on condition that they should keep it for him during the war, and restore it when peace was proclaimed. On the death of Edward III. of England, Brest was made over to its original owner. When war was once more declared between France and England, an English garrison took possession of Brest, and repelled every attempt to dislodge it; but in 1397, Richard II. gave it up to the Duke of Bretagne, in consideration of a heavy ransom. In the following century it was again captured by the English, and once more retaken by the French. Finally, by the marriage of Louis XII. with Anne of Bretagne, Brest became an appanage of the French crown. The advantages of its situation as a sea-port were first recognised by Richelieu, who in 1631 constructed a harbour, which soon became the station of the French navy. entrance to the roadstead, called the Goulet, is about a mile in width; but the Mingan rock in the middle compels vessels to pass close under the formidable batteries which command it on either side. The roadstead itself is formed by the promontory of Finisterre on the north, and that of Quélern on the south. It is in some places three miles broad, and has an area of about 15 square leagues, so that all the fleets of France might ride in it in safety. It is defended on every side by batteries and forts erected under the personal superintendence of Vauban, and is believed to be utterly impregnable. The roadstead itself consists of numerous bays, formed by the embouchures of streams, one of which, the Châteaulin, is navigated by a steamer. Of these bays, the most interesting is that of Camaret, where the English squadron sent out in 1694 under Berkeley was miserably defeated, owing, it was said, to the treachery of some Englishman who gave timely warning to the French king of the intended expedition. Running up from the roadstead is a deep creek formed by the mouth of a small stream called the Penfeld, which serves as a basin to the dockyard, and separates Brest from its suburb La Recouvrance. The creek, though deep, is very narrow, and ships of war can only lie in it in single file. The dockyard is very extensive, and contains a sailwork, a slop shop, a ropery, a foundry, and seamen's barracks. The value of the stores in the dockyard and arsenal was estimated in 1839 at nearly L.6,000,000 sterling. The victualling office is also very extensive. The Bagnes of Brest are the largest in France, and contain about 3000 convicts. Beyond the bagnes is the Hôpital de la Marine, an institution like Greenwich Hospital, containing 26 rooms, each with 53 beds. Brest itself is built on the top and sloping sides of a hill, in some places so steep that the ascent from the lower to the upper town is performed by flights of stairs. Despite its great advantages, Brest has little trade, and no manufacture worth specifying except that of glazed hats for seamen. There are a few fishermen engaged in the cod, pilchard, and mackerel fishing. trade in grain. Pop. (1851) 36,500. There is also a little

BRET, or BRITT, a local name for the turbot, Rhom-

bus vulgaris.

BRETAGNE, one of the ancient provinces of France, bounded on the north by the English Channel and Normandy; west and south by the Atlantic, S.E. by Poitou, and east by Maine and Anjou. Its greatest length was 60 leagues, its greatest breadth 35; and its area nearly 1000 square leagues. It had a sea-board of nearly 150 leagues. It is now represented by the five departments of Côtes-du-Nord, Finisterre, Ille-et-Vilaine, Loire Inférieure, and Morbihan. It was formerly divided into Haute-Bretagne, of which the capital was Rennes, and Basse-Bretagne, of which the capital was Vannes. The language of the inhabitants is the ancient Armoric, which bears so strong an affinity to Welsh, that the natives of the one country understand the dialect of the other.

BRETHREN, THE (or Physicath Brethres). Those to

whom this appellation is applied, receive it only as descrip- Brethren. tive of their individual state as Christians-not as a name by which they might be known collectively as a distinct religious sect. It is not from any doctrinal peculiarity or definite ecclesiastical organization, that they have the appearance of a separate community; but rather from the fact that while all other Christians are identified with some peculiar section of the church of God, the persons known as Brethren refuse to be identified with any. Their existence is a protest against all sectarianism. They see no reason why the church, which is really one, should not be also visibly united, having as its only bond of fellowship and barrier of exclusion, the reception or rejection of those vital truths by which the Christian is distinguished from the unbeliever. The Brethren, therefore, may be represented as consisting of all such as, practically holding all the truths necessary to salvation, recognise each other as on that account alone true members of the only church. In their assemblies they have no pre-appointed person to conduct or share in the proceedings; all is open to the guidance of the Holy Spirit at the time, so that he who believes himself so led of the Spirit may address the meeting. When, however, gifted men are found among the Brethren, they are in general actively engaged in preaching and expounding on their individual responsibility to the Lord, and quite distinct from the assem-The number of places of worship returned in the government census as frequented by the Brethren in England and Wales is 132. This number, however, is believed to be below the truth.

Brethren of the Christian Schools (Fréres des Écoles Chrétiennes), a religious order founded at Rheims in 1679, by the Abbé de la Salle, approved in 1725 by Pope Benedict XIII., and legally recognised by the French government in 1808. In 1840, the number of their houses in France was upwards of 300, the number of members 1600. Their course of education comprehends religious instruction, reading, writing, arithmetic, grammar, and geography. At the date above mentioned they had 584 schools in Paris, attended by 141,550 scholars, young and old. The costume of the Brothers is peculiar, consisting of a coarse cassock, a hooded cloak with hanging sleeves, and a very wide The rules of the founder restrict their diet to the simplest necessaries of life. They are also sometimes improperly called Fréres Ignorantins, as their teaching is confined to the poor, and one of their rules forbids them to learn or teach Latin; Fréres de St Yon, from the name of their principal house (in Rouen) Fréres à Quatre Bras,

Brethren and Clerks of the Common Life, a religious fraternity towards the close of the fifteenth century. They lived under the rule of St Augustin, and were eminently useful in promoting the cause of religion and learning. Their society was formed in the preceding century, by Gerhard de Groot, a native of Deventer; but it did not flourish till about the period above mentioned, when it obtained the approbation of the council of Constance, after which it became very influential in Holland, Lower Germany, and the adjacent provinces. It was divided into two classes; the lettered Brethren or clerks, and the illiterate. They lived in separate habitations, but maintained the closest fraternal union. The former applied to the study of polite literature, and the education of youth; whilst the latter were employed in manual labour and the mechanical arts. The Sisters engaged in similar pursuits. They were frequently called Beghards and Lollards, by way of reproach.

Brether and Sisters of the Free Spirit, a religious sect which sprung up towards the close of the thirteenth century, and gained many adherents in Italy, France, and Germany. They derived their name from the words of St Paul, Rom. viii. 2, 14, and maintained that the true children of God were invested with the privilege of perfect freedom

Brevet

Brevet.

Brethren from the law. Some of their professed principles resembled those of the Pantheists; they held that all things emanated from God; that rational souls were portions of the Deity; that the universe was God; that, by the power of contemplation, they were united to the Deity, and thereby acquired a glorious and sublime liberty, both from the sinful lusts and the common instincts of nature; and that the person who was thus absorbed in the abyss of the Deity, became a part of the Godhead, and was the son of God in the same sense and manner as Christ was, being freed from the obligation of all laws human and divine. Many edicts were published against this sect; but, notwithstanding the hardships which they suffered, they continued till about the middle of the fifteenth century. They were called by several other names, such as Schwestriones (i.e. sisterers), Adamites, Beghards, Turlupins, &c. (Mosheim, Cent. xiii. ch. 5, &c.)

BRETHREN of the Holy Trinity, an order of monks founded They were in France near the close of the twelfth century. also called Mathurins and Brethren of the Redemption of Captives—the redemption of Christian captives from Mahommedan slavery being one of the principal objects of their

institution. (Mosheim, Ch. Hist.)

BRETHREN of the Observation, or Observantines, the more strict of the two parties into which the Franciscan order was divided at the close of the fourteenth century. The others are called the Conventual Brethren.

Brethren, Moravian. See Bohemian Brethren.

Brethren, White (Fratres Albati seu Candidi), were the followers of a leader about the beginning of the fifteenth century, who arrayed himself in a white garment; and as they also clothed themselves in white linen, they were distinguished by this title. Their leader was a priest from the Alps, who carried about a cross, like a standard, and whose apparent sanctity and devotion drew together a number of followers. This deluded enthusiast practised many acts of mortification and penance; endeavouring to persuade the European nations to renew the holy war, and pretending that he was favoured with divine visions. Boniface IX. ordered him to be apprehended and burnt at the stake, upon which his followers dispersed.

BRETON, or Cape Breton. See Cape Breton.

BREUGHEL, the name of six painters, of whom the

two following were the most remarkable.

BREUGHEL, Peeter, a Flemish painter, was the son of a peasant residing in the village of Breughel near Breda. After receiving instruction in painting from Koek, whose daughter he married, he spent some time in France and Italy, and then went to Antwerp, where he was elected into the academy in 1551. He finally settled at Brussels, and died there. The subjects of his pictures are chiefly humorous figures, like those of D. Teniers; and if he wants the delicate touch and silvery clearness of that master, he has abundant spirit and comic power. He is said to have died about the year 1570, at the age of 60.

BREUGHEL, Jan, son of the preceding, was born at Brussels about the year 1565. He first applied himself to painting flowers and fruit, in which he excelled; and he afterwards acquired considerable reputation by his landscapes and sea-pieces. After residing long at Cologne he travelled into Italy, where his landscapes, adorned with small figures, were greatly admired. He left a large number of pictures; nor was he satisfied with embellishing his own works, but rendered himself useful in this respect to others. Even Rubens made use of Breughel's hand in the landscape part of several of his small pictures; such as his Vertumnus and Pomona, the satyr viewing the sleeping nymph, and the terrestrial paradise, which by some is regarded as the masterpiece of that great artist. Breughel died in

BREVET, in France, signifies a royal act in writing, conferring some privilege or distinction, as brevet d'inven-

 ${f R}$ tion, i.e., a patent; also a license to trade, as a bookseller's or printer's brevet.

В

Brever is applied in the British service to a species of commission which entitles an officer to a rank in the army above that for which he receives pay. Thus a brevet major serves as a captain, and receives pay as such. The term brevet is also used sometimes to express general promotion, by which a given number of officers obtain a grade of rank without additional pay. Brevet rank does not exist in the navy; and in the army it is restricted, descending no lower than that of captain, nor ascending above that of lieutenantcolonel. Brevet rank gives precedence in the army generally, but not in the particular regiment to which the officer belongs, except in the case of its being temporarily united with some other corps. (See Grose's Military Antiquities.)

BREVIARY (Lat. breviarium), an abridgment, a compend, an epitome; the daily office or book of divine service in the Romish church. It is divided into seven parts or hours, on account of the saying in Psalm exix. 164, "Seven times a day do I praise thee." These are matins, prime, third, sixth, and none lauds, vespers, and the compline or post communio.

The breviary of Rome is general, and may be used in all places; but various others, appropriated to each diocese and each order of religious persons, have been formed on the model of this.

The institution of the breviary is not very ancient; and there have been inserted in it the lives of the saints, full of stories more remarkable for their strangeness than their authenticity. This gave occasion to several reformations by different councils, especially those of Trent and Cologne; by several popes, particularly Pius V., Clement VIII., and Urban VIII.; and also by several cardinals and bishops, each lopping off some extravagance, and bringing it nearer to the simplicity of the primitive offices. Originally, all were obliged to recite the breviary every day; but by degrees the obligation was restricted to the clergy only, who are enjoined, under penalty of mortal sin and ecclesiastical censures, to recite it at home when they cannot attend in public. In the fourteenth century a particular reservation was granted in favour of bishops, who were allowed, on extraordinary occasions, to pass three days without rehearsing the breviary.

This office was originally called cursus, and afterwards breviarium, denoting that the old office was abridged, or rather, that this collection is a kind of abridgment of all the prayers. The breviaries now in use are innumerable: the difference between them consists principally in the number and order of the psalms, hymns, paternosters, ave-Marias, creeds, magnificats, misereres, hallelujahs, &c. &c.

The Greek breviary (taxis, euchologion), consists in general of two parts; the one containing the office for the evening; the other that of the morning, divided into seven hours. The psalter is divided into twenty parts. The Armenians, and other Eastern churches, have also their own breviaries.

BREVIATOR, an officer under the Eastern empire, whose business it was to write and translate briefs. Those also who dictate and draw up the pope's briefs are styled bre-

viators, or abbreviators.

BREVIARIUM ALARICIANUM, or BREVIARIUM

ANIANI. See CIVIL LAW. BREWER, ANTHONY, a dramatic poet, in the reign of James I. He appears to have been in high estimation among the wits of that time, as may be gathered from a compliment paid to him in a poem called Steps to Parnassus, in which he is supposed to have a magic power of calling the muses to his assistance, and is even set on an equality with Shak-speare himself. He wrote six plays; in one of which, called Linguæ, or the Five Senses, Oliver Cromwell (according to Winstanley) acted, when a youth at Cambridge, the part of Tactus or Touch.

Brewing.

Brewer, one who professes the art of brewing. There are companies of brewers in most capital cities: that of London was incorporated in 1427 by Henry VI.

The following table shows the number of licensed brewers Brewing. in the United Kingdom during the year 1850, and the sums paid for the license.

	E	NGLAND.	so	COTLAND.	IRELAND.		
	Number.   Amount of Duty.		Number.	Amount of Duty.	Number.	Amount of Duty.	
Brewers of Strong Beer not exceeding 20 barrels  Exceeding 20, under 50 ,, 50, ,, 100 ,, 1000, ,, 1000 ,, 1000, and upwards,  Brewers of Table Beer	8,579 8,364 9,234 15,806 1,517 400	L.4,503 19 6 8,782 4 0 14,543 11 0 33,192 12 0 15,200 6 6 272 9 6	47 23 29 125 77 22	L.24 13 6 24 3 0 45 13 6 262 10 0 893 16 3 28 7 0	10 2 1 20 62 2	L.5 5 0 2 2 0 1 11 6 42 0 0 937 2 6 2 12 6	

# BREWING.

cating beverage by means of a process of fermentation; but at the present day the term is usually limited to the manufacture of different kinds of beer, from infusions of malt or

of grains.

In all countries, savage and civilized, one kind or other of exhilarating or intoxicating drink is prepared. In the warmer regions of the globe the juice of various palm trees is extracted, and, when fermented, forms the favourite beverage. Over all the warmer regions of South America, and in Mexico, the universal drink is Pulque, the fermented juice of the American aloe (Agave americana). Guarapo, a favourite drink with the negro races, is the fermented juice of the sugar-cane; and when the sugar-cane is not in season, these races prepare fermented drinks from honey and from rice. In many northern countries, and even occasionally in the highlands of Scotland, the juices of the birch, maple, or ash, are fermented and form a palatable drink. Koumis, the intoxicating beverage of the Mongols and the Tartars, is the fermented milk of the mare. In countries favourable to the growth of the vine, wine is the usual beverage. The Peruvians and many other Indians prepare their favourite intoxicating drink, chicha, from maize. The Arabians, Abyssinians, and several tribes in Africa, prepare their fermented drink, bousa, from the flour or bread made from teff (Poa abyssinica); but the durrha or millet (Sorghum vulgare), and even barley itself, are occasionally substituted for the teff to prepare the muddy sour bousa. The universal Russian beverage kvass or quass, a sharp, acid, muddy liquid, almost the same in taste and appearance as "bousa," is made by mixing rye-bread or ryeflour, or sometimes barley flour, with water, and fermenting it. The well-known national German drink, the weiss-bier, is prepared from a fermented infusion of wheat malt with only a sixth part of barley malt. But over almost all the civilized world, the fermented infusion of barley malt, seasoned or not with hops or other bitters, when it takes the name of beer, is the favourite beverage.

All ancient Greek writers agree in assigning the honour of the discovery of beer to the Egyptians; but from the circumstance of no notice being taken of beer in the books of Moses, it has been rather rashly concluded that such a drink was unknown to them till after his death. This, however, is unlikely. The vine was alone cultivated in Egypt in those districts which were beyond the reach of the inundations; and the quantity of wine raised being limited was reserved for the , rich, while the poorer classes had to content themselves with a cheaper drink prepared from barley. Herodotus, who wrote about 450 years B.C., is perhaps the earliest writer who gives any particulars regarding Egypt, and he describes beer prepared from barley as the ordinary drink

Brewing is the art of preparing an exhilarating or intoxi- of the Egyptians in his day. Pliny, Aristotle, Strabo, and others, who mention that this beer was known by the name of Zythos, give full descriptions of its qualities and intoxicating properties; and Diodorus even affirms that some kinds were so palatable as to be scarcely inferior to wine. The researches of Sir J. G. Wilkinson relative to the ancient Egyptians have thrown much light on this subject, and render it probable that beer was used as a drink by the ancient Egyptians nearly as early as wine itself. Xenophon, in his account of the retreat of the ten thousand Greeks 400 years B.C., mentions that the inhabitants of Armenia used a fermented drink made from barley. Diodorus Siculus states, that the nation of Galatia prepared a fermented drink from barley, styling it zythus, like the Egyptians. Beer was distinguished among the Greeks by a variety of names. It was called δινος κρίθινος (barley wine), from its vinous properties, and from the material employed in its formation. In Sophocles, and probably in other Greek writers, it is distinguished by the name of βρῦτον. Dioscorides describes two kinds of beer, to one of which he gives the name  $\zeta \hat{v} \theta os$ , and to the other  $\kappa o \hat{v} \rho \mu$ ; but he gives no description of either sufficient to enable us to distinguish them from each other. Both, he informs us, were made from barley, and similar liquors were manufactured in Spain and Britain from wheat.

Tacitus informs us that in his time beer was the common drink of the Germans, and from his imperfect description of the process which they followed, it is not unlikely, or rather there can be no doubt, that they were acquainted with the method of converting barley into malt. Pliny gives us some details respecting beer. He distinguishes it by the name of cerevisia or cervisia, the appellation by which it is known in modern Latin works.

This beverage does not appear to have come into general use in Greece or Italy; but in Germany and Britain, and some other countries, it appears to have been the common drink of the inhabitants in the time of Tacitus, and probably long before. It has continued in these countries ever since; and great quantities of beer are still manufactured in Germany, the Low Countries, and Britain. We might quote numerous passages from the narratives of recent travellers to show that the use of a drink prepared from barley is nearly universal over the northern and temperate parts of Europe and Asia. One of the latest of these travellers, M. Huc, the French missionary, remarks that the drink of the farmers in Tibet is "a sort of sharp drink made with fermented barley, which, with the addition of hops, would be very like our beer."

The first treatise published on the subject, so far as we know, was by Basil Valentine. This treatise, according to Boerhaave, is both accurate and elegant. In the year 1585,

Brewing. Thaddeus Hagecius ab Hayck, a Bohemian writer, published a treatise entitled De Cerevisia ejusque conficiendi ratione, natura, viribus et facultatibus. This treatise, consisting only of fifty pages, is written with great simplicity. and perspicuity, and gives a wonderfully accurate description of the process of brewing. In the earlier part of the eighteenth century, Mr Combrune, a practical London brewer, published a work entitled The Theory and Practice of Brewing. Mr Combrune appears to have the merit of having first showed the value of the thermometer in brewing. Before his day it never appears to have been used, and it was not till towards the end of the century that brewers could be persuaded to make use of what they deemed a scientific toy. As might be expected, Mr Combrune's theory of brewing appears to us, with our modern knowledge, very unsatisfactory; and, from the same cause, his experiments on the heats at which malts are coloured are of no value at the present day. He did not attend to the fact, that when the water is properly expelled from the malt before the heat is raised, it can endure, without being coloured, a much higher heat than if the heat be raised upon it while it is yet full of moisture. His work, however, did much to advance the art, and ran through several editions.

In the year 1784, Mr Richardson of Hull published his Theoretic Hints on Brewing Malt Liquors, and also Statistical Estimates of the Materials of Brewing, showing the use of the Saccharometer. These works are reprehensible on account of the air of mystery with which the subject is invested, and the avowal of the author that he conceals certain parts of the processes. Mr Richardson, however, deserves praise for the invention of the saccharometer, which he appears to have been the first to have brought publicly before the notice of the brewer. It is, however, disputed whether the merit of suggesting the use of the hydrometer to ascertain the strength of the wort is due to him or to Mr Baverstock. Mr Baverstock first endeavoured to regulate the strength of his worts by the hydrometer in 1768, and had arrived at such satisfactory results by the year 1770, that in February of that year Mr Thrale, the celebrated brewer at Southwark, and friend of Dr Samuel Johnson, gave Mr Baverstock a certificate of its value in ascertaining the strength of worts in brewing, from experiments conducted by Mr Baverstock in his (Mr T.'s) brewery. It was not, however, till Nov. 1785, that Mr Baverstock published his Hydrometrical Observations and Experiments in the Breweries; so that Mr Richardson has the merit of first bringing his altered hydrometer, which he termed saccharometer, before the notice of the public.

The saccharometer is an instrument essential to every brewer, to enable him to ascertain the strength of his wort, and the proportion of saccharine or fermentable matter which it contains. Mr Richardson's saccharometer was constructed on the principle that a barrel of water of 36 gallons weighed 360 lb., and that if that quantity of water were converted into wort, and again weighed, the difference would show the weight of extractive matter which had been dissolved out of the malt. His saccharometer, therefore, was graduated so as to exhibit one degree for every pound weight which a barrel of wort weighed more than a barrel of pure water. His indications, however, were not quite correct, because he did not advert to the fact, that if a certain number of pounds weight of saccharine matter be dissolved in water, they will displace a certain bulk of water, so that the barrel of water when converted into wort, will fall short of the anticipated weight by the weight of water displaced, and for which there is no room in the barrel.

Various saccharometers have therefore been constructed with the view of correcting this error, and the different ones now in use may be classed under two heads, according to the modes in which their scales are calculated. 1. Those constructed on Richardson's principle of showing the differ-

ence in weight between a barrel of pure water, and the same Brewing. water converted into wort, but making allowance for the water displaced-such are the saccharometers of Dring and Fage, and of Long. 2. Those constructed on the principle of indicating the specific gravity of the wort, that of pure water being reckoned 1000—such are the saccharometers of Allan in Scotland, and of Bate in England. There cannot be a doubt that the latter are the more correct in principle; and, accordingly, Allan's and Bate's instruments are the legal saccharometers for excise purposes in Great Britain. It is easy in practice to reduce, in a general way, the indications of the one saccharometer to that of the other. If we wish to reduce the specific gravity, as indicated by Allan's or Bate's instruments, to Dring's or Long's scale, we have only to divide the specific gravity by 2.77; and, on the other hand, if we wish to convert the indications of Long's scale into the specific gravities of Allan, we multiply the indicated pounds by 2.77.

The first step in the application of science to brewing having been thus made by the use of the thermometer to regulate the temperature, and of the saccharometer to regulate the strength of the wort, the next step was to have the various processes of malting the barley, mashing or infusing it, and fermenting the infusion, or "wort," as it is termed, investigated by scientific men, in order that the scientific principles on which the whole operations of brewing were dependent might be discovered, and made known to the brewer for his guidance. The able report on malting and brewing by Drs Hope, Coventry, and Thomson, to the Board of Excise in Scotland, ordered by the House of Commons to be printed 6th June 1806, was the first great step taken in this country to get science to bear on the operations of the brewer. Independent researches, meanwhile, were carried on by scientific men into various points which bore on that trade, and the researches of Gay-Lussac and Thenard, of Einhoff, Vogel, Saussure, Proust, Brande, Ure, Payen and Persoz, Edwards, T. Thomson and R. D. Thomson, Johnston, Liebig, &c., have combined to explain every chemical change which takes place in barley during its conversion into malt, and the various changes which occur in its infusion during the mashing, boiling, cooling, and fermenting. Scientific research has thus been brought to bear on every process of malting and brewing, and has thus been enabled to explain most of the causes of failures in any part of these processes, and lay down rules for their regulation.

Among the host of practical writers who during the present century have published treatises on malting and brewing, only two seem to require special notice. Mr William Black has the merit of having directed the attention of brewers to the influence of electricity and electro-chemical action in preventing the fermenting process going on regularly, and has convincingly shown that in many cases the irregularity in the process of fermentation, and the consequent more or less complete destruction of the beer, was caused by electrical currents being induced from faulty isolation of the fermenting tun, from chains of pipes of different metals. communicating with the tun acting on its contents like a galvanic circle, from the tubes or stopcoeks used being of different metals, &c. In his treatise he gives instances where this occurred, and was remedied by removal of the cause. Mr Tizard, endeavouring still further to carry the suggestions of science into the practical department of brewing, has left the beaten track altogether, and has employed his talents in inventing and in patenting many new pieces of machinery for the purpose of carrying out his peculiar views. So long as he keeps strictly to the results to which scientific research has led he goes right, but the moment he leaves these he blunders, and recommends visionary and impracticable plans which could only end in disappointment. His suggestion, that in every case there should be but one mash, but that mash be continued for six hours at a regulated temperature, is quite borne out by scientific re-

Brewing. searches, and cannot fail to reward the brewer who follows it out. As to his patent machine for regulating the heat, &c., we think in most cases it could be dispensed with. His second valuable suggestion, of which we quite approve, is the boiling or rather infusing at a boiling temperature the hops by themselves, and when their strength is exhausted running the wort through them in the hop-back. Here we think his coil of steam tubes could be adopted with advantage. And the only other of his suggestions and practices which seems worthy the attention of the practical brewer, is to give up boiling the wort altogether, and run the wort from the mash-tun through the hop-back at once to the coolers or through refrigerators. All these practical suggestions conform strictly with the latest scientific investigations as to the action of the different ingredients found in the infusion of malt on one another; and if Mr Tizard did nothing more than reduce these successfully to practice, he would deserve the warmest thanks of the trade. We would caution brewers, however, against adopting or following his plans relative to underground chambers for his fermenting tuns, &c. Such would but increase the evils relative to electrical agency, &c., indicated by Mr Black as so injurious.

Barley is the seed of various species of Hordeum, which have been cultivated from time immemorial. Two species of hordeum are cultivated in Britain. The first is the Hordeum distiction, or barley in which the seeds are disposed on the spike in two rows. This is the species usually cultivated in England, and in the southern parts of Scotland. The second is the Hordeum hexastichon, variously styled over Scotland bere and big. In this species the grains are really disposed in two rows, but as three seeds spring from the same point, the head appears to have the seeds disposed in six rows. It is often misnamed, "four-rowed" barley. Big is a much more hardy plant than barley, and ripens more rapidly. Hence it thrives better than barley in cold high situations. It is on this account that in the higher districts of Scotland it is sown in preference to barley. A third species of barley, the Hordeum gymnohexastichon, though apparently little known in Britain, is the prevailing kind in the north of Europe, and is said to be the hardiest of all. There are many varieties of the two-rowed barley, but those most in repute at present are the Chevalier and the Annat barleys.

The late Dr Thomson of Glasgow published elaborate tables of the weight, specific gravity, length, breadth, &c., of the grains of different kinds of barley. The general result of his experiments was, that the average weight of the Winchester bushel was 50.7 lb. (i.e. 52 lb. the imperial bushel); and the average weight of a Winchester bushel of big, 463 lb. (i. e.  $47\frac{3}{4}$  lb. the imperial bushel). The specific gravity of English barley was 1·280; of Scotch barley, 1·310; and of big, 1·247. The average length of the corn of the best English barley was 0·343 of an inch; of the best Scotch 0.346 of an inch; and of big 0.324 of an inch; so that the average of all his measurements gave as nearly as might be the exact third of an inch, which it ought to be, according to the origin of our measures, as commonly stated. In consequence of the improvements in agriculture, and the introduction of new varieties of grain, the average weight of the barleys is now considerably higher than that ascertained by Dr Thomson. The average weight of the best barley in the Haddington and Edinburgh corn markets is now 54 lb. per imperial bushel; the top barleys being up to 57 and 58 lb. The cuticle or skin of the grain forms very nearly a sixth of the weight of the grain both in English and Scotch barleys. In big, however, it constitutes between a fourth and a fifth of the entire weight of the corn.

According to Einhoff, 1000 parts of barley-flour contain 720 of starch, 100 of water, 68 of fibrous or ligneous matters, 56 of sugar, 50 of mucilage, 36 6 of gluten, 12 3 of

vegetable albumen, and 2.5 of phosphate of lime. Pro- Brewing. fessor Johnston found barley-flour to contain in addition a quantity of fatty matter which has somewhat the flavour of spirits prepared from raw grain. His analysis gave in the 100 parts of barley-flour, starch 68, water 14, gluten, albumen, &c., 14; fatty matter 2, saline matter or ash 2.

It is customary to convert barley into MALT previous to using it in the manufacture of beer; and in order to understand the reason of this, it is necessary to explain the changes which malting effects on the substances which enter into the composition of barley. It may be shortly stated that malting consists in exciting the grains of barley to germinate, stopping this germination at a certain stage, and then drying them in a kiln so as to enable the malt to be stored up till it is wanted.

When germination or sprouting has been excited in a grain or corn of barley, besides other, three important changes occur. First, there is formed at the base of the sprout a new substance not previously existing in the grain, to which the name diastase has been given. The exact composition of this has not yet been accurately ascertained, but it is generally considered to be a form of transformed gluten. Secondly, acetic acid (vinegar), not previously existing, is also found in the grain. And, thirdly, the insoluble starch is found more or less completely changed into soluble gum, to which the name dextrine has been given. This change of the insoluble starch into the soluble dextrine is mainly produced through the agency of the diastase, aided no doubt by the acetic acid. But this is not all. The combined action of the diastase and acetic acid on the dextrine causes it gradually to become sweet, and assume the form of sugar; and because its chemical properties then resemble the sugar which naturally exists in grapes, the name grape sugar has been given to it. This then is the function of the diastase and acetic acid in the process of germination, and of course in malting, to convert the starch into sugar, and thus prepare it for undergoing the brewer's fermenting process, which changes it into alcohol. In all these changes the diastase is the most important agent, and experiment has shown that one part of diastase can convert 2000 parts of starch into grape sugar.

Now all these conversions of starch into dextrine and grape sugar may be imitated by several simple chemical processes. Thus, exposing starch gradually to a heat of 300°, changes it into dextrine (starch-gum, and Britishgum, as it is called by the calico-dyers, who use it largely), and the gum thus prepared has often a sweet taste, from some of it having passed into the form of grape sugar. When starch and water are boiled together, the boiling converts the starch into dextrine (it is this with which linens are stiffened), but if the boiling be continued for some time. the fluid will be observed to get thin and watery, and acquire a sweet taste from the dextrine assuming the form of grape sugar. By boiling starch in dilute sulphuric acid the same change is effected, and the solution may be obtained pure by adding chalk or lime, which combines with and carries down the acid. This transformation is very rapidly effected if the agency of the acid be increased by elevation of temperature. Thus, 1 lb. of commercial sulphuric acid mixed with 600 lb. of water, will convert 100 lb. of starch into grape sugar in three hours if the temperature be raised by pressure to 250°. This process is actually extensively followed in France with potato starch, for the purpose of subsequently fermenting it and converting it into brandy.

Starch and dextrine have exactly the same chemical constitution, being composed of 12 atoms carbon, 10 atoms hydrogen, and 10 atoms oxygen. Grape sugar, again, is composed of 12 atoms carbon, 11 atoms hydrogen, and 11 atoms oxygen; so that the difference between grape sugar and starch is simply the addition of one atom of water.

Brewing. We shall have occasion afterwards to notice the change which grape sugar undergoes when changed by the process of fermentation into alcohol

> It is thus apparent that the object to be accomplished by the malting of barley, is to convert the insoluble starch into the soluble dextrine and grape sugar. But in the process of malting, as we shall immediately see, barley loses a considerable portion of its solid ingredients, viz., from 8 to 12 per cent. As, however, it has been ascertained that one part of diastase is capable of converting into grape sugar 2000 parts of starch, it might be worth the brewer's consideration whether it would not be advantageous, and a saving to him, to use only a fourth or fifth part of malt, and the rest of unmalted grain. We should not propose to use raw grain as is done by the distiller, for this would impart a disagreeable flavour to the beer, but barley, which had been exposed on the kiln to a temperature of about 300°, which would insure the whole starch being converted into dextrine. That even raw grain may be used advantageously in brewing, the practice of the Edinburgh brewers at one time abundantly testified; for they brewed better small-beer from raw grain than from malt, till they were stopped by the Court of Exchequer on arbitrary grounds, with which we could not coincide. Dr Thomson, however, showed that raw grain could not be used for the finer ales, as it imparted a peculiar and disagreeable flavour to them. This disagreeable flavour, however, we have no doubt would be quite got the better of by using barley, kiln-dried at 300°, and prove a considerable saving to the brewer.

> A duty was first charged upon malt during the troubles of Charles I.'s reign. But it continued moderate till the war with France in 1803. It was then raised to the following sums per bushel:-

English maltL.0	4	4 or 100
Malt of Scotch barley 0	3	81 or 84.856
Malt of Scotch big 0	3	0 or 69.472

But two shillings of this tax was to continue only till the end of the war, and for six months after its conclusion. In consequence of this very heavy tax several regulations were imposed upon the maltster, with a view of facilitating the levying of the duty, and to prevent him from defrauding the revenue. The most important of these were, That the barley should remain in the cistern in which it was steeped with water for a period of not less than 40 hours; and that when the malt was spread on the floor the maltster should not be permitted to sprinkle any water upon it, or sprinkle the floor. This last was found to be a restriction which interfered materially with the malting, and on the repeated remonstrances of the maltsters in different parts of the kingdom a parliamentary inquiry was instituted; but liberty to sprinkle the malt on the floors was not granted till 1838, when the Act 1st Vict. cap. 49, sect. 7, declared "Maltsters may sprinkle any floor of grain which has been kept in the cistern covered with water the full space of fifty hours, at the end of six days, or 144 hours, on giving 24 hours notice to the officer of excise."

Since 1840 the malt duties have been as follows: For malt from barley in any part of the United Kingdom 2s. 7d. per bushel, and 5 per cent. additional, making in all 2s. 81d. per bushel. For malt made from big or bere in Scotland or Ireland 2s. per bushel, and 5 per cent. additional, equal altogether to 2s. 13d., per bushel. The 5 per cent. was imposed in 1840 on all custom and excisable articles, except spirits.

The following table shows the quantity of malt prepared in England, Scotland, and Ireland, during the years 1847 to 1850, and the amount of duty levied thereon.

		ENGLAND.				IRELAND.	
	Year.	No. of Bushels.	Duty Levied.		Year.	No. of Bushels.	Duty Levied.
$From \ Barley. \ \left\{ egin{array}{c} & & & & \\ & & & & \\ & & & & \\ & & & & $	1847 1848 1849 1850	30,269,963 31,848,455 33,161,088 34,423,489	L.4,105,363 12 8 4,319,446 13 10 4,497,472 9 8 4,668,685 9 1	From Barley.	1847 1848 1849 1850	1,277,359 1,529,581 1,458,211 1,550,616	L.173,241 19 10 207,449 13 0 197,770 4 5 210,302 7 6
From Barley.	1847 1848 1849 1850	3,338,285 3,647,835 3,842,762 4,295,032	L.452,755 2 03 494,738 0 0 521,174 15 7 582,513 10 6	From Big.	1847 1848 1849 1850	110,046 140,936 118,189 131,486	11,555 1 5\frac{1}{4},798 8 0 12,\frac{4}{10} 0 5 13,806 0 11
$\operatorname{From}_{\operatorname{Big.}} \left\{ \right.$	1847 1848 1849 1850	312,158 379,099 354,164 344,127	32,776 14 1½ 39,805 11 1 37,292 7 11 36,133 10 1				,

The quantities of malt made in Great Britain and Ireland during the years ending 5th January 1853 and 1854 were respectively 5,134,061, and 5,254,968 quarters.

From the revenue returns we learn that in Great Britain in 1850, the malt license was taken out by 8362 persons; besides 18 roasters of malt, and 25 dealers in roasted malt.

Malting consists of four processes, which follow each other in regular order: steeping, couching, flooring, and kiln-drying.

Steeping takes place in a large square cistern made of wood or stone, which is filled with water to a certain height, when the quantity of barley to be malted is shot into it in successive portions, each portion being well stirred about with rakes, for the double purpose of levelling the surface of the malt and getting rid of the lighter grains which float. Within the last fifteen years the improved cultivation of the soil, and the new varieties of barleys have done away with the necessity of skimming off the light grains. the whole quantity of barley is introduced the grains should still be covered with four or five inches of water. Some maltsters introduce the grain first into the steep cistern,

and then run on the water; with the heavier barley it is of little consequence which plan is adopted. Here the barley is allowed to remain from 40 to 72 hours, according to the temperature and the kind of barley-big requiring least steeping, new barley the most. To prevent the water becoming acescent or putrid, it is advantageous to renew it once or twice during the steeping, particularly if the weather be warm. The temperature of the water should always be from 50° to 55° Fahr. During the steeping the barley imbibes about half its weight of water, and increases about a fifth in bulk, that is to say, 100 lb. of barley after steeping would weigh 147 lb., and 100 bushels of barley would then measure about 122 bushels. The water in which the barley has been steeped acquires an odour resembling that of damp straw, and a yellowish colour from colouring matter dissolved out of the barley skin, which thereby acquires a paler hue. Some carbonic acid is at the same time evolved, which remains dissolved in the steep-water. The object of steeping the barley in the water is to furnish moisture to the farina of the grain, and prepare it for germination in the same way as the moisture of the earth would, were the grain

Brewing. sown in it. Care must therefore be taken not to continue the barley too long in the steep. Maltsters judge of this in a very simple way. If a barley-corn pressed between the finger and thumb continues entire in the husk, it is not sufficiently steeped, but if the flour can be easily squeezed out it is ready for removal. If, however, the farina exudes in the form of a milky juice, it has been oversteeped, and the barley is spoiled for malting purposes.

While the barley is in the steep-cistern it is repeatedly gauged by the excise-officer for the purpose of preventing fraud, and of calculating the quantity of malt which will probably be yielded by it. As 100 bushels of good barley usually swell to 122 bushels, or very nearly in the proportion of 9 to 11, this is allowed for in the excise measure-

The steeping being completed, the water is drawn off from the cistern, and the barley drained, when it is trans-

ferred to the couching-frame.

Formerly the couch-frame was allowed to be constructed of moveable boards, but since the 2d July 1827 it is by law required to be made with "the sides and bottoms thereof straight and at right angles to each other, having three of such sides permanently fixed, and the other side formed of moveable planks at least two inches in thickness," and must not exceed 28 inches in depth. In this couchframe the barley is carefully levelled, and is not allowed to be touched for a period of 24 hours from May to August, and 26 hours from August to May, to enable the exciseofficer to gauge it accurately. The malt duty is usually levied on the couch-gauge, because it is there the malt usually acquires its greatest bulk. The sole object of placing the barley in the couch-frame is to enable the excise-officer to gauge it; it is otherwise no essential stage of the malting process.

At the end of 24 hours during the summer, or 26 hours during the winter months, from the period of its removal from the steep-cistern, the barley, which has begun to acquire increase of temperature, is removed from the couchframe, and spread on the floor in square heaps about 16 inches in depth. For several hours after the grain is in the couch-frame no perceptible increase of temperature occurs, but the moisture on the surface of the grains gradually exhales or is absorbed, so that the grains cease to moisten the hand. After this the heat gradually rises, and it is to prevent the heat increasing too rapidly, and to heat the whole grains equally, that the barley is turned out upon the

On the floor the temperature of the heap gradually rises till it is about 10° above that of the surrounding air, which usually happens about 96 hours after it has been thrown out of the steep. An agreeable odour, somewhat resembling that of apples, is now exhaled, and if the hand be thrust into the heap the grains are found to have become so moist as to wet the hand. The appearance of this stage is called "sweating" by the maltsters, and it is at this stage that germination begins. Up to this period the heaps of grain had been daily turned, in order to bring all the grains equally forward, and also to moderate the heat.

If the barley is now examined, it will be found that the radicles or roots are sprouting from the tip of every grain. At first these have the appearance of a white prominence, which soon, however, increases in length, and divides itself into three or more fibrils. Unless the growth were now checked, these rootlets would increase in length with great rapidity; the great aim of the maltster, therefore, is to keep these as short as possible till the grain be sufficiently malted. For this purpose the heaps of grain are turned over at least twice every day, the grains lying at the bottom and interior of the heap being at each turning thrown to the surface. With the same view the depth of the bed of grain is also reduced at each successive turning, till at last it is reduced to

three or four inches. The number and frequency of the Brewing. turnings is regulated by the temperature of the malt, being more frequent the higher its temperature. In England the malt heap is generally kept at the temperature of 62°; and fourteen days is the usual period required for the grain passing through the germinating stage. In Scotland, on the other hand, the temperature of the malt heap is kept at about 55°, and the consequence is, that the grain takes from 16 to 20 days to pass through the same stages.

About a day after the rootlets appear, the rudiment of the stem, or the plumula, becomes perceptible. This is called by maltsters the "acrospire." It issues from the same end of the seed as the radicles, but, instead of piercing the husk, turns round, and proceeds within the husk to the other end of the grain. As soon as the acrospire approaches the other end of the grain, or its point has passed four-fifths of the grain, its further growth must be arrested, else it would push through the husk and appear externally as a green leaf, when the interior of the grain would become milky, and be quite destroyed for the purposes of the brewer. In well-made malt then the acrospire has only advanced fourfifths up the side of the grain under the skin, and the radicles have not been allowed to get more than one and a half times longer than the grain; and at this period the texture of the grain is so loose that it crumbles to powder under the pressure of the finger and thumb. This crumbling under the pressure of the finger and thumb is styled "the free." It is not commonly known, however, that the same condition of grain occurs on the ninth or tenth day from its being turned out of the steep, and this is styled the "first free," and if the malting be stopped at this stage it will make tolerable beer; but if it be allowed to pass this stage, the grain again becomes tough, and is quite unfit for brewing till the "second free" occurs. There can be no doubt that it is of importance to the maltster that the law now allows him to sprinkle water over the malt when on the floor. This is usually done on the sixth or seventh day if the germination should appear to be languid. This practice is getting more and more into repute,—indeed there are seasons when it would be difficult to make good malt unless moisture were thus supplied to the grains. During the whole period of germination the light should be excluded as much as possible.

It was formerly the practice before removing the malt from the floor to gather it once more into a considerable heap, in order to allow its heat to increase to 75° or 80°, under the idea of "mellowing" the malt. Even some late writers—practical men too—recommended this to be done. It is a practice which is more honoured in the breach than the observance, as it causes a useless waste, without forwarding any of the subsequent processes. By thus heating the grain, after it is ready for the kiln, the malt becomes excessively sweet, much of the dextrine is resolved into sugar, and the dry heat to which it is afterwards exposed in the kiln reacting on it, seems to convert some of it into alcohol, which is carried off and lost. There is thereby caused a sensible diminution in the weight of the malt, while there is no

counterbalancing advantage gained.

As previously explained, during the malting the starch is converted into dextrine and grape sugar; and by examining barley in its different stages of germination, it has been ascertained that this conversion keeps pace with the growth of the acrospire, and advances through the grain along with it, so that all the portions of the grain to which the acrospire has not yet reached, are still in their starchy state, whilst all those parts opposite to the acrospire have their starch converted into dextrine and grape sugar. The glutinous constituents of the grain have also disappeared, being generally supposed to be taken up by the radicles. the grain is on the floor, it has been ascertained that it absorbs oxygen, and gives out carbonic acid gas, but probably

Brewing.

Brewing. to no great extent, seeing that the loss which the grain sus-✓ tains on the floor is trifling, probably not exceeding 1 per cent., and a considerable proportion of this must be attributed to grains bruised and roots broken off during the frequent

> The last operation of malting consists in drying the malt on the malt-kiln, by which the germination is arrested, and the brewer is enabled to store up the malt until it is required. The kiln is a chamber, the floor of which usually consists of perforated iron plates of wire-cloth, and in the roof of which is a vent to permit the escape of the heated air and vapour. Under this chamber is a space in which a fire of charcoal or coke is lighted; or this part is fitted up with a proper hot-air stove in which coals may be burned, the smoke being carried away into a chimney by means of iron tubes or flues. Damper plates are in this latter case provided so as to regulate the draught through the flues, and the admission of hot air to the kiln. The malt is then spread regularly over the perforated iron floor to the depth of three or four inches, and the heated air passing through the perforated plates makes its way through the malt, and carries off its moisture, escaping at the vent in the roof. The heat to which the malt is exposed should be about 90°, and should not exceed 100° until its whole moisture is exhaled. It is a remarkable fact, that if the heat be raised when the malt is still damp, even a low temperature, such as 135° or 140°, will cause it to assume a brown colour; whereas if the malt be freed from moisture at a low temperature, it may be exposed even to a heat of 170° without colouring it, and without depriving it of its vegetative power. The late Dr Thomson demonstrated this fact by first thoroughly drying malt at a temperature under 100° and then exposing it to a heat of 175°, after which he sowed it, and found it vegetated as rapidly as fresh barley. Till the moisture is thoroughly expelled by the low heat, the malt requires to be repeatedly turned; such at least is the common practice. Mr Black, however, objects to this, and asserts that if the current of heated air be sufficient, no turning is requisite till the malt be dried and the heat raised, when he turns to prevent burning. As Mr Black speaks from some experience, we quote his words. "We know that the portion of the malt nearest the covering of the kiln sometimes feels quite dry, while that on the top is quite damp; if, therefore, by turning, we throw this part of the malt upon the top and the wet to the bottom, the steam of the wet malt from below must pass through the drier malt on the top, thus creating double work. The steam also, by again passing through the drier malt on the top, tends to render it tough. If the kilns be properly constructed, turning is not only unnecessary but injurious, until the malt be nearly ready for removal from the kiln, when several turns, with a brisk fire, may be necessary to render the dryness of the malt uniform."—(P. 22.)

> According to the common practice, when the moisture has been nearly expelled, the temperature is raised to from 145° to 165°, and it should be kept at this temperature till it has acquired the desired shade of colour, which is commonly a pale yellowish-brown. If the heat be raised when the malt is moist, its colour is rendered brown, or dark brown, and the quantity of soluble matter is supposed to be diminished.

> In a properly regulated kiln the drying should not occupy more than two days. But if the supply of heated air be great, the whole process of kiln-drying may be finished in twenty-four hours. After this the fire is withdrawn, to allow the malt to cool, or it is removed to the floor of an adjoining apartment and allowed to cool there. Often before removing it, it is well trodden for the purpose of breaking off the rootlets, or "comings," as they are called. At this period they are very brittle and easily broken off, and they are afterwards separated from the malt by a sieve or winnowing machine.

A very objectionable practice used to prevail among many provincial maltsters who manufactured for the London market. When the malt was still hot they sprinkled it with water, for the double purpose, as they imagined, of making it mellow, and causing it to stand out to its measure when it arrived at its destination. Such malt, if kept, invariably gets "slack," as it is termed, or damp; and the worts brewed from it have a strong tendency to run to acidity. It is not profitable for any brewer to employ such malt.

There are several kinds of malt met with in commercepale malt, amber malt, brown malt, blown malt, and black or porter malt. The preparation of pale malt has been already described. That of amber malt consists in raising the finishing heat a little higher. Brown malt is made and prepared exactly as pale malt, excepting that before it is perfectly dried a little water is sprinkled over it when upon the kiln, and the drying is finished by rapidly raising a brisk heat under the malt, which is spread thinly on the floor and constantly stirred.

Blown malt is just a variety of brown malt, and its manufacture used to be largely followed by maltsters in and around London. The malt, when ready for the kiln, is laid thinly on a kiln floor made of wire-cloth, and is immediately dried off with blazing wood, straw, or furze, the grain being constantly turned all the time by men with wooden shovels. Malt thus rapidly dried has a swollen or "blown" appearance from the swelling of the damp farina in the grain. Its colour is also more or less brown.

Black or porter malt, called also patent malt, is the legal colouring matter used in porter-brewing. It is simply malt roasted in a cylinder of perforated iron over a fire (like coffee), till the required colour be given. Any kind of malt may be used for this purpose, so that it is usually prepared from malt which has been injured in its preparation. This kind of malt, being so often made of spoiled materials, is frequently of bad quality. Good black malt should retain its original size and shape, each grain should be separate, not adhering in clusters to each other, and its interior should have a uniform dark chocolate colour. The whole of the starchy and saccharine matters being converted into a kind of caromel, this malt does not add to the strength of the worts, but simply supplies colour and flavour. Brown and blown malts some supposed to be deficient in extractive matter to the extent of from 20 to 30 per cent, but the recent direct experiments of Professors Graham, Hoffmann, and Redwood, prove that they yield as much extractive matter as pale and amber malts.

One hundred pounds weight of good barley converted into pale malt in the above described manner, after being kiln-dried and sifted, are found on an average to weigh only 80 lb. But as raw grain, if dried at the same temperature, would, according to Dr Thomas Thomson's experiments, lose 12 per cent. of moisture, the actual loss of solid matter which the barley has sustained by malting is only 8 per cent. This loss is thus accounted for by Dr Thomson:-

> Carried off by the steep water, ......12 per cent. Dissipated on the floor and kiln, ....3

Dr R. Dundas Thomson, who made numerous experiments on malt for the purpose of ascertaining its feeding and fattening properties, states the loss which barley sustains in malting to be-

Water,	6.00
Saline matter,	0· <b>4</b> 8
Organic matter,	12.52
•	
Total,	19·00

Brewing. or a loss of solid matter one-half greater than that stated by Dr T. Thomson.

Big sustains a considerably greater loss of weight than barley when malted, its average loss of weight, according to Dr Thomas Thomson, amounting to 15 per cent., that of barley, as above explained, being 8.

The bulk or volume, however, of the malt generally exceeds that of the barley used. Thus 100 bushels of English barley yield on the average 109 bushels of malt. Big, however, only yields on the average  $100\frac{1}{2}$  bushels of malt for every 100 of raw grain. In our last edition numerous tables were given of the actual results obtained by malting barleys of different qualities. To these the reader is referred who wishes further particulars on this point.

We still want a good analysis of malt. Proust, indeed, gives the following comparative analysis of barley and malt, but the substance he denominates hordein is evidently starch with fibrous or other insoluble matters.

	Barley.	
Resin,		1
Gum,	4	15
Sugar,	5	15
Gluten	3	1
Starch.		
Hordein,		
	100	100

Dr R. Dundas Thomson, in his interesting work, Experimental Researches on the Food of Animals, gives the ultimate analysis of barley and of malt, but such facts are of little interest to the brewer.

Dr Ure's analysis of barley was a purely practical one, viz., to determine the quantity of solid extract contained in malt available for the brewer's purpose; and as that is the best malt for the brewer which yields the largest quantity of extract, he recommends all malts to be tested for this before being purchased. His procedure is simple. 100 grains by weight of malt are taken, powdered, and dried for half-an-hour by the heat from boiling water. They are then weighed, and the loss in weight shows the quantity of moisture in the malt. Cold water is then poured over the powder, and the vessel containing it is heated in the steam bath, with occasional stirring, for half-an-hour. The husks and insoluble matters are then drained off and washed with boiling water; they are then thoroughly dried and weighed. Their weight gives the insoluble matter in the malt. The residue of the weight, therefore, is the weight of the soluble extract available for the brewer. As the result of several experiments on good malt, he found the average to be in 100 parts by weight-

Moisture,	6.5
Insoluble matter,	26.7
Soluble extract	66.8
	100-0

According to these practical experiments, if we assume that a quarter of malt weighs 324 lb., then the total soluble extract would amount to 213.84 lb. avoirdupois; but as the gum and sugar, in assuming the fluid form, combine with the elements of water, if the extract were dried it would weigh 231 lb., and, reduced to the basis of the barrel of 36 gallons, becomes in the language of the brewer 87 lb. per barrel of 36 gallons, which merely means that the wort from a quarter of malt, if evaporated down to the bulk of a barrel of 36 gallons, would weigh 87 lb. more than a barrel of 36 gallons, would weigh 87 lb. more than a barrel of pure water. These experiments of Dr Ure correspond very closely with the actual yield of extract at two of the greatest London breweries. He was informed by a gentleman connected with these breweries, that the actual average yield was 84 lb. of saccharine extract for every quar-

ter of malt; and if we consider that by the present modes of mashing the whole extract is not obtained, we shall see that the correspondence of the results could scarcely have been closer.

The following table shows the quantities of malt brewed by the undermentioned London houses during each year, from 1849 to 1853 inclusive.

	1849.	1850.	1851.	1852.	1853.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Trueman, Hanbury, & Co. Barclay, Perkins, & Co Meux & Co Reid & Co. Whitbread & Co. Combe & Co Hoare & Co. Elliot, Watney, & Co Calvert & Co. Mann, Crossman, & Co Charrington, Head, & Co. Taylor, Walker, & Co. Goding & Co. Courage & Co Wood & Co Tubb, Wilks, & Cowell Amsinck & Matthews	115,542 59,617 56,640 51,800 43,282 29,558 28,630 24,030 22,023 15,870 13,064 14,469 9,973	106,462 113,420 60,302 56,550 51,400 30,660 33,874 25,265 22,022 15,925 15,143 14,950 9,989 8,296		60,100 53,236 47,304 33,769 36,222 32,310 30,881 26,366 17,660 16,959 16,014 10,500 9,701	39,617 39,131 34,730 22,110 17,515 16,481 12,484 9,615

Besides malt, the only other solid ingredient used in brewing is the HOP. This is the female catkin of the Humulus Lupulus, a plant belonging to the natural order Urticaceæ, and the Linnæan order Diæcia pentandria. The hop was introduced into England from Flanders about the year 1524, and its cultivation rapidly increased in the southern The most extensive plantations are in Kent, Sussex, and Herefordshire, but they are also cultivated successfully in several other counties. The female flowers, placed on different plants from the males, grow in ovoid cones, and consist of scales which have at their base the germ of the future seed. The fruit of the hop is a small rounded seed enveloped in a scaly calix, which contains at its base a granular yellow substance which appears to the eye like fine dust. This secretion is the valuable part of the hop on which its peculiar properties depend, and amounts to about one-eighth of the weight of the hop. When distilled with water, this substance yields 2 per cent. of a volatile colourless oil, to which the plant owes its aroma. 52 per cent. of the powder consists of a resin soluble in alcohol; and the watery solution from which the resin has been separated consists of a peculiar bitter principle termed lupuline, mixed with tannin and malic acid. The lupuline when purified, amounts to from 8 to 12 per cent., and possesses the characteristic taste and bitterness of the hop.

The catkins of the hop ripen in Scptember, when they are picked from the bines, and are carefully dried on kilns. They are then laid in heaps on the floor until they slightly heat, immediately on which being observed they are "bagged." This is the most important operation for the preservation of their virtues. The hops are thrown into the bags in successive layers, each layer being well trampled down; and to render access of air to the fine resinous dust of the catkins still more difficult, it is usual to compress them still further by means of a screw or hydraulic press. The valuable yellow powder with its essential oil is thus preserved for years. The best hops have a golden-yellow colour and an agreeable aroma. When rubbed between the hands they leave a yellow odoriferous powder on them without any broken parts of the plant, and they yield to boiling alcohol from nine to twelve per cent. of soluble yellow matter. This last is the best test of their good quality, and should always be made before purchasing them.

The hop is a very precarious crop, the produce of some years failing to the extent of fully two-thirds, as even the following short table will show. In 1840 the failure of the hop crop was so great, that only 7,114,917 lb. weight paid duty in England. The duty on hops is 2d. per pound, and

Brewing. 5 per cent. additional. The duty however does not extend to Ireland. The following table, from the latest revenue returns, shows the number of pounds weight of hops which paid duty in England during the years 1848 to 1853 inclusive, the amount of duty levied thereon, and the number of acres of land under crop during each of these years:—

Year.	Acres.	Pounds of Hops.	Amount of Duty.
1848	49,232	44,343,984	L.388.007 3 8
1849	42,798	16,650,914	145,693 4 9
1850	43,125	48,537,669	424,702 3 0
1851	43,244	27,042,919	236,623 1 10
1852	46,157	51,102,494	447,144 8 13
1853	49,367	31,751,693	277,824 16 9

During the past year foreign hops have been largely used by some brewers, even in the manufacture of the finest descriptions of ales. In consequence, however, of not possessing the rich flavour of the English hops, they have not as yet been used alone for the finer liquors, but mixed in various proportions, from a third to a sixth, with all the best kinds of English hops. Were more attention paid to the drying and packing of these hops they would be much more largely used than at present. The prejudice, however, which formerly existed against their use is gradually dying out; and when a strong bitter is required, as in India ale, with only a certain amount of flavour, it is found that the flavour may be given by one kind of hop, and the bitter by another, without in the least deteriorating the quality of the liquor. During the year 1852 there were only 34,622 lb. weight of foreign hops imported into Britain; but during the year 1853 the imports of foreign hops had increased to 4,739,307 lb. weight.

The WATER used in brewing should in every case be the purest spring water which can be had. Recent chemical researches have established that many of the old notions with regard to the water are fallacious. River water when pure possesses no superiority over pure spring water; whereas if impure, or loaded with animal and vegetable matters in decomposition, as is the Thames water, it is a decided loss to the brewer, as the vegetable and animal remains are decomposed during the process of brewing, and carry with them some portion of the strength of the wort, besides rendering the wort and the beer more liable to go wrong. Waters which possess a certain amount of hardness are even not objectionable, as the earthy salts, to which the hardness is owing, are precipitated during the process of brewing; in fact, some of the finest ales are made of waters decidedly hard, but free from vegetable and animal impurity.

Brewing properly consists of five successive processes, viz., 1. Mashing; 2. Boiling; 3. Cooling; 4. Fermenting; 5. Cleansing; and to these might perhaps be added Storing and Racking.

Mashing consists in infusing the malt in water of a certain temperature; and the infusion when run off is termed the "wort." Previous to the malt being introduced into the mash-tun it must be bruised or coarsely ground, but it is now generally admitted that bruising the malt in the crushing-mill, where it is passed between two iron cylinders, answers best for the brewer's purpose. If the malt were ground it would be apt to form a cohesive paste with the hot water when it is mashed (called "setting" by the brewer), when it would be difficult to drain. In the crushed malt, however, the husk remains entire, and thus helps to keep the farinaceous particles accessible to the solvent action of the water. Crushed malt is about a fifth part greater in bulk than whole malt, or four bushels of malt after being crushed would measure five bushels. Some brewers recommend that the malt after it is crushed should be kept in a cool place for a day or two, in order that, by attracting moisture from the air, it may be more easily mashed; and Dr Ure, from experiments made for the purpose of ascertain-

ing whether this was or was not in favour of the malt, re-Brewing. commends the practice.

The mash-tun is a large wooden tub with a double bottom, the uppermost of which is moveable, and is pierced with holes, and is fixed a few inches above the other. Into the space between the two bottoms are fixed the ends of the tubes and stopcocks for letting in water or drawing off the wort. The mash-tun ought always to be at least one-third larger than the bulk of the malt to be used.

The temperature of the water which is let into the mashtun is of no small importance. The researches of Payen and Persoz have demonstrated that the action of the diastase in the conversion of starch and dextrine into sugar is most perfect when the temperature is not lower than 158°, and not higher than 167°. If raised much higher, the change of the dextrine into sugar does not take place, the starch remaining in the state of dextrine. The water in the boiler is therefore usually heated to about 170° or 180°, and run into the mash-tun generally in the proportion of a barrel and a half of water (liquor, as the brewers term it) for each quarter of malt. The malt, as it is slowly poured in, is thoroughly mixed with the water by means of oars and rakes, to prevent it forming clots, which it is apt to do if the temperature of the water be high. In many breweries now a machine is fixed in the mash-tun, provided with oars and rakes which are moved by steam-power, and is found to answer well. After the malt has been thoroughly mixed, an additional quantity of warm water is thrown in from below, when the tun is covered over and allowed to remain from 1½ to 3 hours. In many of the great London breweries the practice followed is to run into the mash-tun a certain proportion of water at the temperature of 145° in summer, or 167° in winter, and gradually throw in the malt, and mix it by proper agitation so that it may be properly moistened and no lumps may remain. The quantity of water is usually in the proportion of  $1\frac{1}{2}$  barrel to the quarter of malt. This takes up from half an hour to three-quarters of an hour, after which about two-thirds more water (or a barrel per quarter of malt) is run into the mash at the temperature of 200°, and the agitation is renewed till the whole is thoroughly mixed. The mean temperature of the mash may be reckoned about 145°. The tun is then covered and allowed to remain at rest for an hour or an hour and a half. After this period the infusion of malt, or "wort" as it is called, is run off into a large vessel called the underback.

By this plan, if the additional water at 200° be thrown too suddenly into the mash-tun, there is danger of its destroying to some extent the chemical agency of the diastase in the conversion of the starch and dextrine into sugar. And it is a known fact that the higher the temperature of the water used for mashing, the greater is the quantity of unchanged starch in the wort.

Mr Tizard has lately endeavoured to introduce a new plan of mashing, which seems to possess considerable advantages over that in common use. He mashes the malt in water at the temperature of 160°, no matter what the temperature of the malt may be, thoroughly stirring and mixing it; the water being in the proportion of  $1\frac{3}{4}$  to  $1\frac{3}{4}$ barrel per quarter of malt. The tun is then covered for an hour and a half, to allow full time for every grain to be fully saturated. After this period, in order to raise the mash to that temperature which the researches of Payen and Persoz showed was best fitted for extracting the soluble matters, and allowing the diastase its full action in the conversion of the starch and dextrine into sugar, he heats the mash by means of steam to the temperature of from 160° to 170°. This he effects through the agency of what he calls his " mashing attemperator," which he has patented. This machine is merely the fixed rakes and oars made of hollow tubing, which he sets in circular motion by means of the steam-engine, and throws steam into them. The heat thus

Brewing. communicated to the mash, through the hollow rakes and oars, raises the temperature from 130° or 140° to 160° or 170° in about 20 minutes, at which temperature he maintains the mash for 4 or 6 hours according to the colour and quality of the malt, and the discretion of the brewer. Mr Tizard holds that this plan possesses several advantages over that usually followed. It converts more effectually the whole starch and dextrine into sugar, allowing the diastase to exert its full chemical power. It extracts a larger proportion of saccharine matter from the malt. And by requiring a lesser quantity of water to exhaust the malt, saves waste in the subsequent processes by requiring no boiling. Viewed in a purely chemical light, we should say that Mr Tizard's plan seems best adapted to attain the end in view; but extended practice can alone decide. It appears to us that the essential part of his plan is the continuing the mashing for six hours, and maintaining the temperature at that height which experiment has shown will most effectually convert the whole starch into sugar.

We understand that a patent has just been taken out for a machine which will effect a great saving of labour in mashing, besides making a superior mash. The hot water and the crushed malt are poured into it in a continuous stream, and as it revolves rapidly on the principle of the barrel churn, these are thoroughly mixed together and discharged into the mash-tun without any loss either of heat or of time.

By the ordinary plan of mashing, when the first wort is drawn off into the underback, a second quantity of water is introduced into the mash-tun from below the malt, usually at the temperature of 200°, when the whole is agitated and stirred as before. The quantity of water is, usually 3-4ths of that first used. It is then covered over, and allowed to stand for an hour. Many brewers now approve of making their second mash with water not exceeding 150° in temperature, and think they have improved the quality of their beer thereby.

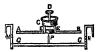
While the second mash is making, the first drawn wort is usually pumped into the boiler, and brought to the boil as speedily as possible. When the wort from the second mash is drawn off it is pumped at once into the boiler, and mixes without stopping the boiling.

Usually a third mash is made with a still smaller quantity of water, also about 200° in temperature, and, after being covered up for half an hour is drawn off, and is either pumped into the boiler, reserved for table beer, or kept to form the first mash with fresh malt.

When three mashes are made, it is usually found that the second contains just half as much extract as the first mash, and the third mash just half as much as the second. In fact, the first mash seems to have extracted nearly the whole soluble matters, and the subsequent mashes merely dilute, and allow to be carried off, the portion of the extract which had been retained by the grains.

The Scottish-ale brewers, acting on this belief, instead of making several mashes, usually make but one, of the strength of about  $1\frac{3}{4}$  or 2 barrels to the quarter of malt; and, in order to procure all the extract retained by the grains, after the taps are opened below, sprinkle hot water in a continuous shower ("sparge," as they call it) over the surface of the mash. As this water percolates through the mass of grains and runs out at the tap below, it carries with it all the soluble matters of the malt. It is essential for the success of this process that the surface of the malt should never be allowed to get dry, otherwise the wet mass of grains falls into cracks, and the water escapes through them, without exhausting the

malt. The sparger is a very simple instrument. It is a copper tube A B, oneand-a-half or two inches in diameter, and of sufficient length to stretch across the mash-tun. It is closed at its extremities; is divided into two equal parts AE and BE, and these have



a single row of holes perforated on their reverse sides. Each Brewing. arm of the tube communicates, by means of the tubes E E, with a copper cup C, which is fixed over the centre; and from the centre of this cup rises a hollow tube terminating in the handle D. When about to be used, the wooden bar GG is fixed across the mash-tun, and the upright pin P in its centre runs through the circular opening of the transverse tube, and up the hollow tube in the centre of the cup, and works on a pivot at the handle. A stream of hot water of the temperature of 180° is then allowed to pour into the copper cup, and as it escapes by the single row of horizontal holes on the opposite sides of each limb, these are turned round by the resistance which the air opposes to the horizontal jets of water, and the whole surface of the mash is con-

tinuously and regularly sprinkled. When the malt is first mashed the infusion has a milkywhite appearance; but as the mashing goes on, and the diastase reacts on the dextrine, a fine frothy head appears all over the mash; and if it be run off it is found to have become quite transparent, to have a fine amber colour, a peculiar smell, and a sweet, luscious taste. When the mash is made by first wetting the malt and then running in additional water, this change is observed to occur when the teniperature is raised by the addition of the hotter water. If, however, the heat be raised too high—as, for instance, to 190° or 200°—the wort invariably runs cloudy from the mash-tun, and is found to contain much unchanged starch and dextrine. The high heat has in this case destroyed the

action of the diastase. When the mashing is performed according to the Scottish

ale-brewers' plan, as the wort is run off the colour is observed to diminish, the smell to become less agreeable, and the taste less sweet. At last the colour becomes nearly opal, and the smell sour. The whole soluble portion of the malt has not, however, been profitably extracted, either by this method or by the ordinary English plan of three several mashings, as is proved by the last wort in the English method, and the last portion of the wort by the Scottish plan, containing undecomposed starch. We have not had an opportunity of examining the worts prepared according to Mr Tizard's plan; but, from the single circumstance of his infusing his malt for six hours, and keeping it during the last five of these at the temperature most favourable for the diastase converting the whole starch into sugar, we should conclude that the whole starch was converted into sugar, and that no portion would pass off undecomposed. Mr Tizard indeed gives a table, the result of numerous experiments, in demonstration of the superiority of his plan over those usually followed. By examining the mash at the end of every hour, he found that the quantity of saccharine matter was increasing up to the end of the sixth hour. Instead, therefore, of getting at the rate of only 84 lb. per barrel for every quarter of malt, he got 90 lb.; which extra quantity, in a large brewery, must be a very large saving annually. Whatever, therefore, may be thought of his "Mashing Attemperator," there seems to be no doubt that his continuing the mashing for five or six hours is a decided improvement, and one strictly in accordance with the latest chemical researches. By Mr Tizard's plan the diastase is left in contact with the starch and dextrine so long as to convert the whole into sugar; whereas if the diastase be drawn off with the first mash before it has had time to effect this change, the chemical powers of what is left in the mash are greatly weakened in the second mash by the running in of water at a temperature of 200°, which is known to destroy its chemical action. If, then, the plan of lengthened infusion be adopted, the Scottish method of "sparging" is the proper mode of removing the whole of the infusion from the grains. Mr Tizard has invented and patented a machine to sparge the mash and also empty the grains out of the mash tun. It appears to us, however, to possess no advantages over the simple and Brewing. cheap Scottish sparger, besides being too complicated and too easily put out of order for any ordinary brewery.

The next part of the process is to boil the wort, and it is when in the boiler that the wort receives the quantity of hops which gives the beer bitterness and flavour, and renders it capable of being kept. Brewers in different parts of the country add their hops in different ways and at different Some add the hops as soon as the wort begins to boil; others wait for half an hour, when they throw in half the quantity they purpose to add, and in another half hour throw in the rest. Some brewers, after adding the hops in masses, allow them to swim on the surface that the steam may penetrate them and open their pores before they beat them down into the wort; others sink them into the wort inclosed in nets, and when they think their virtues are sufficiently extracted, draw the nets up, and allow them to drip into the boiler. As the aroma of the hop depends on the yellow powder, care should be taken not to lose it by breaking up the masses too much before adding them to the wort. The quantity of hops added to the wort varies according to the strength of the beer, the length of time it is intended to be kept, or the heat of the climate to which it is to be sent. For the strongest kinds of ale or porter, the usual proportion is 1 lb. of hops for every bushel of malt, or 8 lb. to the quarter of malt. Strong beer has about  $4\frac{1}{2}$  lb. per. quarter, and table beer rarely more than 2 lb.; Indian ales, and beers for exportation, again, require from 12 to 22 lb. of hops to the quarter of malt.

We have said that the main object in boiling the wort is to increase its strength by driving off the superfluous water which had been added in mashing. Brewers, however, believe that other important ends are served, viz., that any residuary starch should by the boiling be converted into dextrine; that the albuminous and gelatinous particles in solution may be coagulated and precipitated, partly by the heat, partly by combining with the tannin of the hops, and by this deposit tend to clarify the liquor; and that thereby the keeping qualities of the beer are improved. We shall immediately see whether any of these supposed purposes are answered. The boiling is very generally continued for three hours; but many practical brewers condemn this lengthened boiling, as thereby the finer and more aromatic principles of the hops are thrown off, and a nauseous bitter extracted. They therefore limit the boiling to an hour and a half. It seems to be an ascertained fact, that a certain portion of the saccharine extract is lost during the boiling. Whether this is carried off by the vapour, or whether the boiling converts a portion of it into alcohol which flies off along with the steam, has not with certainty been determined. The amount of condensation in boiling is usually in the proportion of 1 in 10 per hour. That is to say that wort of the strength of 50 lb. saccharine extract per barrel would strengthen 5 lb. per barrel by one hour's boiling. When the boiling is finished the boiled wort is drawn off into a large vessel called the "hop-back," or "jack-back," which is furnished with a double bottom, the uppermost of which is of cast iron perforated with small holes, through which the wort drains and leaves the hops.

Mr Tizard objects to boiling the wort at all, condemning it as a useless and wasteful process; and, with great reason, he attributes much of the irregularities which occur during the fermenting process to injury which the wort receives in boiling. Chemical experiments have clearly demonstrated, that to undergo the fermentive stage in perfection, there should be as much gluten and albuminous matter in the wort as possible. But the boiling, and especially the boiling with the hops, is the very surest way to destroy these matters, seeing that the heat coagulates and precipitates them, while the astringent matters in the hop unite with what the heat might have spared, and throw them down as inert matter. But boiling has another hurtful effect on the wort; it

quite puts an end to any further conversion of starch or dextrine into sugar, by destroying the diastase, the essential principle which effects this conversion. By boiling, therefore, all the unconverted starch or dextrine remains in the wort and subsequent beer in the state of gum, and hence the tendency to ropiness which such beer exhibits. In support of his practice of not boiling the wort, Mr Tizard refers to the fermentation of cider and wine, in neither of which is the wort boiled before being fermented, yet these liquors are as clear as beer ever requires to be.

As it is requisite, however, to extract the bitter of the hop by means of heat, Mr Tizard has patented an apparatus for the purpose. As he does not boil the wort, the underback is fitted with a false perforated bottom like that in the mashtun, or the old hop-back plates may be used for the same purpose. Beneath this perforated false bottom, or these plates, a coil or two of metal tubing is fixed, provided with a stop-cock, and made to communicate with the steamboiler. The hops are spread evenly over this perforated bottom, and four hours before setting tap, boiling water is poured over them sufficient to cover them. The vessel is then covered up and left for an hour. Steam is then passed through the coil of tubes below the perforated bottom till the temperature of the water rises to 200°, and it is maintained at this heat for three hours. The wort is then conveyed directly from the mash-tun to the underback, (now the hop-back), till it stands 6 inches in depth above the perforated floor. The wort is then pumped or run off into the coolers; and as the wort is running in from the mash-tun above the hops, and is draining or being pumped away from below them, all their virtues are thoroughly extracted and incorporated with the wort. In this way none of the aroma of the hop is lost; there is no destruction of saccharine matter or of the principles so necessary to a successful fermentation; and as the wort is drawn off at once, nearly at the strength it is wanted, there is no need of prolonged evaporation to bring it down to the proper density.

Lengthened experience can alone determine in which of these plans true economy consists. That Mr Tizard's plan is the most scientific, and promises to yield the best results, can scarcely be questioned. And as the essential parts of his plan could be carried out with scarcely any alteration on the present machinery, it is to be hoped brewers will give it a fair trial, and make known the result. What we consider the essentials of his plan, are the six hours' mashing, the sparging to remove the remains of the saccharine extract from the grains, the separate infusion of the hops, and the transfer of the wort direct from the mash-tun to the coolers. We are quite aware that Mr Tizard would object to this being called his plan, unless his expensive patented machinery were adopted. But we have attempted to separate the essential from the non-essential, and feel satisfied that the above fulfils all the indications which science has pointed out. The hops cause a considerable loss of wort, as every 60 lb. weight of hops is calculated to retain about a barrel of wort. Brewers seem not to attend sufficiently to this circumstance. By the use of a screw or hydraulic press, this quantity could be recovered; but most brewers prefer using these hops for the brewing of weak table beer, to which, besides imparting some bitter, they impart considerable strength of saccharine matter. A preferable plan seems to be to prepare the infusion of hops separately, as recommended by Mr Tizard, but instead of mixing the wort with the exhausted hops, the infusion should be drained from the hops and added to the wort in the underback. No loss of wort would thereby be sustained, and by putting the wet mass of hops in bags and subjecting them to pressure in a screw or hydraulic press, every particle of soluble bitter they could yield would be recovered.

Whether the plan of boiling or not boiling be followed, the wort is next transferred to the coolers, that its tempera-

Brewing. ture may be brought down sufficiently low to admit of its being fermented. The coolers are large flat cisterns or troughs, not in general more than six inches deep, extending the whole breadth of the building, and freely exposed to the air. These coolers are generally made of wood, but iron is very generally superseding wood, being found to possess many advantages. Slate, zinc, and latterly tiles, particularly Prosser's felspathic tiles, have been also used. When the wort has been subjected to boiling, it generally reaches the coolers at a temperature of from 200° to 208°, and here it must cool down to the temperature of 54° or 60°. The more rapidly this can be effected the better, and hence the advantage of the coolers being in a free exposed situation, and hence also the use of fanners (or blowers), which many employ. When the wort is transferred at once to the mashtun through the underback to the coolers, as by Tizard's plan, the temperature of the wort is only about 150°, so that the time occupied in cooling is greatly shortened. In summer brewing, the worts should always be ready to let into the coolers in the evening, to take advantage of the depression of temperature which occurs during the night. The coolers, if of wood, are recommended by some to be always kept covered with pure water till required, when this should be run off, and the worts run in. In this way, it is said, not only is the temperature of the coolers lower than it would otherwise be, but no waste of wort occurs as the pores of the wood are full of water; whereas, when this is not attended to, considerable loss of wort is experienced, not merely in watery parts which can be spared, but in saccharine extract. This practice, however, is condemned by many practical brewers who have tried the practice. They find they cannot have the coolers too dry when the wort is run on to them; dampness and wetness in the coolers tending much to produce that peculiar kind of disagreeable bitterness called "foxiness."

> Many brewers condemn the use of fanners; others again consider them the most valuable aids. Those who object to them, do so on the principle that the current of air caused by the fanners keeps the wort in agitation, and prevents the deposition of those flocks or insoluble particles which fall from the wort as it cools. Those who use the fanners, again, assert that the gentle agitation of the surface does good to the wort, while it does not in the least interfere with the deposit of the sediment, which, indeed, may deposit in the coolers, but when the wort is run off, is almost all carried along with it into the fermenting tun. It must be apparent to any impartial observer, that as the sediment or flocks which fall are afterwards carried into the fermenting vat, it cannot be of the slightest importance to the eventual clearing of the beer, whether the wort on the coolers be agitated or be left still; consequently, if it be desirable to cool down the wort rapidly, the fanners can scarcely be dispensed withmore especially in close foggy weather, when stagnation of the air over the wort is a most fruitful cause of acidity.

During the process of cooling, the volume of the wort diminishes from one-eighth to one-fifth, owing to the evaporation, the effect of which is a concentration of the beer. As the cooling is effected almost entirely by evaporation from the surface, it takes place most rapidly during spring and autumn when the air is dry, and also when a current of air plays over the surface. In such circumstances, six or seven hours usually suffice to cool down the wort to the fermenting temperature, but if the air be moist, and there be no breeze, the cooling is sometimes so slow as to occupy twelve or fifteen hours. In such circumstances, the fanners, or blowers, are of inestimable value, as from the great extent of surface exposed the oxygen is absorbed, and the wort is apt to pass into the acetous fermentation.

Many refrigerators have been invented for the purpose of aiding the brewer to cool down his wort rapidly. In many breweries it is customary to cool down the wort only to 100°

on the coolers, and then pass it through refrigerators in Brewing. which it is brought in close contact with cold spring water, thus effecting a rapid reduction of temperature. Several patents have been taken out for different forms of these, but it does not appear that any of them have given such satisfaction as to lead to their general adoption; so that the coolers are still indispensable parts of the brewer's apparatus. It is an acknowledged fact that on the coolers a considerable loss of saccharine extract occurs, for if the strength of the wort be accurately gauged by the saccharometer before being passed to the coolers, and after it is run from them into the fermenting vat, it will be found that there is a considerable loss of saccharine matter not accounted for. This loss cannot be by evaporation. It seems to be simply loss of fluid on the surface of the coolers themselves; nor need this be wondered at, when we con sider that even to wet the coolers it would require several barrels of water. The very fact of such a loss occurring should be an additional reason for the brewer adopting some simple refrigerator to cool down his whole wort, and not pass it into the coolers at all.

When the wort is sufficiently cooled down, it is run off into the fermenting vats, or "gyle tuns" as they are termed, where it is converted from the luscious sweet wort, into the intoxicating beer. The gyle tuns are large square or cylindrical vessels of wood, varying in size according to the extent of the brewery. These vessels are never filled to the top, because a considerable head of yeast rises during the fermenting process, for which allowance must be made. It is of no small importance that the gyle tun should be placed in a chamber defended as much as may be from atmospheric vicissitudes, and the temperature ought to be maintained as uniformly as possible between 50° and 55°. The temperature to which the wort is cooled down depends on the rapidity with which the fermentation is to be conducted, and on the season of the year. The warmer the temperature of the air, the cooler should be the wort, lest the fermentation should rise too high. In England the wort is generally cooled down to 60° when the temperature is cold, but to 55° if the temperature is warm. In Scotland, again, the worts are if possible cooled down to from 50° to 53°, and the whole fermenting process is conducted more slowly. As a general rule, the cooler the worts are, when set to ferment, the slower but more regular will be the fermentation, and the more under our power to regulate.

When the wort is poured into the gyle tun, it is mixed with a certain quantity of yeast in order to set it into fermentation. In the large porter breweries, this yeast is in general previously mixed with a certain quantity of the wort a short while previous, and placed in a warm place to allow fermentation to commence in it. It is then styled "lobb." In the Scottish breweries the yeast is generally first mixed in the fermenting vat itself, with about six times its measure of wort, and then the whole wort is run from the coolers in full flow upon it. In England one gallon of yeast is generally sufficient to set in full fermentation 100 gallons of wort; but more is required in winter, and less in summer. In Scotland, where the fermenting process is conducted more slowly, and at a lower temperature, the proportion of veast is one gallon to every four barrels during winter, and one gallon to every five barrels during spring or summer.

Yeast is the thick pasty fluid which separates from an infusion of malt when in a state of fermentation. When this is examined by the microscope, it is found to consist of globules of a grayish colour from the 3000th to the 4000th of an inch in diameter. When fermentation begins, these small corpuscular bodies move about in all directions, become larger, and small projections are seen to appear on their surface, which enlarge, drop off, and become independent corpuscles, and in their turn give birth to new ones. It is thus that during fermentation, a quantity of yeast is pro-

Brewing, duced seven times as great as the yeast used. These globules may be drained from the fluid in which they float when the yeast forms a mass like soft cheese; and in this state yeast used to be exported from Holland to France for the use of bakers, and is still so transmitted from one part of Germany to another, and has even been sent to India from Britain. From the experiments of Payen and Persoz, it appears that the essential operative constituent of yeast is a peculiar azotized matter, closely resembling albumen, gluten, caseine, &c., and is not sugar in a state of decomposition as was imagined by Dr Thomson. Hence they found that brain, white of egg, and many other nitrogenous substances, if mixed with a solution of sugar, caused it to ferment, and furnished a supply of yeast. These researches of Payen and Persoz strongly point out to the brewer the advantage of not destroying the albumen and gluten in the wort by boiling. Boiling, as already explained, destroys the greater portion of these principles, and throws them down in an insoluble state. But if the plan were adopted of running the wort from the mash-tun into the coolers, these valuable parts of the wort would be preserved, and would tend to render the process of fermentation surer and steadier.

The act of fermentation converts the sugar of the wort into carbonic acid gas (fixed air), which flies off, and alcohol (spirit of wine), which remains in the beer. This transformation or decomposition, "attenuation" as the brewers term it, is easily understood. Alcohol consists of 4 atoms of carbon, 6 of hydrogen, and 2 of oxygen, represented by C4, H6, O₂. Carbonic acid consists of 1 atom carbon, and 2 of oxygen; and as an atom of water is at the same time decomposed, we have 1 atom of grape sugar and 1 atom of water converted into 2 atoms of alcohol and 4 atoms of carbonic acid. Thus-

 $\begin{array}{lll} 1 \; Grape \; sugar = & C_{12} \; H_{11} \; O_{11} \\ 1 \; Water & = & H_{1} \; O_{1} \end{array} \right\} \; form - \left\{ \begin{array}{ll} 2 \; Alcohol & = \; C_{8} \\ 4 \; Carbonic \; acid & = \; C_{4} \end{array} \right.$  $= C_8 H_{12} O_4$ 

 $= C_{12} H_{12} O_{12}$ C12 H12 O13

Six or eight hours after adding the yeast, the fermentation becomes active. When this process is regular, a white creamy froth appears in the middle and round the edges of the fermenting vat, and gradually extends over the whole surface of the fluid. This frothy head increases more and more, being highest in the middle, and rises two or three feet above the surface of the fluid, gradually assuming a brown hue. During all this time there is a copious disengagement of carbonic acid gas, produced by the conversion of the sugar into alcohol and carbonic acid gas. At the same time, and keeping exact pace with this conversion, or "attenuation" as the brewers style it, the temperature of the fermenting fluid rises till it is 12° or 15° above that at which it was originally set; and an agreeable aroma or vinous smell (technically termed "stomach") is perceived. As this is the most important of all the stages, and it is very necessary the brewer should know whether all is going on regularly, we quote Mr William Black's excellent description of "a sound and regularly good fermentation."

"In such a fermentation five distinct changes occur, followed, after a certain stage, by a highly pungent aroma, which rises with the carbonic acid gas. If this aroma throughout the process be sound and vinous to the smell, we may feel assured that the worts are sound, and will go on regularly; if, on the contrary, a faintish, disagreeable, sub-acid flavour arise at any time during the process, we know that acidity or unsoundness has taken place, which should

be corrected.

" 1. The first stage of fermentation commences with a fine white substance, like cream, appearing all round the edges of the gyle tun; this creamy appearance gradually extends over the surface of the fluid in the tun. This we call creamed over, or the first

stage.

"2. The next should be a curly appearance, like the head of a fine cauliflower, which should also extend all over the tun. This, the second change, we denominate the curling or cauliflower head. This cauliflower head should be examined very narrowly, as from its strong and healthy appearance or otherwise we may pretty nearly VOL. V.

judge of the health of the gyle. As above stated, it should have the appearance of a fine cauliflower. If, however, it should assume the appearance of a well curled wig (we have no better phrase), having broad flaky curls, it denotes unsoundness. The aroma now should

be very perceptible.
"3. The curly head should then rise to a light yeasty or rocky head, little more than perhaps from two to three feet high, of a fine brownish white colour if sound. If unsound, it assumes in some parts an ugly bluish-white appearance, which often extends over the tun. This almost invariably happens where there is any galvanic action from chains of pipes or a mixture of metals; and cannot be cured or prevented but by doing away with the cause; that is by insulating the tuns.

4. After a time the light yeasty head should drop a little, perhaps 3 or 4 inches. This we call the fourth change. The aroma

should now be very vinous and pungent.

"5. The light yeasty head which had dropped should now rise to what we call a close yeasty head, having the appearance of yeast all over, with many little air bubbles on the top, not, however, larger than a nut or walnut; these constantly breaking and others supplying their place. If the fermentation has been healthy throughout, the close yeasty head will continue rising and puffing out gas from the air-bells, until the beer is thought ready for cleansing. Should all these changes, as before stated, take place regularly, and be accompanied through the process by a sound healthy aroma (generally termed "stomach"), we may rest assured that all is right, and that the beer, if afterwards properly treated in storing, will turn out sound and good."

The time during which the fermentation is continued in the gyle tun varies according as the rapid or slow process of fermentation has been followed, also according to the state of the weather, the temperature of the wort, and other causes. When the quick processs of fermentation is followed, as is usual in England, the wort is only kept fermenting in the gyle tun from 24 to 36 hours; and usually by the time the half of the saccharine extract is decomposed, and when the fermentation is still at its height, the yeasty head is beat down and mixed with the wort, when the whole is run off into fixed hogsheads, large barrels or "rounds," in order to be further fermented and "cleansed."

In Scotland, again, where the slow process of fermentation is commonly followed, the wort remains in the fermenting tun from six to twelve days, undergoing, during that period, a slower and more manageable fermentation than according to the English plan; and during this period the head of yeast is usually twice daily beat down, or mixed with the upper portion of the wort, till the proper degree of attenuation is attained. This is done with the view of re-

exciting the activity of the fermentation.

The gyle tuns, or fermenting vats, are usually fitted with a coil of metal tubing for the purpose of regulating the heat of the wort, which may be raised or depressed by passing hot or cold water through them, as each may be required. Mr Black objects to the use of fixed metal tubing in the gyle tuns, as being liable to engender electrical currents, which interfere with the regularity of the fermentation. He therefore recommends a moveable regulator which can be let down into the fermenting vat by means of ropes and pulleys when wanted, fitted with pliable tubes attached to the metal regulator tubes, so that the flow of hot or cold water through them may be discharged over the side of the fermenting vat.

Mr Black has endeavoured to prove that electricity and electro-chemical agencies have much to do with many of the irregularities which are observed in wort during fermentation, and he has certainly pointed out a few marked instances where such a connection seemed to be established. He particularly objects to sinking fermenting vats in the earth, and relates an instructive instance relative to one so fixed, in which, on a day when a thunder-storm threatened, the fermentation became stationary, and all the usual means failed to forward the process; but on the wort being pumped out into casks supported on wooden rests, the fermentation spontaneously resumed, and was finished successfully. He therefore recommends all fermenting tuns to be supported

Brewing. on wooden pillars or beams, so as to isolate them as completely as possible. From this it is apparent that Mr Tizard's plan of having fermenting vats sunk in caves and underground excavations, and surrounded with water, whatever effect such might have in maintaining a uniformity of temperature, would be a sure means of making bad beer.

The next process in brewing is termed "cleansing." perly speaking, this process is only required in the quick plan of fermentation: seeing that when the slow fermenta-

tion is followed no proper "cleansing" process is required.
It was mentioned above, that when the slow process was followed, as it is in Scotland, the fermentation was kept going on in the fermenting vat from six to twelve days. At the end of this period, the required degree of attenuation being attained the head of yeast is no longer mixed with the wort, and a stream of cold water being passed through the refrigerators of the fermenting tun, the fermentation ceases, the tempeperature declines, the turbid particles separate, and by two or three days' rest, the beer becomes quite transparent. It has "cleansed" itself, and is now ready to be run off into the cask or store vat. When the beer or ale is run off from the gyle tun, all the yeast is left behind, both that which floated on the surface, and that which remained at the bot-This retention of the yeast is accomplished by the crane in the bottom of the gyle tun being screwed up three-eights of an inch above the level of the bottom. At one time it was the custom to allow the beer to settle in the fermenting tun for twenty-four or thirty-six hours, then run it off into a square of equal size with the fermenting vat, leaving behind in the vat the whole of the yeast. Here it was allowed to rest for a couple of days, after which it was found bright and ready for the cask. The Scottish brewers have very generally given up this plan, allowing their beer or ale to settle in the gyle tun itself, and run it off from it direct into the casks in which it is to be sent out. The beer undergoes no proper "cleansing" in these casks, that is to say, no further fermentation goes on in them, throwing up a quantity of yeast, but a couple of days is generally allowed to elapse before they are "shived" or bunged down.

In England, again, where the rapid plan of fermentation is adopted, "cleansing" is an essential part of the brewing process. As above mentioned, the wort is fermented to a certain extent only in the gyle tun, and as that fermenta-tion is carried on at a higher temperature than in Scotland, it progresses more rapidly, attaining its maximum in from twenty-four to thirty-six hours. When it is thus at its height, the yeasty head is beaten down and mixed with the wort, and the whole is run off into large fixed barrels termed "cleansing rounds," whence it undergoes a farther stage of fermentation. In some breweries, before the wort is passed from the fermenting vat into these rounds, it is mixed with a certain quantity of wheat or bean flower, but this is a practice not generally approved of. In these vessels the yeast works over and escapes by a large aperture in the top of the barrel, to which a sloping wooden tray is fixed to convey the yeast into a trough. These rounds are usually placed in a double line, with the yeast trough between them, and by all communicating by means of pipes with a store vat at a higher level, are kept constantly full, fresh wort flowing in below in proportion as the yeast works over at the top. It is this process to which brewers have applied the term "cleansing," from the idea that the yeast working over and being removed from the beer "cleanses" it. When the fermentation is ended in these rounds, the beer

is run off into immense cylindrical vats or tuns, called "store vats," where an obscure sort of fermentation still goes on, in-creasing the strength of the beer, and keeping up a constant impregnation of carbonic acid gas, which renders the beer lively and agreeable to the taste when run off into casks for sale. These store vats are of immense size, usually capable of containing three thousand barrels of beer of 36

gallons each barrel, and weighing, when full, above five Brewing. hundred tons. In these it was customary to keep immense stocks for eighteen months or two years until the beer "ripened," that is, lost most of its sweetness and mildness, and acquired a slightly acid taste, technically called "hardness." Good hard beer was then the favourite drink; but it appears that the taste of the consumers has changed now, and that mild beers are much more universally used. Hence in the great porter and ale establishments, it often happens that these liquors are consumed within six weeks of their manufacture

In storing beer it is of great consequence that the temperature of the store room or cellar should be as uniform and as low as possible, seeing that increase of heat promotes fermentation, and is apt to cause the alcohol to become converted into vinegar. Underground cellars, where procurable, seem to fulfil these conditions better than others, and have therefore been strongly recommended. In consequence of electricity having such a marked effect on beer, particularly when kept in casks or store vats which communicate with or rest on the ground, it is desirable to have all these isolated as much as possible by resting them on wooden supports, at least eighteen inches above the surface of the ground, and not leaning on one another.

All beers, when well brewed and sound, after a certain re-pose become transparent, or "bright" as it is termed. When, however, beer is sent out very new, as is getting the custom, it is sometimes necessary to "fine" it, or impart to it that brilliant transparency which is so pleasing to the eye. This is done by means of "finings." The best finings for beer, indeed the only ones which should be used, are made of isinglass. This should be cut into shreds, put into a cask, and covered to the depth of 5 or 6 inches with vinegar or acid beer. When the isinglass has swelled up and absorbed all the vinegar or beer, it is covered to a like depth with a fresh quantity, and the whole vigorously stirred together. The same process of adding and stirring is repeated until the whole becomes of the consistence of a thick pulp or jelly. This jelly is then mixed with thin bright beer till ti is brought to the proper consistence for use, when it is strained through a hair sieve which retains any undissolved portions of isinglass. The specific gravity of the finings should be about 1 025. From a pint to a quart of finings are used to clear a barrel of beer. The finings are first mixed up with some of the beer to be fined, then poured into the barrel and briskly stirred about. The cask is then bunged down for twenty-four hours, after which the beer should be found limpid. The action of the finings is to envelope all the floating feculencies, and carry them down to the bottom of the fluid. Various explanations have been attempted to account for this action, but Dr Ure's seems to be the most satisfactory. The fluid gelatine combines with the tannin of the hops, and thus forms a flocculent mass, which envelopes the muddy particles of the beer, and carries them with it to the bottom, where it forms a sediment. If a pro-per sediment does not fall, it may be made to appear by adding a little of the decoction of hops. If there be the slightest disengagment of carbonic acid gas, the flocculent particles, being thereby kept moving about, will not be enveloped in the finings, and the beer will not clear. This state is called "stubborn" by the brewers.

The above details will enable the reader to acquire a tolerably correct notion of the art of brewing, but as special drinks require somewhat special manipulations, we shall shortly notice these specialties under the heads Porter, English Ale, Pale Indian Ale, Home-brewed Ale, Scottish Ale, and Bavarian Beer.

Porter is a strong beer of a dark colour and peculiar flayour, and is said to be so named, either from its having been the common drink of the porters, or from Harwood, the ori-ginal brewer of the drink, sending it round to his customers,

"porter," meaning thereby not the drink, but themselves, its porters or carriers. Porter was originally brewed to take the place of two or three kinds of beer which used to be mixed by the retailers in the mug as they drew them from the taps; and as this new drink had the taste of all three, but was brewed at once, and run out of one tap, it saved the publican trouble, and was denominated "entire." Hence, the sign so often noticed in London, such a brewer's "entire."

As provincial brewers have found it almost impossible to imitate the flavour and excellencies of the London Porter, various drugs have been used, or have been recommended to be used, in brewing this drink. Even some recent publications by practical men recommend burnt sugar and liquorice to give it colour, and copperas to give it a good head. Aloes, quassia, gentian, and even such poisonous ingredients as St Ignatius' bean and nux vomica, have at various times been recommended to be substituted for hops; and it is well known that paradise grains, notwithstanding the heavy penalty attached to their use, are still largely used surreptitiously in many parts of England to give greater sharpness to the porter and ale brewed there. It need scarcely be added, however, that such ingredients are never used by the respectable brewers, who use nothing but malt and hops, though some aid the colour by making use of burnt sugar or caromel.

As the dark colour of porter is that which more especially serves to distinguish it from other beers, we may describe the three colouring ingredients used for the purpose, premising that in general only one is used in the same brewing. 1. Black malt, or roasted malt, when used, is added in the proportion of from 3 to 5 bushels for every hundred bushels of malt; and is either mashed in the mash-tun along with the other malt, or is mashed separately, or is thrown into the wort when it is boiling. This malt, as before mentioned, yields no saccharine extract convertible into alcohol, but simply a dark-coloured mucilage, and is solely used for the purpose of giving colour and flavour. If this malt be added in too large proportion, especially if used with pale malt alone, it communicates a taste to porter which would be mistaken for that of liquorice, and this is probably the reason why liquorice is recommended to be used by the provincial brewer, and is often used by him for the purpose of imitating the London stout. 2. The second colouring ingredient is "essentia bina." This consists of some of the first-drawn wort boiled down in an iron pan to the consistence of an extract, when it must be carefully and constantly stirred, and the heat continued till it has acquired a dark colour and peculiar flavour, in fact been converted into a caromel. Fifteen gallons of wort so boiled down usually suffice for from 20 to 30 barrels of wort, according to the depth of colour which is wished to be given. 3. The third colouring ingredient is "caromel" or burnt sugar. The process of preparing it is thus described. "Thirty pounds of raw sugar are put into an iron boiler which has a circular bottom, and dissolved in one gallon of boiling water over a moderate fire. It must be kept stirred, and attended with care. After boiling a few minutes, and being stirred with an iron scraper, it thickens, becomes dark coloured, and acquires a bitter taste. Care must be taken that it does not get scorched. It must be constantly stirred, and a small quantity of water added to keep it from setting to the bottom of the boiler. As soon as it approaches to inflame, it is ready to be removed, which is done by thinning it with boiling water, and delivering it to the boiling wort.

Porter is usually brewed from all the different kinds of malt, which are mixed in such proportions as shall suit the taste of the consumers. These proportions are different in different breweries. When black or patent malt is used as the sole colouring agent, Mr Tizard says that good porter

Brewing. by men, who when they knocked at the doors called out may be made from mixtures of the different kinds of malt Brewing. in the following proportions, the last being the best:-

	Black Malt.	Brown Malt.	Amber Malt.	Pale Malt.	Total.
No. 1	3	25	15	57	- 100
2	4	24	24	48	100
3	5	0	95	0	100

When the colour is given with caromel or essentia bina, the black malt is not used, and the colouring matter is added to the wort in the boiler.

It is unnecessary to repeat here the particulars relative to the mashing, boiling, cooling, fermenting, and cleansing of porter, seeing that these have been already fully detailed when describing the English plan of brewing. It may merely be mentioned that it is usual to cool down the wort to about 100° on the coolers, and then run it through refrigerators, or coils of pipes in contact with cold water, till the temperature is reduced to 60° in winter, or 55° in summer. It is then transferred to the gyle or fermenting tuns, which are in general fitted with a coil of metal tubing to give the power of regulating the temperature. The "lobb" being added excites active fermentation, and in proportion as the saccharine matter becomes converted into alcohol, the temperature rises till it attains about 70 Fahr., beyond which it should never be permitted to get. If it threatens to rise beyond this, cold water should be passed through the refrigerators of the gyle tun, or the whole should be run off into the cleansing vats. This temperature is generally attained in from 30 to 36 hours; and as soon as the half of the saccharine extract has been converted into alcohol, which is generally within the 48 hours, it is run off into the rounds or cleansing vats. In the great London breweries these are of such a size as to contain from 10 to 20 barrels each; and as, during the process of "cleansing" from the yeast, the fermentation is still going on, the attenuation of the porter is wrought down to 5 or 7 lb. of saccharine extract per barrel. After this the porter is transferred to store vats, where in former days it used to be kept for 18 or 24 months in order to "ripen" or get "hard;" and as the brewer had thus to keep a two years' stock of porter on hand, the number and size of these in the larger establishments may be conceived. These store vats were usually made so large as to contain three thousand barrels of beer, each barrel being of the capacity of 36 gallons; and such a vat when full weighs about five hundred tons. In some of the largest breweries a few store vats existed of the enormous capacity of ten thousand barrels, and one monster vat was built in Whitehead's, which was said to be capable of containing twenty thousand barrels, or 720,000 gallons. It is not wonderful, therefore, that the bursting of one of these vats in Meux's brewery should have swept away a street, carrying the houses and all their inhabitants into the river. The changed taste of the public for mild malt liquors will soon probably make these immense store vats matters of history, as most of the malt liquor now used in London is reckoned old if kept in the brewery more than six weeks.

When porter is in the store vats, a low species of fermentation still goes on sufficient to reduce still further the proportion of saccharine extract, and furnish sufficient carbonic acid gas to impart to it an agreeable briskness. When porter is bottled the same changes go on-indeed it is questionable whether malt liquor is ever entirely quiescent.

The common draft London porter is made from a wort which is usually about the strength of 20 lb. of saccharine extract per barrel; the ordinary stout from wort of 25 or 26 lb. per harrel; and the strongest bottled stout, and porter for exportation from wort of 30 to 35 lb. per barrel. These different qualities are often stamped with the letters X, XX, and XXX; but this is a mere matter of convenience to the brewer; and porters from different breweries having the same

Brewing. stamp may be of ry different strength. When porter is exported or sent to a distance, additional hops are added to it, varying in quantity in proportion to the distance it has to go. Export porter has usually about  $4\frac{1}{2}$  lb. of hops to each barrel. Strongest bottled porter has usually 8 lb. weight of hops to the quarter of malt; and common stout from  $4\frac{1}{2}$  to 6 lb. of hops per quarter of malt.

Porter has been analyzed for the purpose of ascertaining the proportion of alcohol contained in it. Mr Brande found 100 measures of brown stout to contain 6.80 measures of rectified spirit of wine of the density of 825, equal to about 10.5 per cent. of proof spirit, while common London porter yielded 420 per cent. by measure of rectified spirit. Dr Christison, in 1838, found in bottled London porter 5.36 per cent. by weight of absolute alcohol, which is about 11.91 per cent. by measure of proof spirit. From these experiments it appears, that London porter contains considerably less alcohol than the sour light wines of France or Germany, which yield from 15 to 19 per cent. of proof spirit.

Porter is an exceedingly wholesome and nutritious drink. Indeed, as a beverage, it cannot be denied that it is preferable to wine, however much some may vaunt the advantages which would result to this country from the duties on light wines being taken off, in order that they might come into more general use. As a beverage for the working classes, there can be no comparison between the sound, wholesome, and tonic beer of England, and the sour light wines drunk on the Continent. There is not a working man in England who would not despise and reject the acid wines used by the common people in the grape districts, even though they contain from 4 to 10 per cent. more proof spirit in them than his favourite beer; and, as to the finer qualities of light wines, they are produced in such small quantities that they cannot even now satisfy the wants of the upper classes, and no lowering of the duty would bring down their price to the working man's level.

Ale appears to be the most ancient drink of this country, and the name is usually given to strong beer of a pale colour, as porter is to that of a dark colour. The varieties of ale are infinite, but we purpose only to notice the peculiarity in the manufacture of English ale, Indian ale, English homebrewed ale, and Scottish ale.

In all high-priced English ales of the present day, brilliancy and paleness of colour, with as little excess of sweetness as possible, are the objects to be attained by the brewer. To accomplish these ends, nothing but the finest pale malt must be used, and to secure sound-keeping ale, it is of first importance that the malt shall have been thoroughly dried on the kiln. If prepared from what is technically known as "slack-dried malt," that is malt not thoroughly dried for fear of colouring it, or which has had water sprinkled over it while still warm from the kiln, the wort as run from the mash-tun will be found acid, and will tinge litmus paper of a much deeper red than ordinary wort from well dried malt, and the ale prepared from it will not keep beyond a few months. It is necessary also to be careful in the selection of the hops for ale. Good sound hops should alone be used; many brewers now use a proportion of foreign hops along with the English hop.

In the brewing of common ale in England, it is customary to make three mashes, the first and second being fermented for ale, the last being reserved for beer. The heat of the water let on the first mash is usually 170°, that of the second 185°. The wort from these two mashes is mixed, and boiled for two and a half or three hours with hops, in the proportion of 8 lb. of hops to every quarter of malt When the wort has cooled down to 60° or 65°, it is run off into the gyle tuns, and quick fermentation is excited by adding about one gallon of yeast for every two barrels of wort. The fermentation in the gyle tun comes to maturity in about thirtysix hours, when the ale is run off into fixed barrels or rounds,

where it undergoes a further fermentation, and is "cleansed" Brewing. of its yeast, a hogshead of the ale being reserved for filling up the barrels as the yeast works over. In two days or so this process is over, when the ale is racked into barrels and removed into stock.

Since the public taste, relative to "hard beers," has changed, several of the great London brewers have turned their attention to the brewing of ale. They generally follow much the same plan as they did for porter brewing, following the quick process of fermentation, and finishing the attenuation in the rounds where the cleansing goes on. This mild ale has quite met the taste of the public, and seems to be gradually displacing porter. Ale is not, in general, attenuated so much as porter, or as the bitter ales intended for exportation; the attenuation of the ale is usually carried only to the decomposition of two-thirds of the saccharine extract.

Pale, Indian, or Burton Ale, originally intended for exportation, and now so deservedly in high repute as one of our most esteemed and wholesome beverages, requires more particular treatment in its manufacture. This ale can only be prepared from the best pale malt and the best hops; and the chief peculiarities attending its manufacture are, that it requires more than double the usual proportion of hops, that the attenuation is generally carried to a much greater extent, and that the temperature during the fermentation should never be allowed to exceed 65° Fahr. That a considerable amount of sweetness should exist in common ale is allowable, and indeed, it is the presence of a large quantity of undecomposed saccharine extract which gives to common strong ale its luscious mildness. It is, however, the presence of this large quantity of undecomposed saccharine extract which prevents common ale from being used as a diet drink by the invalid, or being relished in a warm country; and it is the circumstance of the Indian or pale ale having its fermentation carried so much further, and its saccharine matter reduced in quantity, together with its larger proportion of bitter, that commends it so much as a grateful and stimulant stomachic to the European resident in a warm climate, and to the invalid.

The manufacture of this beverage has been endeavoured to be shrouded in much mystery; but we have ascertained that pale bitter ale of first rate quality may be brewed by following with care any of the ordinary plans of fermentation, either the ordinary quick English system, or the slower Scotch process. It has appeared to us, however, that the best keeping, the highest flavoured, and the least acid ale, was always prepared by the slower process, in which the temperature is never raised so high as in the quick process of fermentation. The quantity of hops found necessary for Indian ale is from 18 to 22 lb. per quarter of malt; and the ordinary strength of the wort, when passed into the gyle tun, is 24 lb. per barrel, or 1066 of specific gravity. gives, with good malt, about four barrels of pale ale for every quarter of malt.

When the slow plan of fermentation is followed in England, it is recommended that the pitching temperature should not exceed 56°, and the gyle tun, in every case, must be fitted with refrigerator tubes to regulate the temperature of the wort. Some brewers consider it of essential importance to keep down the heat of the wort during the early stage of the fermentation, and so to regulate the temperature by a stream of cold water through the refrigerator tubes of the fermenting tun, that at the expiration of forty-eight hours the temperature shall not have increased 3° above the pitching heat, by which time the saccharometer indicates an attenuation of 7 or 8 lb. It is, of course, necessary to visit the fermenting vat every fourth or fifth hour day and night. By the time the temperature has risen to 62°, the half of the original strength of the wort should be found to be attenuated. In this plan of fermentation the

Brewing.

Brewing.

temperature is allowed slowly to rise to 64°, by which time three-fourths of the saccharine extract should be attenuated, and at this stage half of the yeasty head is recommended to be skimmed off. When 2 lb. more of the saccharine extract have been decomposed, one-half of the yeasty head is again skimmed off. The density, by this time, should be reduced to 6 lb. per barrel, but the attenuation has still to be carried on till 4 lb. of saccharine extract remain undecomposed. If the fermentation therefore gets languid, the yeasty head should be beaten in. When the desired attenuation is attained, that is when the wort, or ale rather, is reduced to about 4 lb. of extract per barrel, or to the specific gravity of 1011 or 1012, the whole head of yeast is carefully skimmed off, and cold water is passed through the refrigerator tubes, so as to cool down the ale as quickly as possible, and arrest further fermentation. As the fluid comes to rest, by the cooling arresting further fermentation, all impurities subside, and in a few days the ale is pure and transparent, its temperature has fallen to 50°, and it is fit to be drawn off into the store vat. By this process the wort is kept in a state of unnecesarily slow fermentation for twelve or thirteen days.

Other brewers, therefore, who also follow the slow plan of fermentation, instead of retarding the rise of heat during the early stage of the fermentation, allow and encourage it to rise as rapidly as possible to 62°, and maintain it steadily at that temperature, and never allow it to exceed that heat till the required degree of attenuation is attained. Instead of skimming off the yeasty head, these brewers twice daily lightly beat in the head, which hastens the attenuation, so that in general, by the sixth or seventh, and never exceeding the eighth day, the required attenuation is attained. A full stream of cold water is then sent through the refrigeratory tubes of the fermenting vat. The yeasty head is left untouched, and the ale is either allowed to rest in the fermenting tun for two or three days, by which time it becomes pure and transparent, and its temperature falls to 50°, when it is drawn off into casks or into the store vat; or, after a rest of twenty-four hours, it is transferred to a vessel of similar size with the fermenting tun, leaving behind it all the yeast, where it is allowed to rest for a couple of days before being stored or drawn off into casks. After being drawn off into casks it is generally allowed to stand for a couple of days before being shived down, and a handful of fresh hops is added to each cask.

When the water used for brewing pale ale is hard, some brewers assert, and act on the principle, that the pitching heat must be higher, and that the fermentation must be conducted on the quick plan. Some of the largest Burton brewers accordingly manufacture their pale Indian ale by the rapid fermentation process, and boast that they "have brewed and shipped their ales to India in the course of a few days." Whatever may be thought of the practice, the reasoning is bad, seeing that it has been found that the hard water used by the Burton and other brewers loses all its hardness in the mash-tun, and by the time it reaches the fermenting vat is as soft as if the softest river water had been used.

When the rapid plan of fermentation is followed, the pitching heat is set at 60° Fahr.; and the quantity of yeast employed, though varying according to the season, is about 1 gallon for every 2 barrels of wort. Vigorous fermentation is thus excited, and in from 24 to 30 hours the wort should be found to be attenuated one-half, while, by means of the refrigerator tubes of the fermenting vat, the heat should not be allowed to rise higher than 7° above the pitching heat. It is often, however, extremely difficult to keep down the temperature within these limits even with a full flow of cold water through the refrigerators; and if it be allowed to rise to 70° the ale is extremely liable to get acid within a few months, even in this country, and is almost

sure to do so if exported to an Indian climate. As soon, therefore, as the above attenuation is obtained, or the heat threatens to rise higher than 7° above the pitching heat, the whole is run off into fixed hogsheads or rounds, where the attenuation is carried to the desired extent, and the ale is "cleansed." Several brewers who manufacture largely for the foreign market assert that no pale ale can be trusted for exportation whose heat in the gyle tun has exceeded 65°, and in practice they never allow it to exceed 63°. They attribute the large losses which some houses have sustained from ale spoiling in India to this cause; and in their own experience they have never found one cask of ale go wrong whose heat during fermentation was kept below 63° Fahr. When the ale is racked off into casks a handful of hops is added to each to insure its keeping qualities.

Pale Indian ale, if properly brewed, never requires fining,—it clears of itself; and if not clear, it is very rarely indeed that finings will restore to it its crystalline transparency.

The small quantity of undecomposed or unattenuated saccharine extract left in this kind of ale is sufficient, by its slow and gradual fermentation, to supply enough of carbonic acid gas to induce a pleasant liveliness without inducing the slightest turbidity; and the large quantity of bitter in it enables it to bear the heats of India, where it constitutes one of the most refreshing and invigorating of beverages.

The reputation which this bitter ale has acquired, and the demand for it in India, our colonies, and in this country, have induced many brewers over the kingdom to direct their attention to its manufacture; and the consequence has been that numerous brewers now manufacture a pale bitter ale quite equal to the best of either Bass or of Allsopp.

Many, however, who now manufacture an excellent pale ale for the foreign market, do not carry the attenuation so far as above described, but arrest the fermentation when the specific gravity of the wort or ale arrives at 1018; in other words, they only carry the attenuation to the decomposition of nearly three-fourths of the saccharine extract,—the original gravity of the worts of these ales ranging from 1066 to 1068. These pale ales are brewed by the slow fermentation process, the fermentation lasting six or seven days. It would appear that ale with even this considerable amount of undecomposed saccharine extract bears well the heat of a warm climate; these brewers having never yet lost a single cask by their ale souring or otherwise going wrong.

From these statements it will be apparent that pale bitter ale, as at present manufactured, is not brewed according to one fixed plan; but may be brought to perfection either by the quick or the slow process of fermentation, and either by carrying the attenuation to the decomposition of nine-tenths of the saccharine extract, or only to the decomposition of three-fourths.

We believe that good and sound ale may be brewed by any of these processes; but it cannot be denied that when the rapid fermentation is followed the tendency to acidity must be much greater than in slowly fermented ale. This difference may not be so strongly manifested if the ale be used in this country, but, if sent to India or other warm climate, such rapidly fermented ale runs a much greater chance of becoming sour. This is entirely attributable to the higher temperature which the rapidly fermented ale attains in the fermenting vat, and which every now and then it is found almost impossible to check. It is very questionable, indeed, whether any ale, or other malt liquor, whose heat has been raised in the fermenting vat to 70°, will bear unchanged the heat of an Indian climate. The reason of this is very apparent. At the temperature of 70° there is a much stronger tendency in the liquor to undergo the acetous (vinegar) than the alcoholic fermentation. Indeed, the surest way to induce the acetous fermentation is to raise the temperature of the fermenting liquor above 70°, and acetic

Brewing. acid is rapidly produced, as is well known to and is acted on by the vinegar manufacturers. Any near approach to this temperature should therefore be carefully avoided in the manufacture of malt liquors.

Mr Roberts has published a table of analysis of 40 specimens of pale Indian ale. He found the average specific gravity of these, taken from cask and bottle, to be 1007-26. If we take only the 15 samples taken from the cask, the average specific gravity was 1008 25, or, in brewers' language, nearly 3 lb. of saccharine extract per barrel. This, then, shows the average attenuation of the Indian ale at present in the market, but does not with any certainty show the extent to which the attenuation of the wort was carried by the brewer. It was before remarked that the attenuation of malt liquors goes on both in the cask and in the bottle; so that, unless we know the date at which the ale was brewed, and allowed for this, we might make sad mis-

which was attenuated by the brewer only to 1018 of specific gravity, but after having stood six months in bottle the specific gravity was found reduced to 1012. Mr Roberts' tables show also the quantity of proof-spirit contained in these pale bitter ales. The 40 ales he exa-

takes as to the extent to which the attenuation had been carried by the brewer. Thus we lately examined an ale

mined yielded on an average 11.59 per cent. of proof-spirit; the highest examined yielding 13°05 per cent., and the lowest 8'82 per cent of proof-spirit. Pale Indian ale, therefore, contains a third less of spirit than the sour vin du pays and other light and acid Continental wines; while its freedom from acidity, its gently stimulant action, and its tonic

qualities, constitute it a beverage as superior to these wines as one drink can be to another.

Home-brewed Ale, as brewed by the middle classes in England, is usually made in quantities of 2 barrels, i. e., 72 gallons. For this purpose a quarter of malt, or if wished to be extra strong, 9 bushels of malt are taken, with 12 lb. of hops. The malt being crushed or ground, is mashed with 72 gallons of water, at the temperature of 160°, and covered up for three hours, when 40 gallons are drawn off; and into this the 12 lb. of hops are put and left to infuse. Sixty gallons of water at the temperature of 170° are then added to the malt in the mash-tub and well mixed, and after standing two hours 60 gallons are drawn off. The wort from these two mashes is boiled along with the hops for two hours, and after being cooled down to 65°, it is strained through a flannel bag into the fermenting tub, where it is mixed with one-anda-quarter gallons of yeast, and left to work for twenty-four or thirty-six hours. It is then run into barrels to cleanse, a few gallons being reserved for filling up the casks as the yeast works over. Eighteen or twenty gallons of beer are obtained from the used malt by making a third mash with twenty-five

with the used hops. Scottish Ale, but especially the Edinburgh ale, has been long celebrated, but as an ordinary beverage, it is much more luscious and heady than London porter, English ale, or pale Indian ale. It is a much stronger drink than any of these, the home-brewed English ale approaching nearest to it in this respect; and as the attenuation of the saccharine extract is only carried the length of the decomposition of twothirds of its original strength, the large quantity of undecomposed saccharine extract renders it much more luscious to the taste, and milder than the English ales. The Scottish ales are brewed of various strengths, and are known in the market by their price per hogshead, and are hence commonly mentioned as L.7 ale, L.6 ale, &c. According to the kind of ale required the worts are prepared of various degrees of gravity as indicated by Allan's saccharometer. Speaking in a general way, L.3 ale has a wort of the specific gravity of from 1070 to 1080; L.4 ale wort from 1080 to 1095; L.5 ale wort from 1095 to 1110; L.6 ale

or thirty gallons of water, and boiling the wort thus procured

wort from 1110 to 1120; and L.7 ale wort from 1120 to Brewing.

By the Scottish plan only one mash is made, using for the stronger ales about 13 barrels of water to each quarter of malt. The whole water is run in at once into the mashtun at the temperature of 180°, and the crushed malt, as it is poured into the water, is thoroughly mixed with it by means of oars and rakes, and all the lumps carefully broken. The mash-tun is then covered over and allowed to stand for three hours. The heat of the mash-tun at the surface is usually about 140°, but the heat in the interior of the mash is higher, seeing the wort when run off has usually a temperature of about 155°. At the end of this period the sparger, formerly described, is fixed to the mash-tun, and the taps being opened the wort is permitted to flow out, at first slowly till it runs clear, afterwards at full tap. The sparger is then set in motion, and sprinkles the surface of the mash with as much hot water, at the temperature of 180° or 185°, as flows out from the tap below. The surface of the mash is thus kept from becoming dry, else the whole mash would fall into cracks, and also separate from the sides of the mash tun, and allow the water to escape without car-

rying with it the saccharine extract. Supposing that a L.4 ale were wished, and a small brewing were made of 8 quarters of malt, 30 barrels of wort would be run off at the specific gravity of 1072. The wort being pumped into the boiler, after boiling half an hour would have 40 lb. of hops added to it, and in another half hour other 40 lb., making in all 80 lb. of hops. For the higher priced ales 10 lbs. of hops per quarter of malt are occasionally used. The boiling of the wort is continued from an hour to an hour and half longer, until the gravity of the wort is increased to 1084, when it is passed to the coolers, where it is still further strengthened by evaporation, so that when pitched in the gyle tun its gravity is about 1092, and its bulk reduced to 23 or 24 barrels. The wort being cooled down to 50° or 52°, six gallons of yeast, or more or less according to the season, are mixed in the gyle tun with a barrel of the wort, when the rest of the wort is let run into the gyle tun from the coolers in full stream, and the whole is well mixed. The process of fermentation occupies from ten to twelve days, and the heat during the fermentation is never allowed to rise higher than 62°, or 10° above that at which it was pitched, and the yeasty head is repeatedly beat down, usually twice daily, during that period. When the brewer finds that the attenuation has been carried so far as to reduce the specific gravity to 1031, in other words, that two-thirds of the saccharine extract have been converted into alcohol, the ale is left undisturbed in the fermenting vat for 2 or 3 days, by which time it has become clear and transparent, all fermentation has ceased, and its temperature has fallen to 50° or 52°. It is then run off into the casks in which it is to be sent out, which are allowed to stand a couple of days before being bunged down. Finings are scarcely ever required for these ales.

These heavy ales are being gradually displaced by the more wholesome, lighter, and more thoroughly fermented bitter ales of which the Indian ale is the type.

These Scotch ales contain a large per-centage of alcohol. Mr Roberts has published a table containing the analysis of 71 samples of different Scotch ales, and found they contained on an average of the 71 ales 14:59 per cent. of proof spirit. The higher priced ales, as those at L.6 and L.7, contained 16 and 17 per cent. of proof spirit, the highest sample containing 18.5 per cent. The low priced ales, as those of L.3 and L.4, contained on the average 11 and 12 per cent. of proof spirit; the lowest sample of L.2 ale contained 9.8 per cent. of spirit.

The following table shows the quantity of beer or ale exported from Great Britain and Ireland during the years ending 5th January:-

Brewing.

1851,-182,480	barrels,	valued at	L.558,794
1852,—190,077	•••	•••	577,142
1853,—244,115	•••	•••	754,627
1854 -416 030			1.289.382

Bavarian Beer is the only other malt liquor which, from the peculiarities attending its fermentation, requires a special notice. The Germans, from the earliest historical periods, have been a beer-drinking nation, and some excellent malt liquors are made in that country. The "weiss bier," the truly patriotic beverage of Prussia, is not made from barley alone, but from 1 part barley malt and 5 parts wheat malt; but the excessive tendency of wheat beers to sour has caused potato starch to be substituted for the wheat, and tartaric acid to give the admired tartness. The other beers, however, more especially the ones now to be noticed, the Bavarian beers, both the common pot beer (schank-bier) and the intoxicating luscious bock-beer, are brewed from harley malt alone.

The peculiarities attending the manufacture of these beers attracted little notice in this country till the publication of Liebig's Chemistry in its application to Agriculture and Physiology in 1840 directed attention to the subject by contrasting the keeping qualities of the Bavarian beer with that of the English and French beers. Dr Ure has since then personally examined these beers and their mode of manufacture, but did not find the vaunted qualities of the German bier so uniform as Liebig would have us believe. "This perfection (says he) is, however, in my opinion, rarely attained. In my several journeys into Germany I have met with much spurious or ill-made Bavarian beer. The best contains, when brought to England, a little acid."—Dictionary of Arts, &c., vol. i. p. 156.

Liebig's being still the best description of the chemica. changes which accompany the peculiar mode of fermentation adopted for Bavarian beer, we give it entire from the work above quoted, without, however, subscribing to his views, which are fanciful in some points, and in others scarcely in accordance with known facts.

"English, French, and most of the German beers, says Liebig, are converted into vinegar when exposed to the action of air. But this property is not possessed by Bavarian beer, which may be kept in vessels only half filled without acidifying or experiencing any change. This valuable quality is obtained for it by a peculiar management of the fermentation of the wort. The perfection of experimental knowledge may have led to the solution of one of the most beautiful problems of the theory of fermentation.

"Wort is proportionally richer in gluten than in sugar, so that during its fermentation in the common way a great quantity of yeast is formed as a thick scum. The carbonic acid evolved during the process attaches itself to the particles of the yeast, by which they become specifically lighter than the liquid in which they are formed, and rise to the surface. Gluten, in the act of oxidation, comes in contact with the particles of the decomposing sugar in the interior of the liquid. The carbonic acid from the sugar and insoluble ferment from the gluten are disengaged simultaneously, and adhere together.

"A great quantity of gluten remains dissolved in the fermented liquid, even after the transformation of the sugar is completed, and this gluten causes the conversion of the alcohol into acetic acid, on account of its strong disposition to attract oxygen and to undergo decay. Now it is plain, that with its separation, and that of all substances capable of attracting oxygen, the beer would lose the property of becoming acid. This end is completely attained in the process of fermentation adopted in Bavaria.

"The wort, after having been treated with hops in the usual manner, is thrown into very wide flat vessels, in which a large surface of the liquid is exposed to the air. The fermentation is then allowed to proceed, while the temperature of the chambers in which the vessels are placed is never allowed to rise above from 45° to 50° Fahrenheit. The fermentation lasts from three to six weeks, and the carbonic acid evolved during its continuance is not in large bubbles which burst upon the surface of the liquid, but in small bubbles like those which escape from a liquid saturated by high pressure. The surface of the wort is scarcely covered with a scum, and all the yeast is deposited on the bottom of the vessel in the form of a viscous sediment.

"In order to obtain a clear conception of the great difference be-

tween the two kinds of fermentation, it may perhaps be sufficient to Brewing. recall to mind the fact that the transformation of gluten or other azotized matters is a process consisting of several stages. The first stage is the conversion of the gluten into insoluble ferment in the interior of the liquid, and as the transformation of the sugar goes on at the same time, carbonic acid and yeast are simultaneously disengaged. It is known with certainty that this formation of yeast depends upon oxygen being appropriated by the gluten in the act of decomposition; but it has not been sufficiently shown whether this oxygen is derived from the water, sugar, or from the gluten itself; whether it combines directly with the gluten, or merely with its hydrogen, so as to form water. For the purpose of obtaining a definite idea of the process, we may designate the first change as the stage of oxidation. This oxidation of the gluten, then, and the transposition of the atoms of the sugar into alcohol and carbonic acid are necessarily attendant on each other, so that if the one is arrested the other must also cease.

"Now, the yeast which rises to the surface of the liquid is not the product of a complete decomposition, but is oxidized gluten still capable of undergoing a new transformation by the transposition of its constituent elements. By virtue of this condition i the power to excite fermentation in a solution of sugar; and if the gluten be also present, the decomposing sugar induces its conversion into fresh yeast, so that in a certain sense the yeast appears to

reproduce itself.
"Yeast of this kind is oxidized gluten in a state of putrefaction, and by virtue of this state it induces a similar transformation in

the elements of the sugar.

"The yeast formed during the fermentation of the Bavarian beer is oxidized gluten in a state of decay. The process of decomposition which its constituents are suffering gives rise to a very protracted putrefaction (fermentation) in the sugar. The intensity of the action is diminished in so great a degree, that the gluten which the fluid still holds in solution takes no part in it; the sugar in fermentation does not excite a similar state in the gluten.

"But the contact of the already decaying and precipitated gluten or yeast causes the eremacausis (decay) of the gluten dissolved in the wort; oxygen gas is absorbed from the air, and all the gluten

in solution is deposited as yeast.

"The ordinary frothy yeast may be removed from fermenting beer by filtration without the fermentation being thereby arrested; but precipitated yeast of Bavarian beer cannot be removed without the whole process of its fermentation being interrupted. The beer ceases to ferment altogether, or if the temperature be raised undergoes the ordinary fermentation. The precipitated yeast does not excite ordinary fermentation, and consequently is quite unfitted for the purpose of baking; but the common frothy yeast can cause the kind of fermentation by which the former kind of yeast is produced.

"When common yeast is added to wort at a temperature of between 40° and 50° Fahrenheit, a slow tranquil fermentation takes place, and a matter is deposited on the bottom of the vessel which may be employed to excite new fermentation; and when the same operation is repeated several times in succession, the ordinary fermentation changes into that process by which only precipitated yeast is formed. The yeast now deposited has lost the property of exciting ordinary fermentation, but it produces the other process even at a temperature of 50° Fahrenheit. In wort subjected to fermentation at a low temperature, with this kind of yeast, the condition necessary for the transformation of the sugar is the presence of that yeast; but for the conversion of gluten into ferment by a pro-

cess of oxidation, something more is required.
"When the power of gluten to attract oxygen is increased by contact with precipitated yeast in a state of decay, the unrestrained action of air is the only other condition necessary for its own conversion into the same state of decay, that is, for its oxidation. We have already seen that the presence of free oxygen and gluten are conditions which determine the eremacausis of alcohol, and its conversion into acetic acid; but they are incapable of exerting this influence at low temperatures. A low temperature retards the slow combustion of alcohol, while the gluten combines spontaneously with the oxygen of the air, just as sulphurous acid does when dissolved in water. Alcohol undergoes no such changes at low temperatures, but during the oxidation of the gluten in contact with it, is placed in the same condition as the gluten itself when sulphurous acid is added to the wine in which it is contained. The oxygen of the air unites both with the gluten and alcohol of wine, not with sulphurous acid; but when the acid is present it combines with neither of them, being altogether absorbed by the acid. The same thing happens in the peculiar process of fermentation adopted in Bavaria. The oxygen of the air unites only with the gluten and not with the alcohol, although it would have combined with both at higher temperatures, so as to form acetic acid.

"Thus, then, this remarkable process of fermentation with the

precipitation of a mucous-like ferment, consists of a simultaneous

Brewing, putrefaction and decay in the same liquid. The sugar is in the state of putrefaction, and the gluten in that of decay. In the fermentation of beer after this manner, all the substances capable of decay are separated from it by means of an unrestrained access of air, while the temperature is kept sufficiently low to prevent the alcohol from combining with oxygen. The removal of these substances diminishes the tendency of the beer to become acescent, or, in other words, to suffer a further transformation."

> Notwithstanding Liebig's praise of the Bavarian beer, much of it, as commonly brewed, is an inferior drink. Even its keeping qualities have been greatly over-rated. In the Grand Duchy of Hesse a considerable premium was offered for the preparation of beer according to the Bavarian method; and the premium was to be adjudged to any one who could prove that the beer brewed by him had lain for six months in the store vats without becoming acid; but we are informed that hundreds of casks of beer were lost in the endeavour to fulfil the conditions.

It would appear that, as in the case of the Indian ales, Bavarian beer can be well brewed by a much more rapid process of fermentation than one extending over "three to six weeks." Dr Ure, in describing the process followed in Bavaria, mentions that the pitching heat of the wort for the ordinary schank-bier is from 54° to 59°, and, as might be expected at these heats, the wort undergoes a nearly ordinary fermentation, even though the deposit-yeast be used, yeast rising to the surface and forming a tolerable head; and in five or six days the beer is ready to be transferred to the store tun. For the best keeping beer, however, the wort is pitched at the temperature of 41° to 43°, and the fermenting process is consequently much slower: no head of yeast is formed, all is deposited. From this it would appear that the low pitching heat has more to do with the production of deposit-yeast and the non-production of head-yeast than any other requisite. This statement also enables us to understand how so much of the Bavarian beer should be of bad quality, much of it being virtually ill-brewed ordinary beer.

Excellent Bavarian beer has been brewed in Edinburgh. Messrs James Muir and Sons, more than twenty years ago (1832), procured from Bavaria a supply of the deposit-yeast, and with it made several brewings of beer. It was found that good beers could only be brewed with this yeast if the wort was of low specific gravity. The worts were pitched at the temperature of 45°, in the ordinary gyle tun, and were never allowed to rise above 48°. A slight cream or scum at first appeared on the surface; the whole yeast was deposited at the bottom, and the brewing was completed in 10 or 12 days. Better beer was never turned out of any brewery, and they could not supply the demand for it. The supply of deposit-yeast was kept up for many months, when on using a stronger wort, and the weather not permitting the wort to be cooled sufficiently, ordinary fermentation took place, and the supply of deposit-yeast was destroyed. The manufacture of this beer, interfering with their ordinary trade, was not resumed; but their opinion is, that the process is excellently adapted for the manufacture of all the light beers, and as it requires no change in the ordinary apparatus, it is worthy the attention of the table beer brewers. In Bavaria, when the ordinary deposit-yeast cannot be procured, the common yeast which is deposited in every fermentationwhich indeed seems to be identically the same,—is carefully separated from the head-yeast, and used; and after one or two brewings is found to be of sufficient purity for the finest beers. The sole inconvenience attending the Bavarian process is, that it can only be carried on during the six coldest months of the year.

A few years ago the legislature permitted the Board of Excise to grant leave to use sugar in place of barley malt in breweries. Dr Ure was employed by an extensive sugar merchant to make experiments for the purpose of ascertaining whether sugar could be economically substituted for

malt. He examined 10 samples of Muscovado sugar, and Brewing. found the average yield was 12 gallons of proof spirit for every 112 lb. of sugar; whereas an equal quantity of proof spirit could be obtained from  $4\frac{8}{10}$  bushels of malt. One pound of malt he found yielded  $\frac{3}{4}$  lb. of extract, capable of making as much spirit as that weight of sugar. By contrasting the price of sugar and malt, any one can see that sugar cannot be used economically in the brewery. Several extensive brewers however, were induced to try the experiment on the large scale, as for instance the Messrs Whitbread & Co., who in 1847 used no less than 627,188 pounds weight of sugar in their brewery; but almost all seem now convinced, not only that it is not economical, but that it makes an inferior beer to malt.

But, though unprofitable to use sugar alone in brewing beers, some brewers have found it highly advantageous to use it as an auxiliary to the malt. The proportion of sugar which it has been found profitable thus to employ varies from a sixth to a fourth of the estimated quantity of saccharine extract of malt in the wort; and the sugar is added to the wort either when it is boiling in the copper, or when it is passed into the fermenting vat. In the latter case it must be previously dissolved in water, so as to reduce it to the state of a syrup. It has also been recommended to add sugar in the form of a syrup to export beers, especially to those which have become thin in body from the fermentation having been carried too far, as is sometimes the case in spite of all efforts to prevent it when the quick English plan of fermentation is adopted. The addition of a small quantity of strong syrup, highly hopped, is said to improve such beer, not only restoring to it that fulness of body which it had lost, but enabling it to stand exportation much better than it would otherwise do.

Before concluding this article, we must notice a simple mode of analysis for beers, by means of which three useful facts may be arrived at, viz., the original gravity of the wort, the degree of attenuation of the saccharine matter, and the proportion of proof spirit in the beer. The instruments required for this purpose are; 1st, A saccharometer or hydrometer. 2d, A glass sample tube large enough to hold 4 ounces of fluid, and deep enough to allow the hydrometer to be used. 3d, A four-ounce glass bottle furnished with a glass stopper, having a hole drilled through its centre. 4th, A thin glass flask of twice the capacity of the measure bottle; or a retort with its condenser.

The mode of analysis now to be described, appears to have been first suggested in this country by Mr Stevenson of Edinburgh, to have been further investigated by Messrs Dobson and Phillips of the Inland Revenue Department; and, lastly, by a commission appointed by the Board of Inland Revenue, consisting of Professors Graham, Hofmann, and Redwood. The object of these investigations was to enable the excise to estimate more correctly the original gravity of the wort of export ales, for the sake of paying the drawback which is allowed on beers of a certain strength. By the act of 10th Victoria, cap. 5, a drawback is granted of "five shillings per barrel of 36 gallons upon beer exported, of which the worts used before fermentation are of not less specific gravity than 1054, and not greater than 1081; and a drawback of seven shillings and sixpence upon beer exported, of which the worts used before fermentation are of not less specific gravity than 1081." There are two modes of making this analysis, the first that suggested by Mr Stevenson, the second that improved upon by the above professors and adopted by the excise. The first may be styled the "evaporation process," the second the "distillation process."

1. The Evaporation Process.—The beer to be examined is to be poured into the sample tube, and allowed to stand till all the carbonic acid gas has escaped. It is then brought to the temperature of 60°, and its specific gravity is taken

Brewing. by means of the saccharometer and marked down. Let us suppose we find it 1024. The four-ounce measure bottle is then filled with the beer, and the stopper inserted; the surplus beer escapes through the drilled hole, leaving the bottle quite full. This measured quantity of beer is then poured into the glass flask, the bottle carefully washed out with water, and the rinsings added to the flask. The flask is then placed over an argand or gas burner, and boiled till rather more than half of the beer is evaporated. The heat drives off all the alcohol. The inspissated beer or extract is then poured back into the measure bottle, the flask washed out with pure water and the washings also added to the bottle, and the bottle then filled up to its original measure with pure water. The specific gravity of this mixed fluid is then taken in the test tube, and as water has now taken the place of spirit, its gravity is found to have increased to 1036, or n increase of gravity of 12 degrees. These 12 degrees are styled the "spirit indication," from indicating the percentage of proof spirit in the beer. This then gives an answer to one of our queries, viz., the proportion of proof spirit in the beer.

We wish, however, to find out the original gravity of the wort. To get at this we must refer to the excise tables of spirit indications. By these we learn that the 12 degrees, the "spirit indication" of this beer, requires a wort of the specific gravity of 543 to produce it. To get the original gravity of the wort, however, we must add the ascertained gravity of the extract, ascertained as above to be 36, which added to the 54.3 gives 1090.3 as the original specific gravity of the wort before the beer was manufactured.

The researches of Professors Graham, Hofmann, and Redwood, show that this mode under-estimates the proportion of spirit in the beer, and, of course, the strength of the wort. They therefore recommend, and the excise have adopted,-

2. The Distillation Process. The accurately measured Brewing. four ounces of beer are poured into the retort, along with the rinsings of the measure bottle; the condenser is fitted on, and the measure bottle used as the receiver. Rather more than half the quantity of the beer is distilled over, by which time the whole alcohol is expelled and is collected in the measure bottle. Water is then added to the spirit in the measure bottle till the bottle is exactly full, when the specific gravity of the mixture is taken. Let us suppose we take the same beer as in the former process. The specific gravity of the mixed spirit and water is 987.5 or 12.5 degrees less than the specific gravity of water, which is 1000. This number 12.5 then is the "spirit indication of the beer." By a reference to the new excise table of spirit indications, we find that 12.5 degrees of spirit indicates a wort of the gravity of 56.9. To this we must add the gravity of the extract filled up with water, and measured as before, viz., 36, which gives 1092 9 as the original gravity of the wort from which the beer was fermented. By comparing these two results, the difference in the indications will be seen; and none can doubt that the distillation process is the most accurate: thus,

	y Distillation.	By Evaporation.
Spirit indication Extract gravity	56·9 . 36	54·3 36
Original gravity of wort	92.9	90.3

We subjoin the table constructed by Professors Graham, Hofmann, and Redwood, by which in future the Inland Revenue will be guided in giving back the drawback on all export beers; the numbers in the body of the table indicate the strength of wort corresponding to the spirit indications marked on the margin.

Degrees of Spirit Indication.	•0	•1	•2	•3	•4	•5	•6	•7	-8	.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	0· 3·0 6·6 10·7·1 19·5 24·1 28·8 33·7 39·1 44·2 49·0 54·3 59·4 64·8 70·5	0·3 3·3 7·0 11·1 15·5 19·9 24·6 29·2 34·3 39·7 44·7 49·6 54·9 60·0 65·4	0·6 3·7 7·4 11·5 16·0 20·4 25·0 29·7 34·8 40·2 45·1 50·1 55·4 60·5 65·9	0·9 4·1 7·8 12·0 16·4 20·9 25·5 30·2 35·4 40·7 45·6 55·9 61·1 66·5	1·2 4·4 8·2 12·4 16·8 21·3 26·0 30·7 35·9 41·2 46·0 51·2 56·4 61·6 67·1	1·5 4·8 8·6 12·9 17·3 21·8 26·4 31·2 36·5 41·7 46·5 51·7 56·9 62·2 67·6	1·8 5·1 9·0 13·3 17·7 22·2 26·9 31·7 37·0 42·2 47·0 52·2 57·4 62·7 68·2	2·1 5·5 9·4 13·8 18·2 22·7 27·4 32·2 37·5 42·7 47·5 52·7 57·9 63·3 68·7	2·4 5·9 9·8 14·2 18·6 23·1 27·8 32·7 38·0 43·2 48·0 53·3 55·4 63·8 69·3	2·7 6·2 10·2 14·7 19·1 23·6 28·3 33·2 38·6 43·7 48·5 53·8 58·9 64·3 69·9

J. S-

## EXPLANATION OF THE PLATES.

Figs. 1 and 2, Plate CXLI., explain the arrangement to be on each side of it, cannot be seen in this view. Imof the utensils and machinery in a porter brewery on the largest scale; in which, however, it must be observed that the elevation, fig. 1, is in a great degree imaginary as to the plane upon which it is taken; but the different vessels are arranged so as to explain their uses most readily, and at the same time to preserve, as nearly as possible, the relative positions which are usually assigned to each in works of this nature.

granaries or malt-lofts, usually situated in the upper part of the buildings. Of these, we have only been able to represent one at A, fig. 1; the others, which are supposed over the mashing-tun D. The malt is reserved in the bina

mediately beneath the granary A is the mill, in the upper floor of which are two pair of rollers for bruising or crushing the grains of the malt. (An enlarged representation of the rollers is given at figs. 3 and 4.) In the floor beneath the rollers are the mill-stones b b, where the malt is sometimes ground, instead of the simple bruising which it receives by passing between the rollers.

The malt, when prepared, is conveyed by a trough into

The malt for the service of the brewery is stored in vast a chest d, from which it can be elevated by the action of a spiral screw e (see also figs. 5 and 6) into the large chest or binn B, for ground malt, situated immediately

Brewing. till wanted, and it is then let down into the mashing-tun, with different pipes and cocks of communication, to serve Brewing.

the copper G.

The water for the service of the brewery is obtained from the well E, by a lifting pump worked by the steamengine; and the forcing-pipe f of this pump conveys the water up to the large reservoir or water-back F, placed at the top of the engine-house. From this cistern iron pipes are laid to the copper G, and also every part of the establishment where cold water can be wanted for cleaning and washing the vessels. The copper G can be filled with cold water by only turning a cock; and the water, when boiled therein, is conveyed by the pipe g into the mashing-tun D. It is introduced beneath a false bottom, upon which the malt lies, and, rising up through the holes in the false bottom, it extracts the saccharine matter from the malt; a greater or less time being allowed for the infusion, according to circumstances. The instant the wainto it, in order to be boiled ready for the second mashing; because the copper must not be left empty for a moonce as much liquor as will fill the bottom of the copper, a pan or second boiler is placed over the top of the copper, as seen in fig. 3, Plate CXLII.; and the steam rising from the copper communicates a considerable degree of heat to the contents of the pan, without any expense of fuel. This will be more minutely explained hereafter.

During the process of mashing, the malt is agitated in the mash-tun, to expose every part to the action of the water. This is done by a machine contained within the mash-tun, and put in motion by the horizontal shaft H, leading from the mill. The mashing-machine is shown in fig. 1, Plate CXLII. When the mashing is finished, the wort or extract is drained down from the malt, into a vessel I, of similar dimensions to the mash-tun, and situated immediately beneath, from which it is called the underback. Here the wort does not remain longer than is necessary to drain off the whole of it from the tun above. It is then pumped up by the three-barrelled pump k, into the pan at the top of the copper, by a pipe which cannot be

seen in the plate.

the succeeding mashes is discharged from the copper. But this waiting is no loss of time, because the heat of the copper, and the steam arising from it, makes the wort, which had become cooler, ready for boiling. The instant the copper is empty, the wort is let down from the pan into the copper, and the second wort is pumped up from the underback into the copper pan. The proper proportion of hops is thrown into the copper through the near hole, and then the door is shut down, and screwed fast, to keep in the steam, and cause it to rise up through pipes into the pan; and by bubbling up through the wort in the pan, it communicates so much heat that it is soon ready for boiling in its turn; for it is to be observed, that the different worts follow each other through all the different vessels with the greatest regularity, so that there is no loss of time, but every part of the apparatus is constantly employed. When the boiling of the wort has continued fig. 2, and has a cock in it, near r, to stop the passage. a sufficient time to coagulate the grosser part of the extract and to evaporate part of the water, the contents of enters a large pipe x x, which has the former pipe r withinthe copper are run off through a large cock into the jackback K, which is a vessel of sufficient dimensions to contain it, and provided with a bottom of cast-iron plates, perforated with small holes, through which the wort drains and leaves the hops. The hot wort is drawn off from the jack-back through the pipe h by the three-barrelled pump,

where the extract is obtained by hot water supplied from all the purposes of the brewery except that of raising the cold water from the well. The coolers L are very shallow vessels, built over one another in several stages; and that part of the building in which they are contained is built with open lattice-work on all sides, to admit the free current of air. When the wort is sufficiently cooled to be put to the first fermentation, it is conducted in pipes from all the different coolers to the large fermenting vessel or gyle-tun M, which, with another similar vessel behind it, is of sufficient capacity to contain all the beer of one day's brewing.

When the first fermentation is concluded, the beer is drawn off from the great fermenting vessel M into the small fermenting casks or cleansing vessels N, of which there are a great number in the brewery. They are placed four together, and to each four a common spout is provided to carry off the yeast, and conduct it into the troughs u placed beneath. In these cleansing vessels the beer reter is drawn off from the copper, fresh water must be let mains till the fermentation is completed, and it is then put into the store-vats, which are casks or tuns of an immense size, where it is kept till wanted, and is then drawn ment, otherwise the intense heat of the fire would melt off into barrels and sent away from the brewery. The the bottom. For the convenience of thus letting down at store-vats are not represented in the plate, but are of a conical figure, and of different dimensions, from fifteen to forty feet diameter, and usually twenty feet in depth. The steam-engine which puts all the machinery in motion is explained by the figure. On the axis of the large flywheel is a bevelled cog-wheel, which turns another similar wheel upon the end of a horizontal shaft, which extends from the engine-house to the great horse-wheel, which it turns by means of a cog-wheel. The horse-wheel puts in motion all the pinions for the mill-stones bb, and also the horizontal axis which works the three-barrelled pump k. The rollers aa are turned by a bevelled wheel upon the upper end of the axis of the horse-wheel, which is continued for that purpose; and the horizontal shaft H, for the mashing engine, is driven by a pair of bevelled wheels. There is likewise a sack-tackle, which is not represented. It is a machine for drawing up the sacks of malt from the court-yard to the highest part of the building, whence the sacks are wheeled on a truck to the maltloft A, and the contents of the sacks are thrown in.

The horse-wheel is intended to put in horses occasion-The wort remains in the copper pan until the water for ally if the steam-engine should fail; but these engines are now brought to such perfection that it is very seldom any

accidents occur with them.

Fig. 2, Plate CXLI., is a representation of the fermenting-house at the brewery of Messrs Whitbread and Company, Chiswell Street, London, which is by far the most complete in its arrangement of any work of the kind, and was erected after the plan of Mr Richardson, who conducts the brewing at those works. The whole of fig. 2 is to be considered as devoted to the same object as the large vessel M and the casks N, fig. 1. In fig. 2, r is the pipe which leads from the different coolers to convey the wort to the great fermenting vessels or squares M, of which there are two, one behind the other; ff represents a part of the great pipe which conveys all the water from the well E, fig. 1, up to the water cistern F. This pipe is conducted purposely up the wall of the fermenting-house, Just beneath this passage a branch-pipe p proceeds and side of it. From the end of the pipe x, nearest to the squares M, another branch n n proceeds, and returns to the original pipe f, with a cock to regulate it. The object of this arrangement is to make all, or any part of, the cold water flow through the pipe x x, so as to surround the wort-pipe r, which is only made of thin copper, and lower which throws it up to the coolers L, this pump being made the temperature of the wort passing through the pipe r,

Brewing. until, by the thermometer, it is found to have the exact lever, which bears upon the teeth of one of these cog- Brewing. temperature which is desirable before it is put to ferment wheels, and is thereby lifted up every time a cog passes. p, the quantity of cold water which shall pass in contact passes across the wood frame, and in the middle of it has with the surface of the pipe r can be regulated at pleasure, so as to have a command of the heat of the wort when it enters into the square.

ed, the beer is drawn off from them by pipes marked v, and conducted by its branches w to the different rows of fermenting-tuns marked NN, which fill all the building. Between every two rows are placed large troughs to contain the yeast which they throw off. The plate shows that the small tuns are all placed on a lower level than the bottom of the great vessels M, so that the beer will flow into them, and, by standing in them all, will fill them to the same level. When they are filled, the communication-cock is shut; but as the working off of the yeast diminishes the quantity of beer in each vessel, it is necessary to fill them up again. For this purpose the two large vats OO are filled from the great vessels M before any beer is drawn off into the small casks N, and this quantity of beer is reserved at the higher level for filling up. The two vessels OO are in reality placed between the two squares M, but we have been obliged to place them so that they can be seen. Near each filling-up tun o is a cistern t, with a pipe of communication from the tun O, and this pipe is closed by a float-valve. The small cisterns t have always a communication with the pipes which lead to the small fermenting vessels N, and therefore the surface of the beer in all the tuns and in the cisterns will always be at the same level; and as this level subsides by the working off of the yeast from the tuns, the float sinks and opens the valve, so as to admit a sufficiency of beer from the filling-up tuns o to restore the surfaces of the beer in all the tuns, and also in the cistern t, to the original level. In order to carry off the yeast which is produced by the fermentation of the beer in the tuns OO, an iron dish or vessel is made to float upon the surface of the beer which they contain; and from the centre of this dish a pipe o descends and passes through the bottom of the tun, being filled through a collar of leather so as to be tight, at the same time that it is at liberty to slide down as the surface of the beer descends in the tun. The yeast flows over the edge of this dish, and is conveyed down the pipe to a trough beneath.

Beneath the fermenting house are large arched vaults P, built with stone, and lined with stucco. Into these the beer is let down when sufficiently fermented, and is kept till wanted. These vaults are used at Mr Whitbread's brewery instead of the great store-vats of which we have before spoken, and are in some respects preferable, because they preserve a great equality of temperature, being beneath the surface of the earth.

Figs. 3, 4, and 7, Plate CXLL, represent the malt-rollers, or machine for bruising the grains of malt. A is the hopper into which the malt is let down from the malt-loft above, and from this the malt is let out gradually through a sluice or sliding-shuttle a, and falls between the rollers BD. These rollers are made of iron, truly cylindrical, and their pivots are received in pieces of brass let into iron frames, which are bolted down to the wooden frame of the machine. A screw E is lapped through the end of each of these iron frames; and by these screws the brasses can be forced forwards, and the rollers made to work closer to each other, so as to bruise the malt in a greater degree. G is the shaft by which one of the rollers is turned, and the other receives its motion by means of a pair of equal cog-wheels H, which are fixed upon the ends of the pivots, at the opposite ends of each of the rollers: d is a small

in the great square M. By means of the cocks at n and This lever is fixed on the extremity of an axis, which a lever c, (3 & 7), bearing up a trough b, which hangs under the opening of the hopper A. By this means the trough b is constantly jogged, and shakes down the malt regular-When the first fermentation in the squares M is finish- ly from the hopper A, and lets it fall between the rollers: e is a scraper of iron plate, which is always made to bear against the surface of the roller by a weight, to remove the grains which adhere to the roller.

Fig. 5 is the screw by which the ground or bruised malt is raised up, or conveyed from one part of the brewery to another. K is an inclined bar or trough, in the centre of which the axis of the screw H is placed; and the spiral iron plate or worm, which is fixed projecting from the axis, and which forms the screw, is made very nearly to fill the inside of the box. By this means, when the screw is turned round by the wheels EF, or by any other means, it raises up the malt from the box d, and delivers it at the spout G. Fig. 6 represents a section of the screw.

The screw is equally applicable for conveying the malt horizontally in the trough k as inclined; and similar machines are employed in various parts of breweries for conveying the malt wherever the situation of the works re-

Fig. 1, Plate CXLII., is the mashing-machine. WW is the tun, made of wood staves, hooped together. In the centre of it rises a perpendicular shaft NN, which is turn ed slowly round by means of the bevelled wheels KI at the top. RR are two arms projecting from the axis, and supporting the short vertical axis S at the extremities, so that, when the central axis is turned round, it will carry the axle S round the tun in a circle. The axis S is furnished with a number of arms T, which are shown in fig. 2, and have blades placed obliquely to the plane of their motion. When the axis is turned round, these arms agitate the malt in the tun, and give it a constant tendency to rise upwards from the bottom.

The motion of the axis S is produced by a wheel Q on the upper end of it, which is turned by a wheel P fastened on the lower end of the tube O, which turns freely round upon the central axis N. On the upper end of the same tube O is a bevelled wheel M, receiving motion from a wheel L, which is fixed upon the end of the horizontal axis F, which gives motion to the whole machine. This same axis has a pinion G upon it, which gives motion to the wheel H, fixed upon the end of a horizontal axle, which at the opposite end has a bevelled pinion I working the wheel K, before mentioned. By this means the rotation of the central axis N will be very slow compared with the motion of the axis S, for the latter will make seventeen or eighteen revolutions on its own axis in the same space of time that it will be carried once round the tun by the motion of the axis N. At the beginning of the operation of mashing, the machine is made to move with a slow motion; but, after having wetted all the malt by one revolution, it is made to revolve quicker. For this purpose the ascending shaft A, which gives motion to the machine, has two bevelled wheels BC fixed upon a tube X, which is fitted upon the shaft. These wheels actuate the wheels D and E upon the end of the horizontal shaft F; but the distance between the two wheels B and C is such, that they cannot be engaged both at once with the wheels D and E; but the tube X, to which they are fixed, is capable of sliding up and down on the axis A sufficiently to bring either wheel B or C into action with its corresponding wheel E or D upon the horizontal shaft; and as the diameters of BE and CD are of very different proportions, the velocity of the motion of the machine can

Brewing be varied at pleasure by using one or other: b and c are and at the same time, by closing the dampers from the Brewing. two levers, which are forked at the ends, and embrace collars at the ends of the tube X; and the levers being united by a rod, the handle b gives the means of moving the tube X and its wheels BC up or down to obtain the

action of the different wheels.

Figs. 3 and 4 represent a large close copper. AA is the copper, and B the pan placed over it. The copper has a large tube E rising up from the dome of it, to convey the steam; and from the top of this four inclined pipes R descend, the ends being immersed beneath the surface of the water or wort contained in the pan. By this means the steam which rises from the copper issues from the ends of the pipes R, and rises in bubbles through the liquor in the pan, so as to heat it. In the centre of the copper is a perpendicular spindle  $\alpha$ , which, at the lower end, has arms dd fixed projecting from it, and is turned round by a cog-wheel b at the upper end. From the arms dd chains are hung in loops, which drag round upon the bottom of the copper when the axis is turned; and this motion stirs up the hops to keep them from burning at the bottom: fg is a chain and roller to draw up the spindle a when the rowser is not wanted; and ee are iron braces proceeding from the outside of the copper, to retain the axis a firmly in the centre of the copper. D is the waste-pipe for carrying off the steam into the chimney when it is not required to heat the liquor in the pan. The copper represented in the drawing is made in the same manner as usual; but the fire is applied beneath it in a manner very different from the common brewing-coppers. The method was devised with a view to the burning or consuming of the smoke, and was employed in the brewery of Messrs Meux and Company, London, about the year 1803.

The fire-place is divided into two by a wall extended beneath the bottom of the boiler, as shown by Z in the plan, fig. 4, where the dotted circle A represents the bottom of the copper, and the circle X its largest part. The section in fig. 3 shows only one of these fire-places, of which C is the fire-grate. The raw coal is not thrown in through the fire-door in the manner of common furnaces, but is put into a narrow inclined box of cast-iron h, built in the brick-work, and shaped like a hopper. The coals contained in this hopper fill it up, and stop the entrance of the air so as to answer the purpose of a door; and the coals at the lowest part or mouth of the hopper are brought into a state of ignition before they are forced forwards into the furnace, which is done by introducing a rake or poker at i, just beneath the lower end of the hopper h, and forcing the coals forwards upon the grate bars C. Immediately over the hopper h, a narrow passage is left to admit a stream of fresh air along the top of the hopper to pass over the surface of the fuel which is burning at the lower end of the hopper h. By this means the smoke rising from that portion of fuel is carried forwards over the burning coals upon the grate C, and is thereby consumed. Beyond the grate bars c, a breast wall S is erected, to direct the flame upwards against the bottom of the boiler A, and thence descending under the bottom, the flame is received into the flues, which make each a half turn round the lower part of the copper, as shown in the plan at tt, and then enter the chimney or perpendicular flue W at the same point; the entrance being regulated by a damper to make the draught more or less intense. There is also a sliding door or damper E, which closes up the lower part of the chimney; and by means of these two dampers the fire under the copper can be regulated to the greatest precision; for by opening the damper E it admits the cold air to enter immediately into the chim-

flues into the chimney, the intensity of the draught through the fire is checked, which is very necessary to be done when the contents of the copper are drawn off. Immediately over the fire-grate c, an arch of fire-bricks or stone s is placed beneath the bottom of the copper, to defend it from the intense heat. The chimney is supported on iron columns RR. Behind the fire-grate c is a cavity r, for the reception of the masses of scoriæ which are always formed in so large a fire. They are pushed back off the grate into this receptacle with an iron hook as fast as they accumulate. The bottom of this receptacle is formed of sliding iron doors, which can be opened by drawing them out, and in this way the clinkers are discharged; or the whole of the fire may be driven back off the grate into this cavity, and will then fall through into the ash-pit and be carried away therefrom, which is very necessary to be done when the copper is to be cooled, so that men may descend into it to clean out the sediment which is left after boiling the wort. For a more particular description of this method of setting boilers, see Philosophical Magazine, vol. xvii.

Fig. 6 represents one of the sluice-cocks which are used to make the communications of the pipes with the pumps or other parts of the brewery. BB represents the pipe in which the cock is placed. The two parts of this pipe are screwed to the sides of a box CC, in which a slider A rises and falls, and intercepts at pleasure the passage of the pipe. The slider is moved by the rod a, which passes through a stuffing-box in the top, the box which contains the slider, and has the rack b fastened to it. The rack is moved by a pinion fixed upon the axis of a handle e, and the rack and pinion is contained in a frame d, which is supported by two pillars. The frame contains a small roller behind the rack, which bears it up towards the pinion, and keeps its teeth up to the teeth of the pinion. The slider A is made to fit accurately against the internal surface of the box C, and it is made to bear against this surface by the pressure of a spring, so as to make a

perfectly close fitting.

Fig. 5 is a small cock to be placed in the side of the great store-vats, for the purpose of drawing off a small quantity of beer, to taste and try its quality. A is a part of the stave or thickness of the great store-vat; into this the tube B of the cock is fitted, and is held tight in its place by a nut aa screwed on withinside. At the other end of the tube B a plug c is fitted, by grinding it into a cone, and it is kept in by a screw. This plug has a hole up the centre of it, and from this a hole proceeds sideways and corresponds with a hole made through the side of the tube when the cock is open; but when the plug c is turned round, the hole will not coincide, and then the cock will be shut. D is the handle or key of the cock, by which its plug is turned to open or shut it; this handle is put up the bore of the tube (the cover E being first unscrewed and removed), and the end of it is adapted to fit the end of the plug of the cock. The handle has a tube or passage bored up it to convey the beer away from the cock when it is opened, and from this the passage f, through the handle, leads to draw the beer into a glass or tumbler. The hole in the side of the plug is so arranged, that when the handle is turned into a perpendicular direction with the passage f downwards, the cock will be open. The intention of this contrivance is, that there shall be no considerable projection beyond the surface of the tun; because it sometimes happens that a great hoop of the tun breaks, and, falling down, its great weight would strike out any cock which had a projection; and if this happened in the night much beer might be lost ney W, and thus take off the rapidity of the draught; before it was discovered. The cock above described being

Bribery.

Briançon almost wholly withinside, and having scarcely any projection beyond the outside surface of the tun, is secure from

> Fig. 7 is a small contrivance of a vent peg, to be screwed into the head of a common cask when the beer is to be drawn off from it, and it is necessary to admit some air to allow the beer to flow. AA represents a portion of the head of the cask into which the tube B is screwed. The

top of this tube is surrounded by a small cup, from which Bribery. project the two small handles CC, by which the peg is turned round to screw it into the cask. The cup round the upper part of the tube is filled with water, and into this a small cup D is inverted; in consequence, the air can gain admission into the cask when the pressure within is so far diminished that the air will bubble up through the water, and enter beneath the small cup D.

BRIANÇON, a strongly fortified town of France, in the department of Upper Alps, capital of an arrondissement of the same name on the right bank of the Durance, 50 miles E.S.E. of Grenoble. It is the highest town of France, being nearly 4300 feet above the level of the sea, and is surrounded by still loftier elevations crowned by forts communicating with each other and with the town, and making it all but impregnable. Pop. (1851) of town, 3433; of arrondissement, 30,982.

BRIAREUS, in Grecian Mythology, a giant, the son of Æther, Titan, or Cœlus, and Terra. This was the name he received in heaven; but that by which he was known on earth was Ægeon. He was of singular service to Jupiter, when Juno, Pallas, Neptune, and the rest of the gods, endeavoured to dethrone him; but he afterwards conspired with the rest of his gigantic brethren to dethrone the father of the gods. Virgil describes Briareus as having a hundred arms and fifty heads, and breathing out fire. The fable says that as a punishment he was thrust by Jupiter under Ætna, and that whenever he moves the mountain belches forth

BRIBE, a reward given to pervert the judgment. word is French, bribe, which originally denotes a bit, fragment, or morsel of meat taken off the table; so that bribe imports as much as panis mendicatus, and still keeps up the idea of the matter of which bribes anciently consisted. Hence also the Spaniards use bribar and brivar for begging; and brivia, brivoneria, and brivonismo, for beggary. the writers of the middle ages, a bribe given to a judge is called quato litis, and the receiver campi particeps, or cambi particeps; because the spoils of the field, or the profits of the cause, were thus shared with the giver.

BRIBERY, as a public offence, may be defined as the administration of a bribe or reward, that it may be a motive in the performance of functions for which the proper motive ought to be a conscientious sense of duty. When this is superseded by the sordid impulses created by the bribe, a person is said to be corrupted, and thus corruption is a term sometimes held equivalent to bribery. The offence may be divided into two great classes, the one characteristic of despotisms, where a person invested with power is induced by payment unjustly to use it; the other, which is an unfortunate characteristic of constitutional governments, where power is obtained by purchasing the suffrages of those who can impart it. The former offence is in every sense the more odious and formidable, and indeed it may be said, that until a country has outgrown it, there is no room for the existence of elective bribery, since the nations among which justice is habitually sold appear to be far below the capacity of possessing constitutional rights.

When Samuel in his old age challenges a rigid scrutiny of his conduct, he says, "Whose ox have I taken, or whose ass have I taken? or whom have I defrauded? whom have I oppressed? or of whose hands have I received any bribe to blind mine eyes therewith?" And Amos, when denouncing the condition of the Israelites under Jeroboam, says, "they afflict the just, they take a bribe, and they turn aside the poor in the gate from their right." It is a natural propensity, removable only by civilization or some power-

ful counteracting influence, to feel that every element of power is to be employed as much as possible for the owner's own behoof, and that its benefits should be conferred not on those who best deserve them, but on those who will pay most for them. Hence, judicial corruption is an inveterate vice of imperfect civilization. It is so deeply seated among oriental races, that the attempts by controlling authority to eradicate it have been often futile. It has been the main impediment to the employment of natives in the British Eastern empire, since no external appearance of respectability, or apparent systematic routine of business, can be relied on as securities that the whole organization is not contaminated by systematic bribery. It is difficult to get the oriental mind to understand how it is reasonable to expect the temptation of a bribe to be resisted. In the Russian empire this oriental characteristic has had another conflict with the demands of a higher civilization. The organization of the government requires that the empire should be honestly served by its official men, but their morality is of the humblest oriental standard, and force will not change it. In no country, perhaps, has the offence been visited with more dire chastisement where it has been discovered, yet by the concurring testimony of all who are acquainted with Russian society, not only the official departments, but the courts of law, are still influenced by systematic bribery. There is, perhaps, no other crime on which the force of law, if unaided by public opinion and morals, can have so little influence; for in other crimes, such as violence or fraud, there is generally some person immediately injured by the act, who can give his aid in the detection of the offender; but in the perpetration of the offence of bribery, all the immediate parties obtain what they desire and are satisfied.

The purification of the bench from judicial bribery has been gradual in most of the European countries. In France it received an impulse in the sixteenth century from the high-minded chancellor L'Hôpital. In England, judicial corruption acquired a painful, but perhaps a wholesome renown, from the fate of the illustrious Bacon. If it were admitted, that although he received customary gifts, they never influenced his decisions, yet a comparison of even this modified culpability with the conduct of his predecessor Ellesmere, whose hands were clean from all contact with unofficial sources of emolument, led undoubtedly to the establishment of a higher morality of the bench. In Scotland for some years after the Revolution, the bench was not without a suspicion of interested partiality; but during the past half century at least, there has been in all parts of the empire a perfect reliance on its purity.

The same may be said of the higher class of ministerial officers. There is no doubt that in the period from the Revolution to the end of Queen Anne's reign, when a speaker of the House of Commons was expelled for bribery, and the great Marlborough could not clear his character from pecuniary dishonesty, there was much corruption in the highest official quarters. The level of the offence of official bribery has gradually descended, until it has become an extremely rare thing for the humbler officers connected with the revenue to be charged with it. It has had a more

Bribery. lingering existence with those who, because their power is more of a constitutional than an official character, have been deemed less responsible to the public. During Walpole's administration, there is no doubt that members of parliament were paid in cash for votes; and the memorable saving, that every man has his price, has been preserved as a characteristic indication of his method of government. At the present day there is a lurking suspicion that the promoters of railways and other public objects have accomplished their aims by communicating pecuniary advantages to members of the legislature.

One of the forms in which administrative corruption is most difficult of eradication, is the appointment to office. It is sometimes maintained that the purity which characterizes the administration of justice is here unattainable, because in giving a judgment there is but one form in which it can be justly given, but when an office has to be filled many people may be equally fitted for it, and personal motives must influence a choice. It very rarely happens, however, that direct bribery is supposed to influence such appointments. Perhaps those which lie most open to suspicion are the lucrative offices with easy duties at the disposal

of the East India Company.

In its other great form of electoral bribery, the offence still flourishes, and it is at present the object of the anxious attention of British statesmen. To be a legislator in a free country seems so worthy an object of ambition, and the distribution of a small portion of superfluous wealth among needy voters seems so unselfish a method of securing the distinction, that it is difficult to obtain for the pernicious practice that social condemnation which is necessary to give laws for its extinction a fair field. This offence was a characteristic of Rome in her best days, as it has been of England in the eighteenth and nineteenth centuries. The common word ambition is derived from the ambitus, or going about of the briber distributing money among voters. Severe laws were directed against this practice, as well as against the seeker of office, to attract the attention of those ready to dispose of their votes, making himself conspicuous by being clothed in white, or candidatus—the word whence the common term candidate is derived.

It does not appear that bribery was conspicuous in England, until in the early part of the eighteenth century constituencies had thrown off the feudal dependence which lingered among them; and, indeed, it is often said, that bribery is essentially the defect of a free people, since it is the sale of that which is taken from others without payment. It is alluded to by Fielding and Smollett, and had become conspicuous in the days of Hogarth, who represents it in its double shape of demoralization; one picture shows a reckless expenditure of money among profligate expectants, whose demoralization is a systematic source of profit to them; while another presents us with the impoverished father of a family urged against his conscience to relieve the misery of his wife and children by the sale of his vote.

The exceptional classes of humble voters preserved by the reform act in the shape of freemen, or others holding the franchise not by qualification but by privilege, have ever been the most amenable to bribery. It is worthy of remark, that the scandal does not extend to Scotland, probably because the popular element was not let in to the Scottish constituencies until after a considerable amount of public feeling had been concentrated against the practice. It has been comparatively little known in France, and its absence has been attributed, perhaps uncharitably, not so much to the virtue of the humbler ranks as to the unwillingness of the higher classes to make the pecuniary sacrifices readily submitted to in England for political objects. It is certain that towards the conclusion of the reign of Louis-Philippe, this electoral purity was contemporary with much official corruption.

In this country there has been much elaborate legislation for the suppression of bribery. It has ever had to contend with the unwillingness of the House of Commons to commit electoral questions to the legal tribunals, and has thus been subject to the cumbrous forms and the influence of party spirit inseparable from the gregarious operations of the house. The Grenville Act, and those which followed up its design of infusing impartiality and responsibility with the elements of election committees, have of course had their influence; and in 1851 an act was passed for appointing special commissioners to inquire into accusations of bribery on the spot (15th and 16th Vict., c. 57).

It would be useless on the present occasion to offer an account of the laws against bribery, as the whole question is under discussion in parliament while this notice passes through the press. The importance of obtaining some really effective remedy was forcibly exemplified by the statement of an eminent lawyer, Sir Fitzroy Kelly, who, in the House of Commons, on February 10. 1854, said "He agreed that it was quite useless to add to the penalties by which the commission of bribery was now followed, either with respect to the voter or the candidate. They had seen that imprisonment, unlimited except by the discretion or mercy of the judge, heavy pecuniary penalties, disfranchisement, disqualification to hold office, to vote, or to sit in parliament, and even the punishment of transportation where perjury had accompanied bribery, had been all inadequate to repress the offence; for they had found that the bribery and every species of corruption which prevailed at the last general election equalled, if they did not exceed, that which had ever been known at any former period of our history." It is certain, however, that both public and parliamentary morality have been of late setting strongly against the practice, and it may be useful to preserve a record of so lamentable a statement, that it may serve as that point of highest elevation from which it is to be hoped that the tide of political immorality will henceforth be found to recede. (J. H. B.)

BRICIANI, a military order instituted by St Bridget of Sweden, who gave them the rules and constitutions of the orders of Malta and St Augustin.

BRICK, a kind of artificial stone made of baked clay.

1. The art of making bricks appears to have been prac-History. tised in the earliest ages. Burnt bricks were employed in the construction of Babel. Now, as that structure appears to have been raised about four hundred years after the Flood, this method of making bricks would seem to have existed from the very origin of society. Bricks were in common use in Egypt while the Israelites were in subjection to that nation; for the task assigned them was the making of brick; and we are informed in Exodus that the Israelites built two Egyptian cities. No particulars are given in Scripture of the method of making bricks; but as straw was one of the ingredients, it is probable that their bricks were not burnt, but merely baked by the heat of the sun. The kiln-burnt Babylonian bricks are imperfectly baked, and contain charred fragments of straw. The sun-dried bricks from the ruins of that city sometimes have inscriptions in the ancient arrow-headed character. These bricks are of a brown colour, contain fragments of straw, and are often larger than the burnt bricks. Some have been seen 14 inches square, and others even of 19 inches.

The art of brick-making was carried to considerable perfection by the Greeks. Pliny informs us that they made use of bricks of three different sizes, distinguished by the following names; didoron, or six inches long; tetradoron, or twelve inches long; and *pentadoron*, or fifteen inches long (lib. xxxv. c. 14). That the Romans excelled in the art of making bricks we have the amplest evidence, since brick structures raised at Rome 1700 years ago still remain as entire as when first built. Brick-making has been carried to great perfection by the Dutch, who have long been in the

Briciani Brick.

Brick.

Brick. habit of forming their floors, and even in some cases of paving their streets with bricks. And it is remarkable how long their bricks will continue uninjured in such situations. Though brick-making has long been carried on in England, and especially in the neighbourhood of London, upon a very great scale, and though the process upon the whole is conducted in this country with very considerable skill, yet it must be acknowledged that English bricks are by no means so durable as Dutch bricks. We are disposed to ascribe this inferiority not so much to the nature of the materials employed in the manufacture of English bricks, as to the mode most frequently employed in London in building houses. Few of the London houses, comparatively speaking, are freeholds. Most of them are built upon ground let for a lease of a certain number of years, which seldom exceeds ninety-nine years. After the expiration of this period, the house becomes the property of the landlord who let the ground. Thus it becomes the interest of the builder to construct the house so that it shall last only as long as the lease. Hence the goodness of the bricks becomes only a secondary object. Their cheapness is the principal point. The object, therefore, of the brickmakers is not to furnish durable bricks, but to make them at as cheap a rate as possible. Accordingly, the saving of manual labour, and of fuel, has been carried by the makers of London bricks to very great lengths. We cannot but consider this mode of proceeding as very objectionable, and as entailing a much heavier expense upon London than would have been incurred had twice the original price been laid out upon the bricks when they were first used, and had the houses been constructed to last a thousand instead of a hundred years. No doubt, certain advantages attend these ephemeral structures. The inhabitants are enabled, once every century, to suit their houses to the prevailing taste of the day; and thus, there are no antiquated houses in London. But as the increase of the price of all the materials of building has more than kept pace with the increase of the wealth of individuals, it is to be questioned whether the houses are always improved when they are pulled down and re-

Nature and kinds of clay.

2. The best material for making brick is what in the English language is called loam, a term usually applied to a natural mixture of sand and clay. Such a mixture may be converted into brick without any addition whatever. Marl likewise answers the purpose of common bricks very well, indeed better than most other mixtures. It is a natural mixture of calcareous earth and clay in variable proportions. Now, the more lime it contains, the better does it answer for a manure; and the less lime it contains, the more suitable it is to the brick-maker.

It would be in vain to attempt a particular detail of the constituents of clay, because they vary too much from each other to admit of any correct generalization. We believe, however, that clays very frequently consist of decomposed felspar, in which case we may conceive them as composed of about three parts of silica in the state of a very fine powder, and one part of alumina. This is the case with porcelain clay. Indeed, the porcelain clay of Cornwall appears incontrovertibly to be nothing else than decayed felspar, or perhaps felspar which never had assumed any other form than that of clay. The rock from which it is taken is an agglutinated mixture of quartz and this clay. The quartz is separated by washing. * Such a rock might probably be converted into most beautiful brick, merely by cutting it out in the proper shape, and subjecting it to the requisite heat; or rather, by kneading the whole into a paste with the requisite quantity of water, moulding it into bricks, and then drying and burning them.

tter's clay is a compound of	
Silica	43.5
Alumina	33.2
Lime	3.5
Oxide of iron	1.0
Water	18-0
	99.2
Loss	8
Total	100-0

When the clay proceeds from the decomposition of hornblende, as is likewise often the case, it contains about three parts and a half of silica, one of alumina, one of lime, and about one and a half of oxide of iron. Sometimes the grains of sand which exist in clay consist of fragments of felspar. In such cases the clay may be fused by heat.

No mixture of alumina and silica, in any proportions whatever, can be fused by the strongest heat which can be raised in our furnaces. Hence such mixtures are best adapted for making fire-bricks, crucibles, and glass-house pots. Stourbridge clay is such a mixture, blackened by coaly matter. It answers these purposes better than any other clay in England. It is a slate clay belonging to the coal formation, and contains interspersed coaly matter. There is a similar bed of clay upon the banks of the Calder, about ten miles east from Glasgow. Mr Buttray used it to make the crucibles in which he fused steel, a process requiring the most intense heat that can be raised in furnaces. Its quality seems fully equal to that of Stourbridge clay. Neither can a mixture of lime and alumina be fused, in whatever proportions the ingredients be mixed. But a mixture of silica, lime, and alumina, is very fusible, and the fusion is most readily effected when we employ two parts of silica to one of lime. The presence of oxide of iron also renders clay fusible, but not unless its proportion be much greater than ever is likely to occur in any clay used for the manufacture of bricks.

For making common bricks, the most durable mixture ought to be common clay and limestone or chalk. Perhaps the best proportions would be three parts of clay, and one part of calcareous earth in powder. When such a mixture is exposed to heat, it would experience an incipient fusion, and would thereby be rendered much harder and denser than common bricks. The consequence would be, that it would imbibe much less water, and would therefore be much less liable to crack and fall to pieces in winter, than common bricks. For when water has insinuated itself into the pores of a common brick, and is converted into ice, it undergoes an expansion which dislocates the parts of the brick and reduces it to fragments. This is often conspicuously the case with tiles, which, from their exposed situation, are more liable to be soaked with water than common bricks. Hence also covering the surface of the brick with a coating of paint has a great tendency to preserve it from cracking and breaking. practice is frequently followed in England.

It would be foreign to the object of this article to enter into any long details respecting the chemical investigations and the opinions entertained at different periods respecting the nature of clay. At first it was supposed to be a peculiar species of earth, but Hellot demonstrated that it consisted at least of two constituents; for sulphuric acid had the property of destroying its plastic nature, and of rendering it scarcely more adhesive than sand. The portion that remained behind did not effervesce with acids. It was not therefore of a calcareous nature. Mr Pott went a step farther; he showed, in the continuation of his

Lithogeognosia, that sulphuric acid formed, with the pos-

Prepara-

of the

brick.

Brick. tion of clay which it dissolved, a salt possessing the pro- cess of kneading the clay, as conducted either in the Brick. Dissertation on Clays, which he had drawn up in consequence of a premium offered by the Academy of Sciences at Bourdeaux, for the best solution of the following question:-What are the principles and constituents of clay, and the natural changes which it experiences, and what are the methods of rendering it fertile? The academy did not consider Baumé's solutions as satisfactory. He published his Memoir, in consequence, as a kind of defiance. He had been employed along with Macquer in making numerous experiments on clay, with a view to the improvement of the porcelain manufacture in France. Guided by these experiments, he drew as a conclusion that clay is a mixture of two different substances: 1. Silica in a state of purity; 2. Silica combined with an under-lose of sulphuric acid. It was the second of these constituents that gave to clay its fattish and plastic nature. Margraaf had long before (in 1756) demonstrated that the ingredient of clay which Baumé took for a salt, and which he affirmed was soluble in water, was a peculiar species of earth, different from every other, which constitutes the basis of alum, which dissolves in sulphuric acid, but which does not form alum unless a portion of potash be added to the solution. Thus, by the labours of Hellot, Pott, Baumé, and Margraaf, the nature of clay was completely developed. It was ascertained to be a mixture of alumina and silica, in variable proportions. It was shown, also, that it sometimes contained sulphuric acid, and not unfrequently potash. Hence the reason why, in some cases, it could be converted into alum by digestion in sulphuric acid, without the necessity of adding any potash to the solution. Modern chemists have added considerably to these facts. They have shown that chalk, felspar, mica, hornblende, oxide of iron, coal, bitumen, &c. are not unfrequently mixed with it; and that these additions alter its qualities considerably, and render it fit or unfit for the different purposes to which clay is usually applied.

3. Clay intended to be made into bricks ought to be tion of the dug out of the earth and exposed to the air and weather for a considerable time before it is employed. The longer this exposure is continued, so much the better will it be fitted for making bricks. This exposure answers a variety of purposes. If the stones, by the decomposition of which the clay has been formed, are not entirely decomposed, this exposure serves to complete the process, by promoting the disintegrating action of the air and rain. The exposure serves likewise to pulverize the clay, which is essential to the making of good bricks. We have little doubt that the same amelioration in the clay would be produced by simply drying it in the open air, and then grinding it to powder in a mill. By such a process the quality of the bricks would be exceedingly improved. Nor do we conceive that such an addition would greatly enhance the expenses of the brickmaker, at least in those districts where the mill could be driven by water.

When the clay has been reduced to powder, the next step is to make it into a stiff paste with water. Too much water should not be employed, because it is injurious to the strength of the bricks; and the utmost care should be taken to mix the whole of the clay as equally as possible than others, it will occasion an inequality in the texture of the bricks formed of it, will render them apt to crack, and will greatly injure both their strength and their beauty. Hence the great importance of working the clay for a considerable length of time before moulding it into bricks. It is in this part of the process that we believe

perties of alum. In the year 1769 Baumé published his neighbourhood of London or Edinburgh, we have always found a great sparing of labour. Hence we believe the reason why so many of the English bricks appear full of cracks, even when sold to the builder. Such bricks ought never to be purchased, as it is perfectly obvious that they cannot make a durable building.

The kneading of the clay is performed in some places by men's feet, in others by the feet of horses, and in others by machinery. The last method is undoubtedly the best; and we conceive likewise that it might be rendered the cheapest. It would be easy to devise machinery for kneading the clay, upon principles similar to those employed in mashing by the London porter brewers. And, if such a machine were driven by water, we conceive that it would not be nearly so expensive as either men or

When the clay is sufficiently kneaded, it is moulded into the form of a brick, by being put into a very simple wooden mould; and the upper part of the brick is made smooth and even by cutting off the superfluous part with a wooden knife. The process is very simple, and is conducted by the workmen with great rapidity. A good brickmaker would mould about 5000 bricks in a day. He disengages the bricks from the mould by a gentle stroke on the back of the mould; and the wet bricks are at first arranged in rows upon long boards. When sufficiently dry to be handled, they are turned, and at last piled up in loose walls, which are thatched with straw to keep off the rain. In this position they are allowed to remain till they have become as dry as they can become in the open air.

In many cases the clay used for brick-making is destitute of the requisite quantity of sand. If such clay were made into bricks, it would shrink so much in their burning, that the bricks would lose their shape, and would probably crack in every direction. To prevent this, it is necessary to add a certain quantity of sand. This sand should not be very fine. It answers best when the particles are of such a size as to be readily distinguished by the naked eye. Even when as large as coriander seeds, it has been found to answer better than very fine sand. The brickmakers in the neighbourhood of London bring their sand from the bottom of the Thames near Woolwich, where it is raised by boats employed for that purpose, and brought up the river for the use of the brick-makers.

4. No general directions can be given respecting the Burning quantity of sand to be mixed with the clay, because that of the depends upon the nature of the clay and upon the uses bricks. for which the bricks are intended. The more sand is added, the more accurately do the bricks retain their shape, and the less apt are they to crack during the burning, but at the same time their strength is diminished. Chemical lutes are often composed of four parts of sand and one part of clay. Such mixtures do not contract much in burning, and, therefore, are not apt to crack and drop off, which is the reason why chemists employ them. But they have not the adhesiveness of brick after being burned, and would not therefore answer the purposes of the brick-maker. In stone-ware the mixture consists of about four parts of clay and one of fine sand. It burns to a hard cohesive substance, capable of striking fire with with the water. If some parts of the paste be moister steel. Such a proportion, then, in many cases would answer the purposes of the brick-maker.

The London brick makers make another addition to the clay, which we believe is peculiar to them. They add to every three parts of the clay about one part of the ashes from the fire-places of the city of London. These ashes contain some earthy matter; but they consist in a great British brickmakers in general are most defective. As measure of small coal unburnt and little altered, which has far as we have had an opportunity of witnessing the pro- fallen through the interstices of the grate. The conse-

Brick.

quence is, that such a mixture, when sufficiently heated, are made by arching the bricks over so as to leave a space the London bricks are burned in a great measure by

It is essential to dry the bricks thoroughly in the open clay, the water which it contains being prevented from escaping by the adhesiveness of the mixture, is converted into steam, and cracks and breaks the mass of clay to pieces. Indeed, after the bricks are rendered as dry as they can become in the open air, they ought to be exposed at first to a gentle heat, which ought to be raised to redness very slowly, and in proportion as the moisture of the brick is dissipated. Water adheres with such obstinacy to clay, that it is never all driven off by the heat at which bricks are burnt. But the portion which remains is so intimately combined with the clay, as to constitute one solid mass, which has no great tendency to absorb an additional quantity of water.

Bricks are most commonly burnt in a kiln. This is a very simple structure, usually about thirteen feet long, ten and a half wide, and twelve feet high. The walls are one foot two inches thick, and incline a little to each other as they ascend. The bricks are placed on flat arches, having holes left in them like lattice-work. After the bricks are arranged on the kiln, to the number of about 20,000, they are covered with old bricks or tiles. Some brush-wood is then kindled in the kiln, and a moderate fire kept up till the bricks are rendered as dry as possible. The time required for this is two or three days; and the bricks are known to be dry when the smoke (which is at first black) becomes transparent. The mouth of the kiln is then filled up with pieces of brick and clay, leaving only room to introduce a faggot at a time. This structure at the mouth of the kiln is called a shinlog. The kiln is then supplied with faggots of furze, heath, fern, or whatever vegetable substance can be procured at the cheapest rate, till the arches look white, and the fire appears at the top. The fire is then diminished, and at length allowed to go out, and the kiln is permitted to cool. This burning process usually lasts about forty-eight hours.

The method of burning bricks in the neighbourhood of London is very different from this; and we do not know whether it be practised anywhere else. It obviously originated from the difficulty of procuring a sufficient quantity of vegetable matter to burn the enormous number of bricks consumed every year in London. If we consider the immense extension of houses which has taken place in London within the last fifty years, and if we consider that this vast city, containing nearly 2,500,000 inhabitants, is almost renewed every century, we may be able to form some notion of the prodigious quantity of bricks which it must consume. In the country round London there is a particular kind of clay, well known by the name of London clay. This clay is almost everywhere covered with a bed of gravel, which varies in thickness according to the elevation of the surface. Hence the whole of the country round London is fit for making bricks. Nothing more is necessary than to dig through the surface of gravel, and get to the clay.

We have already mentioned, that about a fourth part of the London bricks consists of small coal kneaded up along with the clay. When the bricks are sufficiently dry, they are piled up on each other in parallelopipedons to the intended height. Between each two rows of brick there is strewed a quantity of cinders, amounting to about three inches in thickness. At the distance of about nine feet from each other, perpendicular spaces are left, about

takes fire and burns of itself, though very slowly; so that between each about a brick in width. Over the whole is strewed a pretty thick covering of cinders. The flues are means of the fuel mixed with the clay of which they are filled likewise with cinders, or, if they cannot be had, with coal. The fire-place is usually at the west end, and is generally three feet high. The fire, when once kindled air before burning them; for when heat is applied to wet in the fire-place, propagates itself very slowly through the whole clamp, as bricks piled in this manner are called. So very slow is the progress, that bricks in the neighbourhood of London take about three months in the burning. The heat is very intense, and, as the fuel is mixed up with the clay itself, every part of the brick is sure to be sufficiently burnt.

We conceive that the mixture of about one fourth of chalk with the clay of which the London bricks are made, would greatly improve their quality. The consequence would be an incipient fusion, which would render their surface much more compact and solid. The only difficulty would be to proportion the quantity of chalk so as to prevent complete fusion, which would run the bricks into each other, and destroy them entirely. Bricks made of materials which have undergone complete fusion would be greatly superior to common bricks. They would perfectly resist the action of the weather, and would, therefore, last much longer than common bricks. In Sweden it is customary at some of the iron founderies to cast the scoriæ into bricks, which they employ in constructing their furnaces. Such furnaces the writer of this article has seen; and he was assured by the gentleman who had the charge of the works, that they answered fully better than common bricks. It would be easy to make any quantity of such bricks in some of the large iron founderies of Great Britain. We are persuaded that such bricks might be brought into use for a variety of purposes with great advantage, and might even constitute a lucrative article of manufacture. Bricks made from the scorize of iron and copper founderies would vie in beauty with marble and porphyry, and would possess a lustre of surface to which few marbles could reach.

Few parts of Great Britain are so well adapted for the making of bricks, according to the London plan, as the neighbourhood of Newcastle-upon-Tyne. There the enormous heaps of small coal, which are of no use whatever, would furnish abundance of fuel at a much cheaper rate than even the London ashes; while the magnesian limestone that occurs in such plenty in the neighbourhood of Sunderland would enable the brickmaker to give the claythe requisite degree of fusibility.

The vast employment of bricks in Great Britain, especially in England, is shown by a parliamentary paper, which states that in 1802 the duty was paid on 713,880,743 bricks; but in the year 1845 on 1,878,037,639, and the duty in this last year amounted to L.576,199. This tax is now abolished.

Fire-bricks are made in the same way as common bricks, Fire-but the materials are different. The best clay for their com- bricks. position is Stourbridge clay; and, instead of sand, it is usual to mix the clay with a quantity of old fire-bricks, or crucibles, or glass-pots, reduced previously to powder. This mixture answers the same purposes as sand, while it does not communicate the tendency to fusion when it comes in contact with various fluxes that are communicated by siliceous sand.

There is a kind of bricks mentioned by Pliny as used by Swimming the ancients, which were so light as to swim in water. "Pi- bricks. tanæ in Asia, et in ulterioris Hispaniæ civitatibus Massia et Calento, fiunt lateres, qui siccati non merguntur in aqua." (Plinii Natur. Histor. lib. xxxv. c. 14). Pliny does not mention the part of the world in which the earth employed in the manufactures of these bricks was found, though in all probability it could not be far from the cities where the bricks are said by him to have been made. He says that the material employed was a kind of pumice stone. But it was quite

Brickmaking. unknown to the moderns, till, in 1791, Fabbroni found a substance at Castel del Piano, not far from Santa Fiora, between Tuscany and the Papal dominions, which formed bricks capable of swimming in water. This is a white earthy matter, which constitutes a bed in that place, and was known in Italy by the name of Latte di Luna. In more recent mineralogical books it is distinguished by the name of farina fossilis (bergmehl). Haüy considers it as a variety of tale, and Brochant as a variety of meerschaum. According to the analysis of Fabbroni this substance is composed of

DIOILI tilip pan	preside to composed or	
,	Silica Magnesia Alumina	15 12
	Lime	3
	Iron	
	Water	
-	ore recent analysis of Klaproth Silica	. 79 . 5 . 3
	•	100

This mineral, therefore, is neither a variety of talc nor of meerschaum. One would be disposed to consider it as a hydrate of silica; for both the alumina and oxide of iron are present in so small proportions that we can scarcely consider them as in chemical combination.

Considering the composition of this earth, it is rather singular that it is capable of being agglutinated by a red heat. We suspect that the bricks of Fabbroni, which swim in water, have but very little strength. This, if it be the case, must

greatly circumscribe their utility.

The colour of the London bricks is not red, as is the case with common bricks and tiles, but a light brownish yellow. This colour is more pleasing to the eye than common brick red, and on that account the London bricks are preferred for building houses. The brick-makers assign a curious enough reason for this colour. According to them, their bricks are kept as much as possible from contact with the air during their burning. The consequence of this is, that the iron contained in them is not oxidized to so great a degree as in common bricks. But this mode of reasoning is far from being exact. If air were excluded entirely, the bricks would not be burnt at all, because the fire would be extinguished. But if enough of air be admitted to burn the coal mixed with the clay, which must be the case, that air must also act upon the iron, and reduce it to the state of peroxide. Indeed, there can be no doubt that the iron in the London yellow bricks is in the state of peroxide as well as in the red bricks, for the peroxide of iron gives various colours to bodies, according to circumstances. We find bodies tinged with it red, yellow, and brown, according to the substances with which the oxide is combined. ascribe the yellow colour of the London bricks to the ashes of the coals, which, by uniting with the peroxides of iron, form a kind of yellow ochre.

The best clay in England for making common building bricks is found in Staffordshire, and in some parts of Derbyshire. That in Staffordshire contains a large portion of iron, and from it are made those durable blue bricks which have been so extensively used for flooring purposes, and also for building many railway stations. Draining and sewerage tiles are also made from this clay, which burns with a peculiar glaze, and during the last few years, the manufactories of blue bricks and tiles have given employment to a very large number of people. The Derbyshire clay burns into bricks of a peculiar redness, and from the absence of pebbles and lime, and from the care which is bestowed upon it, particularly in tempering and grinding, no part of the country can excel Derby and its vicinity in the production of bricks of great beauty and solidity. In Manchester, Liverpool, and the other manufacturing towns of Lancashire, the clay contains a large quantity of stones, and as cheapness rather than beauty is the desideratum in these busy marts, the bricks made are of a rough description, except for fronting the buildings, when extra pains are taken.

Many attempts have been made to introduce machinery in manufacturing bricks, but as yet with comparatively little success in super-

seding hand labour. The Marquis of Tweeddale has been the most successful so far, but his invention has not been found perfect where the clay contains any pebbles, because he cuts at once a number of bricks out of a layer of clay by means of copper wire descending vertically, and where these wires come into contact with the stones, however small, the bricks are ragged and require to be again thrown into the feeder. If, however, the clay was entirely freed from stones, his machine would be very simple and effective. Clay must, however, be cast out of the ground by hand, then wheeled to the machine to be tempered, boys have again to be employed to carry off the bricks when moulded and set them up in stacks to dry, and the machine has therefore the mere passing of the clay through the moulder's hands to compete with, and so far the competition has been unfavourable to the use of the machine.

making.

But pressing the bricks before they are dry has become very general, and for this purpose several machines have been for some years in active operation. That now generally used was introduced into England about 20 years ago by the late Mr Bakewell, and was the invention of an American. After the bricks are moulded they are partially dried, and are then placed in a brass mould of the exact size of the brick required. By means of a lever, a flat cover drops upon the top of this brass mould, and the same motion raises an under plate, so that in proportion to the pressure exerted, is the solidity of the brick. Nothing can exceed the excellence, squareness, and solidity of bricks when this operation is faithfully performed, and the bricks thus pressed weigh from 1 to  $1\frac{1}{2}$  lb. heavier than the same sized bricks made by hand and not pressed.

The desideratum is to find a machine that can not only compete in price with hand labour, but which can also deliver the bricks in a pressed state, ready to be placed at once in the kiln. A man and two boys can press by the hand machine about 3000 bricks a-day. Considering the many millions of bricks annually consumed in England, it is to be hoped that a successful machine for making bricks of first-rate quality will speedily be invented.

We have alluded to the exceilence of the Stourbridge clay for making fire bricks. but our description would be incomplete if we were to omit the extraordinary beds of clay found at Hawarden in Flintshire. At this place are manufactured in immense quantities those fire-bricks which are not only used throughout Lancashire and other counties for the construction of furnaces, but have formed for many years an article of export to all parts of the world, but

particularly to the West Indies.

About 50 years ago the late Mr William Hancock established works at Buckley Mountain, which have since been continued by his successors and other parties, and the trade gives employment to many hundred families. Two descriptions of clay are found near Hawarden; one of them burns blue, similar in appearance to the bricks made in Staffordshire; the other comes out of the kiln nearly white, and these latter have the peculiar property of not only resisting the most intense heat without fusing, but the admission of cold air into a furnace constructed with them does not cause them to fly or crack as is too generally the case with the common fire-bricks. Hence they are much used for casing the furnaces of iron-founders, scap-boilers, and others, whose furnaces are necessarily left to cool suddenly when the metal is withdrawn. In many respects the Welsh clay is similar to some found in the neighbourhood of Newcastle-on-Tyne, and we subjoin an analysis of each, that in Flintshire being made by Dr Sheridan Muspratt, and that in Northumberland by Dr Richardson.

	lintshire White		Newcastle Clay, Analyzed by
	Muspratt.		Richardson.
Silica		•••	<b>51·10</b>
Alumina			31:35
Iron		•••	4.63
Lime		•••	1.46
Magnesia		•••	1.54
Water		•••	10.47
Loss	68	•••	•••
	100.000		100.55
	Flintshire		Newcastle
	Blue Clay.		Blue Clay.
Silica	. 49.251	•••	51.11
Alumina	. 30.548	•••	30.40
Iron	. 7.984		4.91
Lime	0.153		1.76
Magnesia			Mere traces.
Water	. 12.064	•••	12.29
-	<del></del>		
	100.000		100.48

The Flintshire clay is also used for the manufacturing of flooring tiles, and for wares of a domestic character.

Brick-Layer || Bride, It is a great mistake in speaking of technical matters to confound the idea of fire-proof with what is scientifically called infusible, the former being only a relative term, implying fusibility at the certain temperature mentioned in connection with it. Substances which are perfectly capable of standing all the degrees of temperature employed in factories, may be melted, and frequently volatilized, before the oxy-hydrogen blow-pipe, or between the poles of a powerful battery. Thus pure silica, for example, has been rendered molten like glass, and drawn out into fine threads. The degree of fusibility which a substance possesses is mainly dependent upon its chemical constituents; but it appears often to rest as much upon the elementary composition of those ingredients; for not only is the fusibility influenced by the proportion of acids and bases which make up a clay or refractive substance, but also by the manner in which such acids and bases may be combined.

The property of easy fusibility is dependent either on the nature of the bases, alkalies, earths, and metallic oxides, or in a still greater degree upon the manner in which the silicic acid and those

bases are proportioned in the substance.

Alumina is a base, which, in combination with silicic acid, forms one of the most refractory of substances, and imparts this property to the clays in proportion as they are unmixed with lime, iron, magnesia. &c.

A chemical analysis, therefore, of clays, although it cannot supersede actual experiment on the large scale, may be of the greatest service, as clays seldom come up to what is required of them, and only acquire the requisite properties by certain additions, the choice of which must be guided by centesimal results.

The chief cause of cracking is the contraction which materials undergo by heating, and this must be lessened by the addition of substances which do not shrink themselves, nor impair the refractory nature of the materials. Pure sand, free from lime and iron, and ground fire-clay which has been previously burned, are the substances most generally and appropriately used, and are found to be capable of withstanding, as crucibles, the intense white glow of the glass furnace. The alumina and silica are nicely apportioned in the Welsh clays, hence they include in a great measure the qualifying distinctions we have glanced at, and are therefore very good for producing fire-bricks for manufacturing purposes, where great heat has to be resisted. The large amount of iron present, though an objection, will not materially interfere with the fusibility, as there is so little lime in the clay.

(T. T.) (S. H.)

BRICK-Layer, an artificer whose business is to build with oricks, or make brick-work. The London Brick-layers' Company was incorporated in 1568, and consists of a master, two wardens, twenty assistants, and seventy-eight liverymen.

Brick-Laying. See Building.

BRICKNOĞGING, brick-work employed to fill up the interstices of timber framing.

BRICKTRIMMER, a framework of brick, overarching ordinary fire-places, and designed to protect the woodwork

from the danger of taking fire.

BRIDAINE, JACQUES, a celebrated French preacher and home-missionary, was born in 1701 at Chuslan in the department of Gard. Though a rigid Catholic in principle, he gained the good-will of the Protestants of France, by the boldness with which he advocated their cause on many occasions, and the personal kindness which he displayed towards many of their number during the persecutions to which they were exposed under the Regent Orléans and Louis XV. He accomplished no fewer than 250 evangelizing journeys through various parts of France, in the course of which he made himself universally popular. He was the author of a collection of Cantiques Spirituels, which has been frequently reprinted, and of five volumes of sermons, printed at Avignon in 1825. In the neighbourhood of this town he died in 1767.

BRIDE (Saxon, bryd), a newly-married woman. In its true and original signification it denoted a woman espoused or contracted to be married; and, in an analogous sense, its use is still retained in Scotland.

Among the Athenians betrothment was indispensable to the validity of a marriage-contract. On the wedding-day it was the custom for the bride, closely veiled, to be conducted to her husband's house in a chariot drawn by mules or oxen. She was seated between her husband and one of his most intimate friends; lighted torches were carried be-

fore her; and as the procession moved along she was entertained with the hymenean song, which was sung to the accompaniment of Lydian flutes, as described in the Iliad, xviii. 490. When they alighted, it was usual in some places to burn the axletree of the carriage, to signify that the bride was to remain at her husband's house. The threshold being crossed, sweetmeats were showered upon the wedded pair, as emblems of plenty and prosperity. Then came the nuptial feast, to which, contrary to the usual practice, women as well as men were invited, though the women appear to have sat at a separate table with the bride. As marriage among the Greeks was celebrated without any public rite, either civil or religious, the guests assembled on such occasions appear to have been regarded in the light of witnesses to the fact. At the conclusion of the feast the bride was conducted by her husband to the bridal chamber; and then the Epithalamium or nuptial song was sung before the doors of the apartment. (See Theoc. Idyl. xviii.) In the heroic age, as described by Homer, women were held in greater estimation, and enjoyed a much higher social position than in subsequent times, when the restrictions imposed upon their liberty appear to have been of a kind not very dissimilar to those which exist among oriental nations at the present day. The usage of the Dorians, however, and especially at Sparta, formed a striking contrast to that of the Ionians; for the Dorian women continued in the possession of almost unrestricted liberty, so much so, indeed, as to have given occasion for serious charges against their moral character.

Among the Romans the custom of taking the bride by apparent force from the arms of her mother or guardian, was kept up in memory, it is said, of the rape of the Sabines under Romulus. A similar practice appears to have existed as a relic of antiquity at Sparta. (Herodot. vi. 65). Preparatory to the nuptials of the Romans, a meeting of friends was sometimes held at the house of the woman, for the purpose of settling the marriage-contract and other preliminaries; and on this occasion it was customary, at least during the imperial period, for the future husband to place a ring on the finger of his betrothed. On the marriage-day the bride appeared in a white robe, adorned with a purple fringe or with ribands, and fastened at the waist with a girdle, which at night was unloosed by the husband. The hair of the bride was divided on this occasion with the point of a spear; and she wore a veil, which, as well as her shoes, was of a bright yellow colour. Attended by a numerous train of friends, she was carried home in the evening to the bridegroom's house, accompanied by three boys, one of whom carried a torch, and the other two led the bride, who held a spindle and distaff. She brought three pieces of money, called asses, in her hand to the bridegroom, whose doors on this occasion were adorned with flowers and branches of trees. Being there interrogated who she was, she answered Caia, in memory of Caia Cecilia, wife of Tarquin the elder, who was an excellent lanifica or spinstress; and before her entrance she lined the door-posts with wool, and smeared them with grease. Fire and water being set on the threshold, she touched both; but, starting back from the door, refused to enter, till at length she passed the threshold, being careful to step over without touching it. Then the keys were delivered to her, a nuptial supper was prepared, and minstrels attended. She was seated on the figure of a priapus, and in this situation the attendant boys resigned her to the pronubæ, who brought her into the nuptial chamber and put her to bed. This office was performed by the pronubæ, matrons who had been only once married, to denote that the marriage was to be in perpetuity.

The Roman matrons held quite a different position from that of married women among the Greeks; the wife being mistress of the household, and sharing the honours of her husband. See MARRIAGE, and DIVORCE.

BRIDEGROOM (Saxon, brydguma, i.e., bride's man),

Bridewell a man newly married, or a man about to be married. For the correctness of the latter definition we have the authority of Shakspeare:

"As are those dulcet sounds at break of day That creep into the dreaming bridegroom's ear, And summon him to marriage."

In nothing have the usages of different nations varied more than in regard to marriage, and the ceremonies by which it is celebrated or solemnized. Amongst the Romans the bridegroom was decked to receive his bride; his hair was combed and cut in a particular form; he had a coronet or chaplet on his head, and was dressed in a white garment.

BRIDEWELL, a name frequently given to houses of correction. The first establishment of this kind was a royal

palace in the parish of St Bride's, London, which was called Bridge. Bridewell from its vicinity to a well dedicated to St Bride or Bridget. This foundation partakes of the mixed character of hospital, prison, and workhouse. It was founded in 1553 by Edward VI., who gave the place where King John had formerly kept his court, and which had been repaired by Henry VIII., to the city of London, with seven hundred merks of land, bedding, and other furniture. Juvenile delinquents are sent to the hospital as apprentices to manufacturers, who reside there; and, on their having faithfully served their time of seven years, they become entitled to their freedom, together with a donation of ten pounds each to enable them to carry on their respective trades. See also Workhouse, and Poor-Laws.

## BRIDGE.

THE mathematical theory of the structure of bridges has been a favourite subject with mechanical philosophers. It gives scope to some of the most refined and elegant applications of science to practical utility; and while its progressive improvement exhibits an example of the very slow steps by which speculation has sometimes followed execution, it enables us to look forward with perfect confidence to that more desirable state of human knowledge in which the calculations of the mathematician shall direct the operations of the artificer with security, instead of following with servility the progress of his labours.

Of the origin of the art of building briages something will be found in other parts of this work (see the articles Arch, and Iron Bridges). The subject has been much discussed during the last half century, by some of the most learned antiquaries and most elegant scholars; but additions still more important have been made to the scientific and practical principles on which that art depends; and the information that may here be expected will be comprehended under the head of physico-mathematical principles, subservient to the theory of this department of architecture; while the historical account of the works which appear to be the most deserving of notice will be found under the articles already referred to.

This article will contain five sections, relating respectively (1) to the resistance of the materials employed, (2) to the equilibrium of arches, and (3) to the effects of friction, (4) an account of the discussions regarding the London bridges, in which will be found the views of many philosophers and practical men, and (5) the application of theory to existing bridges.

#### Sect. I.—Of the Resistance of Materials.

A. In all homogeneous solid bodies, the resistances to extension and compression must be initially equal, and proportional to the change of dimensions.

The equilibrium of the particles of any body remaining at rest depends on the equality of opposite forces, varying 'according to certain laws; and that these laws are continued without any abrupt change, when any minute alteration takes place in the distance, is demonstrated by their continuing little altered by any variation of dimensions, in consequence of an increase or diminution of temperature, and might indeed be at once inferred as highly probable, from the general principle of continuity observed in the laws of nature. We may therefore always assume a change of dimensions so small, that, as in all other differential calculations, the elements of the curves, of which the ordinates express the forces, as functions of, or as depending on, the distances as abscisses, may be considered as not sensibly differing from right lines crossing each other, if the curves be drawn on the same side of the absciss, in a point corresponding to the point of rest, or to the distance affording an equilibrium; so that the elementary finite differences of the respective pairs of ordinates which must form, with the portions of the two curves, rectilinear triangles, always similar to each other, will always vary as the lengths of the elements of the curves, or as the elements of the absciss, beginning at the point of rest; and it is obvious that these differences will represent the actual magnitude of the resistances exhibited by the substance to extension or compression.

It was on the same principle that Bernoulli long ago observed, that the minute oscillations of any system of bodies, whatever the laws of the forces governing them might be, must ultimately be isochronous, notwithstanding any imaginable variation of their comparative extent, the forces tending to bring them back to the quiescent position being always proportional to the displacements; and so far as the doctrine has been investigated by experiments, its general truth has been amply confirmed; the slight deviations from the exact proportion which have been discovered in some substances being far too unimportant to constitute an exception, and merely tending to show that these substances cannot have been perfectly homogeneous, in the sense here attributed to the word. When the compression or extension is considerable, there may indeed be a sensible deviation, especially in fibrous or stratified substances; but this irregularity by no means affects the admissibility of any of the conclusions which will be derived from this proposition.

B. The strength of a block or beam must be reduced to one half, before its cohesive and repulsive forces can both be called into action.

We must suppose the transverse sections of the body to remain plane and perpendicular to the axis, whatever the point may be to which the force is applied; a supposition which will be correctly true if the pressure be made by the intervention of a firm plate attached to each end, and which is perfectly admissible in every other case. Now, if the terminal plates remain parallel, it is obvious that the compression or extension must be uniformly distributed throughout the substance, which must happen when the original force is applied in the middle of the block; the centre of pressure or resistance collected by the plate acting like a lever, being then coincident with the But when the plates are inclined, the resistance depending on the compression or extension will be various in different parts, and will always be proportional to the distance from the neutral point where the compression ends and the extension begins, if the depth of the substance is sufficient to extend to this point; consequently the forces may always be represented, like the pressure of a fluid, at different depths, by the ordinates of a triangle; and their result may be considered as concentrated in the centre of gravity of the triangle, or of such of its portions as are contained within the depth of the sub-

Bridge. stance; and when both extension and compression are concerned, the smaller force may be considered as a negative pressure, to be subtracted from the greater, as is usual when any other compound forces are supposed to act on a lever of any kind. Now when the neutral point is situated in one of the surfaces of the block, the sum of all the forces is represented by the area of the triangle, as it is by that of the parallelogram when the plates remain parallel; and these areas being in either case equivalent to the same external force, it is obvious that the perpendicular of the triangle must be equal to twice the height of the parallelogram, indicating that the compression or extension of the surface in the one case is twice as great as the equable compression or extension in the other; and since there is always a certain degree of compression or extension, which must be precisely sufficient to crush or tear that part of the substance which is immediately exposed to it, and since the whole substance must in general give way when any of its parts fail, it follows that the strength is only half as great in the former case as in the latter. And the centre of gravity of every triangle being at the distance of one third of its height from the base, the external force must be applied, in order to produce such a compression or extension, at the distance of one sixth of the depth from the axis; and when its distance is greater than this, both the repulsive and cohesive forces of the substance must be called into action, and the strength must be still further impaired. (Plate CXLIII. fig. 2.)

C. The compression or extension of the axis of a block or beam is always proportional to the force, reduced to the direction of the axis, at whatever distance it may be applied.

We may suppose one of the inflexible plates attached to the extremities of the block to be continued to the given distance, and to act as a lever held in equilibrium by three forces, that is, by the cohesive and repulsive resistances of the block, and the external force; and it is obvious that, as in all other levers, the external force will always be equal to the difference of the other two forces depending on the compression and extension, or to the mean compression or extension of the whole, which must also be the immediate compression or extension of the middle, since the figure representing the forces is rectilinear. And the effect will be the same, whatever may be the intermediate substances by which the force is impressed on the block, whether continued in a straight line or otherwise. When the force is oblique, the portion perpendicular to the axis will be resisted by the lateral adhesion of the different strata of the block, the compression or extension being only determined by the portion parallel to the axis; and when it is transverse, the length of the axis will remain unaltered. But the line of direction of the original force must always be continued till it meets the transverse section at any point of the length, in order to determine the nature of the strain at that point.

D. The distance of the neutral point from the axis of a block or beam is to the depth, as the depth to twelve times the distance of the force, measured in the transverse section.

Calling the depth a, and the distance of the neutral point from the axis z, the resistances may be expressed by the squares of  $\frac{1}{2}a + z$  and  $\frac{1}{2}a - z$ , which are the sides of the similar triangles denoting the compression and extension (Prop. B.); consequently, the difference of these squares, 2 az, will represent the external force (Prop. C.) But the distance of the centres of gravity of the two triangles must always be  $\frac{2}{3}a$ ; and, by the property of the lever, making the centre of action of the greater resistance the fulcrum, as the external force is to the smaller resistance, so is this distance to the distance of the force from the centre of action of the greater re-

sistance; or  $2 \ az : (\frac{1}{2} \ a + z)^2 = \frac{2}{3} \ a : (\frac{aa}{12z} - \frac{a}{3} + \frac{z}{3});$  Bridge.

and adding to this the distance of the centre of action from the axis, which must be  $\frac{1}{2} a - \frac{1}{3} (\frac{1}{2} a + z) = \frac{1}{3} a - \frac{1}{3} z$ ,

we have  $\frac{aa}{12z}$  for the distance of the force from the axis;

whence, calling this distance y,  $z = \frac{aa}{12v}$ 

E. The power of a given force to crush a block is increased by its removal from the axis, supposing its direction unaltered, in the same proportion as the depth of the block is increased by the addition of six times the distance of the point of application of the force, measured in the transverse section.

Since the compression or extension of the axis is invariable, whatever the distance of the force may be, that of the nearest surface must be as much greater, by the properties of similar triangles, as the half depth, increased by the distance of the neutral point, is greater than that distance itself, that is, in the ratio of a + 6y to a, since z is to a as a to 12y (Prop. D.), and to  $\frac{1}{6}$  a as a to 6y; and the strength is reduced in the same proportion as the partial compression or extension, by the operation of a given force, is increased. (Plate CXLIII. fig. 3.)

F. The curvature of the neutral line of a beam at any point, produced by a given force, is proportional to the distance of the line of direction of the force from the given point

of the axis, whatever that direction may be.

Since the distance z of the neutral point from the axis is inversely as y, the distance of the force, and the radius of curvature, or the distance of the intersection of the planes of the terminal plates from the neutral point, must be to the distance z as the whole length of the axis is to the alteration of that length produced by the compression or extension, it follows that the radius of curvature must be inversely as the distance y, and inversely also as the compression, and the curvature itself must be conjointly as the force and as the distance of its application. If the direction of the force be changed, and the perpendicular falling from the given point of the axis on the line of the force be now called y, the distance of the force from the axis measured in the transverse section will be increased by the obliquity exactly in the same ratio as its efficacy is diminished, and the curvature of the neutral line will remain unaltered; although the place of that line will be a little varied, until at last it coincides with the axis, when the force becomes completely transverse: and the radius of curvature of the axis will always be to that of the neutral line as the acquired to the original length of the axis. (Plate CXLIII. fig. 4.)

G. The radius of curvature of the neutral line is to the distance of the neutral point as the original length of the axis to the alteration of that length, or as a certain given quantity to the external force; and this quantity has been termed the modulus of elasticity.

Or r: z = M: f, and  $r = \frac{Mz}{f} = \frac{Maa}{12fy}$ , as is obvious from

the preceding demonstration; y being the distance of the line of the force from the given point, whatever its direction may be.

H. The flexibility, referred to the direction of the force, is expressed by unity, increased by twelve times the square of the distance, divided by that of the depth.

Making the alteration of the axis unity, the corresponding change at the distance y will be to 1 as z + y to z,

or as  $1 + \frac{y}{z}$  to 1, and will consequently be equal to  $1 + \frac{12yy}{aa}$  (Prop. D.)

Bridge.

When the direction of the force becomes oblique, the actual compression of the axis is diminished, but its effect referred to that direction remains unaltered.

I. The total compression of a narrow block, pressed in the direction of one of its diagonals, is twice as great as if the same force were applied in the direction of the axis.

This proposition affords a simple illustration of the application of the preceding one. Calling the length of any portion of the axis x, beginning from the middle, and neglecting the obliquity, the distance of the force may be called y = nx; and the compression in the line of the

force being everywhere as  $1 + \frac{12yy}{aa}$ , its fluxion will be

$$dx + dx \frac{12nnxx}{aa}$$
, and the fluent  $x + \frac{4n^2x^3}{aa}$ , which, when

 $y=\frac{1}{2}$  a, becomes x+x, which is twice as great as if y were always = 0. But if the breadth of the block were considerable, so that it approached to a cube, the compression would vary according to a different law, each section parallel to the diagonal affording an equal resistance, and the exact solution of the problem would require

an infinite series for expressing the value of  $\int n^{\frac{1}{x}} dx$ .

K. If a solid bar have its axis curved a little into a circular form, and an external force be then applied in the direction of the chord, while the extremities retain their angular position, the greatest compression or extension of the substance will ultimately be to the mean compression or extension

which takes place in the direction of the chord, as  $1 + \frac{4h}{a}$  to

$$1 + \frac{16hh}{15aa}$$
; a being the depth of the bar, and h the actual versed sine, or the height of the arch.

We must here separate the actions of the forces retaining the ends of the bar into two parts, the one simply urging the bar in the direction of the chord, and the other, which is of a more complicated nature, keeping the angular direction unaltered; and we must first calculate the variation of the angular situation of the ends, in consequence of the bending of the bar by the first portion, and then the strain required to obviate that change, by means of a force acting in the direction of the middle of the bar, while the ends are supposed to be fixed. If each half of the bar were rectilinear, these two strains would obviously be equal, and would neutralize each other in the middle of the halves, which might be considered as the meeting of the ends of two shorter pieces, acting transversely or obliquely on each other, without any strain; the curvature produced by the whole strain being elsewhere as the distance from the line joining these points. But since the bar is supposed to be curved, it becomes necessary to determine the place of these neutral points, by calculating the change of its angular position throughout its extent.

Considering, first, the middle of the bar as fixed, and calling the angular extent of the variable arc x, beginning from the middle, and the radius r, the ordinate y, or the distance of the arc from the chord, will be  $r\cos x - b$ , b being the cosine of the whole arc; and the fluxion of the change of the angular situation, being as the strain and the fluxion of the arc conjointly, will be expressed by  $pr\cos x dx - pbdx$ , of which the fluent is  $pr\sin x - pbx$ . In the second place, the curvature derived from the force acting between the two halves, when the ends are considered as fixed points, will be as  $r - r\cos x$ , and the fluent of the change of angular situation may be called  $qrx - qr\sin x$ ; and at the end, when x becomes equal to

c, the whole extent of the arc, these two deviations must Bridge destroy each other, since the positions of the middle and of the ends remain unaltered; consequently  $pr \sin c - pbc$ 

$$=qrc-qr\sin c$$
, whence  $\frac{p}{q}=\frac{rc-r\sin c}{r\sin c-bc}$ , and the exact

proportion of p to q may be found by means of a table of sincs. But when the arc is small, sin. c being equal to

$$c - \frac{1}{6}c^3 + \frac{1}{120}c^5 \dots, rc - r \sin c = \frac{1}{6}rc^3$$
, and  $r \sin c - bc$ 

 $=(r-b)\,c-\frac{1}{6}\,rc^3$ ; now r-b, the versed sine of the arc, becomes ultimately  $\frac{1}{2}\,rc^2$ , and  $(r-b)\,c=\frac{1}{2}\,rc^3$ ; therefore  $p:q=\frac{1}{6}:\frac{1}{3}=\frac{1}{2}:1$ ; that is, the strain at the middle, expressed by p, must be half as great as the strain at the ends, expressed by q:c consequently, when the force is considered as single, the distance of the line of its direction from the summit must ultimately be one third of the versed sine or height.

Now if we call any portion of the chord x, we have for the corresponding value of y, the distance from the line of direction of this force,  $\sqrt{(r^2 - x^2) - d}$ ; and for the fluxion of the compression or extension in the direction of

the chord,  $dx\left(1+\frac{12yy}{aa}\right)$ , which will be true for both portions of the bar, whether y be positive or negative; but  $y^2=r^2-x^2+d^2-2d$   $\sqrt{(r^2-x^2)}$ , and the fluent becomes  $x+\frac{12}{aa}\left(r^2x-\frac{1}{2}x^3+d^2x-2d$  [ $r^2$  ARC SINE  $\frac{x}{r}$ 

 $x \sqrt{(r^2-x^2)}$ . When the arc is small, calling the whole

versed sine h, we may have  $y = \frac{1}{2}h - \frac{xx}{2r}$  and  $y^2 = \frac{1}{9}h^2 - \frac{hx^2}{3r}$ 

$$+\frac{x^4}{4r^2}$$
, and the fluent is  $x + \frac{12}{aa} \left( \frac{1}{9} h^2 x - \frac{hx^3}{9r} + \frac{x^5}{20r^2} \right)$ ;

but when x becomes equal to the semichord c, h being  $\frac{cc}{2r}$ ,

the expression becomes  $c + \frac{12}{aa} \left( \frac{c^5}{36r^2} - \frac{c^5}{18r^2} + \frac{c^5}{20r^2} \right)$ 

$$= c + \frac{4 c^5}{15 a^2 r^2} = c + \frac{16 h^2 c}{15 a^2}$$
, which shows the compres-

sion or extension in the line of the chord, while c expresses that which the bar would have undergone if it had been straight, and the force had been immediately applied to the axis; the actual change being greater in the pro-

portion of 
$$1 + \frac{16 hh}{15 aa}$$
 to 1.

The greatest strain will obviously be at the ends, where the distance from the line of direction of the force is the greatest, the compression or extension of the surface being here to that of the axis as a + 6y to a (Prop. E.), or 4h

as  $1 + \frac{4h}{a}$  to 1; consequently the compression or extension in the line of the chord is to the greatest actual

change of the substance as  $1 + \frac{16 hh}{15 aa}$  to  $1 + \frac{4h}{a}$ .

Thus if the depth a were 10 feet, and the height or versed sine h = 20, the radius being very large, the whole compression of the chord would be to the whole compression of a similar substance, placed in the direction of the chord, as 5·267 to 1; and the compression at the surface of the ends would be to the compression of the axis there as 9 to 1; and, disregarding the insensible obliquity, this compression may be considered as equal throughout the bar, so that the compression at the ends will be to the compression of the chord as 9 to 5·267, or as 17 to 10

Bridge.

Supposing, for example, such a bar of iron to undergo a terials which it supports, as determining the direction of Bridge. change of temperature of 32° of Fahrenheit, which would naturally cause it to expand or contract about  $\frac{1}{5000}$  in all its dimensions; then the length of the chord, being limited by the abutments, must now be supposed to be altered ¹/₅₀₀₀ by an external force; and, at the extremities of the abutments, the compression and extension of the metal will amount to about  $\frac{1}{3000}$ ; a change which is equivalent to the pressure of a column of the metal about 3300 feet in height, since M, the height of the modulus of elasticity, is found, for iron and steel, to be about 10,000,000 feet; and such would be the addition to the pressure at one extremity of the abutment, and its diminution at the other, amounting to about five tons for every square inch of the section, which would certainly require some particular precaution, to prevent the destruction of the stones forming the abutment by a force so much greater than they are capable of withstanding without assistance. Should such a case indeed actually occur, it is probable that the extremities would give way a little, and that the principal pressure would necessarily be supported nearer the middle, so that there would be a waste of materials in a situation where they could co-operate but imperfectly in resisting the thrust; an inconvenience which would not occur if the bar were made wider and less deep, especially towards the abutments.

## SECT. II.—Of the Equilibrium of Arches.

We may now proceed to inquire into the mode of determining the situation and properties of the curve of equilibrium, which represents, for every part of a system of bodies supporting each other, the general direction of their mutual pressure; remembering always that this curve is as much an imaginary line as the centre of gravity is an imaginary point, the forces being no more actually collected into such a line than the whole weight or inertia of a body is collected in its centre of gravity. Indeed the situation of the curve is even less definite than that of the centre of gravity, since in many cases it may differ a little according to the nature of the co-operation of the forces which it is supposed to represent. In reality, every gravitating atom entering the structure must be supported by some forces continued in some line, whether regular or irregular, to the fixed points or abutments, and every resisting atom partakes, in a mathematical sense, either positively or negatively in transmitting a lateral pressure where it is required for supporting any part of the weight; and when we attempt to represent the result of all these collateral pressures by a simple curve, its situation is liable to a slight variation, according to the direction in which we suppose the co-operating forces to be collected. If, for instance, we wished to determine the stability of a joint formed in a given direction, it would be necessary to consider the magnitude of the forces acting throughout the extent of the joint in a direction perpendicular to its plane, and to collect them into a single result; and it is obvious that the forces represented by the various elementary curves may vary very sensibly in their proportion, when we consider their joint operation on a vertical or on an oblique plane; although, if the depth of the substance be inconsiderable, this difference will be wholly imperceptible, and in practice it may generally be neglected without inconvenience; calculating the curve upon the supposition of a series of joints in a vertical direction. If, however, we wish to be very minutely accurate, we must attend to the actual direction of the joints in the determination of the curve, and must consider, in the case of a bridge, the whole weight of the structure terminated by a given arch-stone, with the ma-

the curve of equilibrium where it meets the given joint, instead of the weight of the materials terminated by a vertical plane passing through the point of the curve in question, which may sometimes be very sensibly less; this consideration being as necessary for determining the circumstances under which the joints will open, as for the more imaginary possibility of the arch-stones sliding upwards or downwards. But we may commonly make a sufficiently accurate compensation for this difference, by supposing the specific gravity of the materials producing the pressure, and the curvature of the line which terminates them, to be a little increased, while the absciss remains equal to that of the curve of equilibrium intersecting the joints.

L. If two equal parallelopipeds be supported each at one end, and lean against each other at the other, so as to remain horizontal, the curve of equilibrium, representing the general effect of the pressure transmitted through them, will be of a parabolic form.

The pressure of the blocks where they meet will obviously be horizontal, but at the other ends it will be oblique, being the result of this horizontal pressure and of the whole weight of each block. And if we imagine the blocks to be divided into any number of parts, by sections parallel to the ends, which is the only way in which we can easily obtain a regular result, it is evident that the force exerted at any of these sections by the external portions must be sufficient to support the lateral thrust and the weight of the internal portions; and its inclination must be such that the horizontal base of the triangle of forces must be to the vertical perpendicular as the lateral thrust to the weight of the internal portion; or, in other words, the lateral thrust remaining constant, the weight supported will be as the tangent of the inclination. But calling the horizontal absciss x, and the vertical ordinate y,

the tangent of the inclination will be  $\frac{dy}{dx}$ ; which, in the case of a parallelopiped, must be proportional to the distance x from the contiguous ends; and  $x = \frac{m dy}{dx}$ ; consequent-

ly xdx = mdy, and  $\frac{1}{2}x^2 = my$ , which is the equation of a parabola. It is usual in such cases to consider the thrusts as rectilinear throughout, and as meeting in the vertical line passing through the centre of gravity of each block; but this mode of representation is evidently only a convenient compendium.

If the blocks were united together in the middle, so as to form a single bar or lever, the forces would be somewhat differently arranged; the upper half of the bar would contain a series of elementary arches, abutting on a series of similar elementary chains in the lower half, so as to take off all lateral thrust from the supports at the ends.

With respect to the transverse strains of levers in general, it may be observed, that the most convenient way of representing them is to consider the axis of the lever as composed of a series of elementary bars, bisected, and crossed at right angles, by as many others extending across the lever, or rather as far as two thirds of the half depth on each side, where the centre of resistance is situated. The transverse force must then be transmitted unaltered throughout the whole system, acting in contrary directions at the opposite ends of each of the elementary bars constituting the axis; and it must be held in equilibrium, with respect to each of the centres, considered as a fulcrum, by the general result of all the corpuscular forces acting on the longer cross arms; that is, by the difference of the compression or extension on the different sides of the arms. This difference must therefore be

Bridge. constant; and in all such cases the strain or curvature must increase uniformly, and its fluxion must be constant; but if the transverse force be variable, as when the lever supports its own weight, or any further external pressure, the fluxion of the curvature must be proportional to it. Now the transverse force, thus estimated, being the sum of the weights or other forces acting on either side of the given point, the additional weight at the point will be represented by the fluxion of the weight, or by the second fluxion of the strain or curvature, which is ultimately as the fourth fluxion of the ordinate. Also the fluxion of the strain being as the whole weight on each side, it follows, that when the strain is a maximum, and its fluxion vanishes, the whole weight, or the sum of the positive and negative forces on either side, must also vanish; as Mr Dupin has lately demonstrated in a different manner.

> M. In every structure supported by abutments, the tangent of the inclination of the curve of equilibrium to the horizon is proportional to the weight of the parts interposed between the given point and the middle of the structure.

> The truth of this proposition depends on the equality of the horizontal thrust throughout the structure, from which it may be immediately inferred, as in the last proposition. The materials employed for making bridges are not uncommonly such as to create a certain degree of lateral pressure on the outside of the arch; but as there must be a similar and equal pressure in a contrary direction against the abutment, its effects will be comprehended in the determination of the point at which the curve springs from the abutment, as well as in the direction of the curve itself; so that the circumstance does not afford any exception to the general truth of the law. It is, however, seldom necessary to include the operation of such materials in our calculations, since their lateral pressure has little or no effect at the upper part of the arch, which has the greatest influence on the direction of the curve; and it is also desirable to avoid the unnecessary employment of these soft materials, because they tend to increase the horizontal thrust, and to raise it to a greater height above the foundation of the abutment.

> We have therefore generally  $\int w dx = mt = m \frac{dy}{dx}$ , w being the height of uniform matter, pressing on the arch at the horizontal distance x from the vertex, t the tangent of the inclination of the curve of equilibrium, y its vertical ordinate, and m a quantity proportional to the lateral pressure or horizontal thrust.

> N. The radius of curvature of the curve of equilibrium is inversely as the load on each part, and directly as the cube of the secant of the angle of inclination to the horizon. The general expression for the radius of curvature is r

 $=\frac{(\mathrm{d}z)^3}{\mathrm{d}x\mathrm{d}^2y}$ ; and here, since  $m\mathrm{d}y=\mathrm{d}x\int w\mathrm{d}x$ ,  $\mathrm{d}x$  being constant,  $md^2y = w(dx)^2$ ; but dz being  $= dx \sqrt{(1+t^2)}$ ,  $\frac{(dz)^2}{ddy}$  sented by its length z, we have  $z = m\frac{dy}{dx}$ ; but dz = dy $=\frac{m}{w}(1+t^2)$ , and  $r=\frac{m}{w}(1+t^2)^{\frac{5}{2}}$ ; and m being constant, r is inversely as the load w, and directly as the cube of the secant  $\sqrt{(1+t^2)}$ . The same result may also be obtained from a geometrical consideration of the magnitude of the versed sine of the elementary arc, and the effect of the obliquity of the pressure; the one varying as the square of the secant, the other as the secant simply.

- O. Consequently, if the curve be circular, the load must be everywhere as the cube of the secant.
- P. If the curve of equilibrium be parabolic, the load must be uniform throughout the span.

(Prop. L.) The uniformity of the load implies that the Bridge. superior and inferior terminations of the arch, commonly called the extrados and intrados, should be parallel; but it is not necessary that either of them should be parabolic, unless we wish to keep the curve exactly in the middle of the whole structure. When the height of the load is very great in proportion to that of the arch, the curve must always be nearly parabolic, because the form of the extrados has but little comparative effect on the load at each

A parabola will therefore express the general form of the curve of equilibrium in the flat bands of brick or stone, commonly placed over windows and doors, which, notwithstanding their external form, may very properly be denominated flat arches. But if we consider the direction of the joints as perpendicular to the curve, it may easily be shown, from the properties of the wedge, that they must tend to a common axis, in order that the thrust may be equal throughout; and the curve must be perpendicular to them, and consequently circular; but the difference from the parabola will be wholly inconsiderable.

Q. For a horizontal extrados, and an intrados terminated by the curve itself, which, however, is a supposition merely theoretical, the equation of the curve is

$$x = \sqrt{m}$$
 hyp. log.  $\frac{y + \sqrt{(yy - aa)}}{a}$ .

Since in this case w = y (Prop. M.), we have  $\int y dx$ 

$$= m \frac{dy}{dx}$$
, and  $md^2y = y (dx)^2$ ; whence, multiplying both

sides by dy, we have  $m dy d^2y = y dy (dx)^2$ ; and, taking the fluent,  $\frac{1}{3}$  m  $(dy)^2 = \frac{1}{3}y^2 (dx)^2$ , and  $mt^2 = y^2$ , which must be corrected by making y = a when t vanishes, so that we

shall have  $mt^2 = y^2 - a^2$ , and  $y = \sqrt{(a^2 + mt^2)}$ . But since  $\frac{dy}{dx}$ 

$$= t = \sqrt{\left(\frac{yy - aa}{m}\right)}$$
,  $dx = dy \sqrt{\frac{m}{(yy - aa)}}$ , and  $x = \frac{a}{(yy - aa)}$ 

 $\sqrt{m}$  HL  $(y + \sqrt{y^2 - a^2}) - \sqrt{m}$  HL a; whence all the points of the curve may be determined by means of a table of logarithms. But such a calculation is by no means so immediately applicable to practice as has generally been supposed; for the curve of equilibrium will always be so distant from the intrados at the abutments, as to derange the whole distribution of the forces concerned.

R. For an arch of equable absolute thickness throughout its length, the equation is  $z = \sqrt{(y^2 - m^2)}$  and

$$x = m_{\text{HL}} \frac{y + \sqrt{(yy - mm)}}{m}$$

The weight of any portion of the half arch being repre-

$$\sqrt{(1+\left(\frac{\mathrm{d}x}{\mathrm{d}y}\right)^2)} = \mathrm{d}y \sqrt{(1+\frac{mm}{zz})}$$
, and  $\mathrm{d}y = \frac{\mathrm{d}z}{\sqrt{(1+\frac{mm}{zz})}}$ 

$$=\frac{z\mathrm{d}z}{\sqrt{(zz+mm)}}$$
, of which the fluent is  $\sqrt{(z^2+m^2)}$ , re-

quiring no further correction than to suppose y initially equal to m; and we have  $z = \sqrt{(y^2 - m^2)}$ . Again, since

$$dz = dx \sqrt{1 + \frac{zz}{mm}}$$
, we find in the same manner  $dx =$ 

$$\sqrt{(mm+zz)}$$
, and  $x=m$  HL  $(z+\sqrt{[mm+zz]})-m$  HL  $m$ 

Bridge.

 $y = m \text{ HL } \frac{z+y}{m}$ . This curve will therefore in some cases

be identical with that of the preceding proposition. It is commonly called the catenaria, since it represents the form in which a perfectly flexible chain of equable thickness will hang by its gravity.

ness will hang by its gravity. S. If the load on each point of an arch be expressed by the equation  $w = a + bx^2$ , the equation for the curve of equilibrium will be  $my = \frac{1}{2} ax^2 + \frac{1}{12} bx^4$ .

Since the whole load 
$$\int w dx$$
 is here  $ax + \frac{1}{2}bx^3$ , we have  $m\frac{dy}{dx} = ax + \frac{1}{3}bx^3$  (Prop. M.), and  $my = \frac{1}{2}ax^2 + \frac{1}{12}bx^4$ .

This expression will, in general, be found sufficiently accurate for calculating the form of the curve of equilibrium in practical cases; and it may easily be made to comprehend the increase of the load from the obliquity of the arch-stones. The ordinate y at the abutment being given, the value of m may be deduced from it; and since at the vertex my is simply  $\frac{1}{2}$   $ax^2$ , the radius of curvature

$$r$$
 will here be  $\frac{xx}{2y} = \frac{m}{a}$ .

T. If we divide the span of an arch into four equal parts, and add to the weight of one of the middle parts one sixth of its difference from the weight of one of the extreme parts, we shall have a reduced weight, which will be to the lateral thrust as the height of the arch to half the span, without sensible error.

The weight of the half arch being expressed by  $ax + \frac{1}{3}bx^3$  when x is equal to the whole span, if we substitute x for  $\frac{1}{2}x$ , it will become  $\frac{1}{2}ax + \frac{1}{24}bx^3$  for one of the middle parts, leaving  $\frac{1}{2}ax + \frac{7}{24}bx^3$  for the extreme part, which gives  $\frac{6}{24}bx^3$  for the difference of the parts, and one sixth of this added to the former quantity makes it  $\frac{1}{2}ax + \frac{1}{12}bx^3$ : but since  $my = \frac{1}{2}ax^2 + \frac{1}{12}bx^4$ , dividing by mx, we have  $\frac{y}{x} = \frac{1}{2}ax + \frac{1}{12}bx^3 = \frac{1}{2}ax + \frac{1}{12}bx^3$ .

It is also obvious, that if we subtract, instead of adding, one sixth of the difference, we have 
$$\frac{1}{2}ax$$
; and dividing by  $\frac{1}{2}x$ , we obtain  $a$ , and thence  $r=\frac{m}{a}$ ,  $m$  being previous-

by  $\frac{1}{2}x$ , we obtain a, and thence  $r = \frac{1}{a}$ , m being previously found by the proposition.

U. When the load is terminated by a circular or elliptical arc,  $w = a + nb - n \sqrt{(b^2 - x^2)}$  and  $my = \frac{1}{2}$ 

cal arc,  $w = a + nb - n \sqrt{(b^2 - x^2)}$  and  $my = \frac{1}{2}$   $(a+nb) x^2 - \frac{1}{2} nb^2 x$  arc  $\sin \frac{x}{b} - \frac{1}{2} nb^2 \sqrt{(b^2 - x^2)} + \frac{1}{6} n (b^2 - x^2)^{\frac{3}{2}} + \frac{1}{8} nb^2$ .

The whole load fwdx is here  $ax + nbx - \frac{1}{2} nb^2$  arc

The whole load  $\int w dx$  is here  $ax + nbx - \frac{1}{2}nb^2$  arc  $\sin \frac{x}{b} - \frac{1}{2}nx \sqrt{(b^2 - x^2)}$ ; and hence  $my = \frac{1}{2}ax^2 + \frac{1}{2}nbx^2 - \frac{1}{2}nb^2x$  arc  $\sin \frac{x}{b} + \frac{1}{2}nb^5 - \frac{1}{2}nb^2\sqrt{(b^2 - x^2)} + \frac{1}{6}n(b^2 - x^2)^{\frac{5}{2}} - \frac{1}{6}nb^3$  (Prop. M.) And the radius of curvature at the vertex will again be  $\frac{m}{a}$ . When the

curve is circular, the axes of the ellipse being equal, n = 1.

If the extrados and intrados are concentric, the calculation requires us to take the difference between the results determining the weight for each curve; but it will commonly be equally accurate, in such a case, to consider the depth of the load as uniform, at least when the joints are in the direction of the radii.

X. The abutment must be higher without than within, by a distance which is to its breadth as the horizontal distance of the centre of gravity of the half arch from the middle of the abutment is to the height of the middle of the key-stone above the same point.

This proposition follows immediately from the proportion of the horizontal thrust to the weight, determined by the property of the lever; the one acting at the distance of the height of the arch from the fulcrum, and the other at the distance of the centre of gravity from the abutment, so as to balance each other; and the oblique direction of the face of the abutment being perpendicular to the thrust compounded of these two forces. The same rule also serves for determining the proper position of the abutment of a beam or rafter of any kind, in order that it may stand securely, without the assistance of friction. But for a bridge, if we calculate the situation of the curve of equilibrium, we obtain the direction of the thrust at its extremity more conveniently, without immediately determining the place of the centre of gravity.

Y. In order that an arch may stand without friction or cohesion, a curve of equilibrium, perpendicular to all the surfaces of the joints, must be capable of being drawn within the substance of the blocks.

If the pressure on each joint be not exactly perpendicular to the surfaces, it cannot be resisted without friction, and the parts must slide on each other; this, however, is an event that can never be likely to occur in practice. But if the curve, representing the general pressure on any joint, be directed to a point in its plane beyond the limits of the substance, the joint will open at its remoter end, unless it be secured by the cohesion of the cements, and the structure will either wholly fall, or continue to stand in a new form. (Plate CXLIII. fig. 5.)

From this condition, together with the determination of the direction of the joints already mentioned (Prop. P.), we may easily find the best arrangement of the joints in a flat arch: the object, in such cases, being to diminish the lateral thrust as much as possible, it is obvious that the common centre of the joints must be brought as near to the arch as is compatible with the condition of the circle remaining within its limits; and it may even happen that the superincumbent materials would prevent the opening of the joints even if the centre were still nearer than this; but if, on the other hand, the arch depended only on its own resistance, and the materials were in any danger of being crushed, it would be necessary to keep the circle at some little distance from its surfaces, even at the expense of somewhat increasing the lateral pressure.

When the curve of equilibrium touches the intrados of an arch of any kind, the compression at the surface must be at least four times as great as if it remained in the middle of the arch-stones (Prop. E.), and still greater than this if the cohesion of the cements is called into action. In this estimate we suppose the transverse sections of the blocks inflexible, so as to co-operate throughout the depth in resisting the pressure on any point; but in reality this co-operation will be confined within much narrower limits, and the diminution of strength will probably be considerably greater than is here supposed, whenever the curve approaches to the intrados of the arch.

The passage of the curve of equilibrium through the

that of a frame of carpentry, or of a beam resisting a transverse force, by an increase of its depth in preference to any other of its dimensions: a greater depth does, indeed, give it a power of effectually resisting a greater force of external pressure derived from the presence of any occasional load on any part of the structure; but the magnitude of such a load is seldom very considerable, in

proportion to the weight of the bridge.

It is of some importance, in these investigations, to ening the materials to be too soft, or the abutments insecure, or any part of the work to be defective, and to afford too little resistance, the length of the curve of the arch being diminished, or its chord extended, it will become flatter, and consequently sink; the alteration being by far the greatest, if other things are equal, where the depth is the least, that is, near the crown or key-stone; so that if the curvature was at first nearly equal throughout, the crown will sink so much as to cause a rapid increase of curvature on each side in its immediate neighbourhood, which will bring the intrados up to the curve of equilibrium, or even above it, the form of this curve being little altered by the change of that of the arch. The middle remains firm, because the pressure is pretty equally divided throughout the blocks; but the parts newly bent give way to the unequal force, and chip a little at their internal surface; but being reduced in their dimensions by the pressure, they suffer the middle to descend still lower, and are consequently carried down with it, so as to be relieved from the inequality of pressure depending on their curvature, and to transfer the effect to the parts immediately beyond them, till these in their turn crumble, and by degrees the whole structure falls. (Plate CXLIII. fig. 6.)

## SECT. III.—Of the Effect of Friction.

The friction or adhesion of the substances employed in architecture is of the most material consequence for insuring the stability of the works constructed with them, and it is right that we should know the extent of its operation. It is not, however, often practically necessary to calculate its exact magnitude, because it would seldom be prudent to rely materially on it, the accidental circumstances of agitation or moisture tending very much to diminish its effect. Nor is the cohesion of the cements employed of much farther consequence than as enabling them to form a firm connection, by means of which the blocks may rest more completely on each other than they could do without it; for we must always remember that we must lose at least half of the strength, before the cohesion of the solid blocks themselves, in the direction of the arch, can be called into action, and at least three fourths before the joints will have any tendency to open throughout their extent.

Z. The joints of an arch, composed of materials subject to friction, may be situated in any direction lying within the limits of the angle of repose, on either side of the perpendicular to the curve of equilibrium; the angle of repose being equal to the inclination to the horizon at which the materials begin to slide on each other; and the direct friction being to the pressure as the tangent of this angle is to the radius.

It is obvious, that any other force as well as that of gravity will be resisted by the friction or adhesion of the surfaces when its direction is within the limits of the angle at which the substances begin to slide; and it may be inferred from the experiments of Mr Coulomb and Profes-

Bridge. middle of each block is all that is necessary to insure the sor Vince, that this angle is constant, whatever the mag- Bridge. stability of a bridge of modern dimensions and of sound nitude of the force may be, since the friction is very nearmaterials. Its strength is by no means increased, like ly proportional to the mutual pressure of the substances. The tendency of a body to descend along any plane being as much less than its weight as the height of the plane is less than its length, and the pressure on the plane being as much less than the weight as the length is greater than the horizontal extent, it follows, that, when the weight begins to overcome the friction, the friction must be to the pressure as the height of the plane to its horizontal extent, or as the tangent of the inclination to the radius.

This property of the angle of repose affords a very easy deavour to trace the successive steps by which the fabric method of ascertaining, by a simple experiment, the fric-of a bridge may commonly be expected to fail. Suppostion of the materials employed. Taking, for example, a common brick, and placing it, with the shorter side of its end downwards, on another which is gradually raised, we shall find that it will fall over without beginning to slide; and when this happens, the height must be half of the horizontal extent, a brick being twice as long as it is broad. In this case, therefore, the friction must be at least half of the pressure, and the angle of repose at least 30°; and an equilateral wedge of brick could not be forced up by any steady pressure of bricks acting against its sides, in a direction parallel to its base. But the effects of agitation would make such a wedge totally insecure in any practical case; and the determination only serves to assure us, that a very considerable latitude may be allowed to the joints of our materials, when there is any reason for deviating from the proper direction, provided that we be assured of a steady pressure; and much more in brick or stone than in wood, and more in wood than in iron, unless the joints of the iron be secured by some cohesive connection. It may also be inferred from these considerations, that the direction of the joints can never determine the direction of the curve of equilibrium crossing them, since the friction will always enable them to transmit the thrust in a direction varying very considerably from the perpendicular; although, with respect to any particular joint, of which we wish to ascertain the stability independent of the friction, it would be desirable to collect the result of the elements of which that curve is the representative, with a proper regard to its direction.

## Sect. IV.—Discussions regarding the London Bridges.

The parliamentary inquiry respecting the improvement of the port of London, brought forward a variety of important information, and suggested a multiplicity of ingenious designs, deserving here of some notice. The principal part of that which relates to our present subject is contained in the Second and Third Reports from the Select Committee of the House of Commons; ordered to be printed 11th July 1799, and 28th July 1800.

These Reports contain some interesting details respecting the history of the old London Bridge, which appears to have been begun, not, as Hume tells us, by William Rufus, who was killed in 1100, but in 1176, under Henry II., and to have been completed in eighty-three years. The piles were principally of elm, and remained for six centuries without material decay; although a part of the bridge fell, and was rebuilt about 100 years after it was begun. About the middle of the last century the centre pier was removed; the piles were drawn by a very powerful screw, and a single arch was made to occupy the place of two. In consequence of this the fall was somewhat diminished, and it was necessary partially to obstruct the channel again, in order that the stream should have force enough for the water-works; but it was very difficult to secure the bottom from the effects of the increased velocity under the arch. Several strong beams were firmly fixed across the bed of the river, but only

Bridge two of them retained their situations for any length of time; strained undergo the greatest change of form. Thus, if Bridge teen inches below the surface at low water.

were published in the reports, together with engraved details on an ample scale. They finally adopted three resolutions respecting the rebuilding of London Bridge.

1. That it was essential to the improvement and accommodation of the port of London, that London Bridge should be rebuilt upon such a construction as to permit a free passage, at all times of the tide, for ships of such a tonnage, at least, as the depth of the river would then admit of between London Bridge and Blackfriars Bridge.

2. That an iron bridge, having its centre arch not less than sixty-five feet high in the clear, above high-water mark, would answer the intended purpose, and at the least expense.

3. That the most convenient situation for the new bridge would be immediately above St Saviour's Church, and upon

a line from it to the Royal Exchange.

In a subsequent Report, ordered to be printed 3d June 1801, we find a plan for a magnificent iron bridge of 600 feet span, which had been submitted to the committee by Messrs Telford and Douglas. Mr Telford's reputation in his profession as an engineer deservedly attracted the attention of the committee; but many practical difficulties having been suggested to them, they circulated a number of queries relating to the proposal, among such persons of science, and professional architects, as were the most likely to have afforded them satisfactory information. But the results of these inquiries are not a little humiliating to the admirers of abstract reasoning and of geometrical evidence; and it would be difficult to find a greater discordance in the most heterodox professions of faith, or in the most capricious variations of taste, than is exhibited in the responses of our most celebrated professors, on almost every point submitted to their consideration. It would be useless to dwell on the numerous errors with which many of the answers abound; but the questions will afford us a very convenient clue for directing our attention to such subjects of deliberation as are really likely to occur in a multiplicity of cases; and it will perhaps be possible to find such answers for all of them as will tend to remove the greater number of the difficulties which have hitherto embarrassed the subject.

QUESTIONS RESPECTING THE CONSTRUCTION OF A CAST-IRON BRIDGE, OF A SINGLE ARCH, 600 FEET IN THE SPAN, AND 65 FEET RISE. (Plate CXLIII. fig. 7.)

QUESTION I. What parts of the bridge should be considered as wedges, which act on each other by gravity and pressure, and what parts as weight, acting by gravity only, similar to the walls and other loading, usually erected upon the arches of stone bridges? Or does the whole act as one frame of iron, which can only be destroyed by crushing its

The distribution of the resistance of a bridge may be considered as in some measure optional, since it may be transferred from one part of the structure to another, by wedging together most firmly those parts which we wish to be most materially concerned in it. But there is also a natural principle of adjustment, by which the resistance has a tendency to be thrown where it can best be supported; for the materials being always more or less compressible, a very small change of form, supposed to be equal throughout the structure, will relieve those parts most which are the most strained, and the accommodation will be still more effectual when the parts most deed, we wanted to cross a mere ditch, without depend-

and the materials carried away had been deposited below the flatter ribs, seen at the upper part of the proposed the middle arch, so as to form a shoal, which was only six- structure, supported any material part of its weight, they would undergo a considerable longitudinal compression, The committee received an immense variety of plans and and being shortened a little, would naturally descend very proposals for docks, wharfs, and bridges. Many of these rapidly upon the more curved, and consequently stronger parts below, which would soon relieve them from the load improperly allotted to them: the abutment would also give way a little, and be forced out by the greater pressure at its upper part, while the lower part remained almost entirely unchanged.

It is, however, highly important that the work should, in the first instance, be so arranged as best to fulfil the intended purposes, and especially that such parts should have to support the weight as are able to do it with the least expense of lateral thrust, which is the great evil to be dreaded in a work of these gigantic dimensions, the materials themselves being scarcely ever crushed when the arch is of a proper form, and the failure of an iron bridge, by the want of ultimate resistance of its parts to a compressing force, being a thing altogether out of our contemplation; and it is obvious that the greater the curvature of the resting parts, the smaller will be the lateral thrust on the abutments.

We may therefore sufficiently answer this question, by saying that the whole frame of the proposed bridge, so far as it lies in or near the longitudinal direction of the arch, may occasionally co-operate in affording a partial resistance if required; but that the principal part of the force ought to be concentrated in the lower ribs, not far remote from the intrados.

But it is by no means allowable to calculate upon a curve of equilibrium exactly coinciding with the intrados; since, if this supposition were realized, we should lose more than three fourths of the strength of our materials, and all the stability of the joints independent of cohesion, so that the slightest external force might throw the curve beyond the limits of the joint, and cause it to open. Nor can we always consider the curve of equilibrium as parallel to the intrados: taking, for example, the case of a bridge like Blackfriars, the curve of equilibrium, passing near the middle of the arch-stones, is, and ought to be, nine or ten feet above the intrados at the abutment, and only two or three feet at the crown; so that the ordinates of this curve are altogether different from the ordinates which have hitherto been considered by theoretical wri-It may be imagined that this difference is of no great importance in practice; but its amount is much greater than the difference between the theoretical curves of equilibrium, determined by calculation, and the commonest circular or elliptical arches.

With respect to the alternative of comparing the bridge with masonry or with carpentry, we may say, that the principles on which the equilibrium of bridges is calculated are altogether elementary, and independent of any figurative expressions of strains and mechanical purchase, which are employed in considering many of the arrangements of carpentry, and which may indeed, when they are accurately analysed, be resolved into forces opposed and combined in the same manner as the thrusts of a bridge. It is, therefore, wholly unnecessary, when we inquire into the strength of such a fabric, to distinguish the thrusts of masonry from the strains of carpentry, the laws which govern them being not only similar, but identical, except that a strain is commonly understood as implying an exertion of cohesive force; and we have seen that a cohesive force ought never to be called into action in a bridge, since it implies a great and unnecessary sacrifice of the strength of the materials employed. If, in-

Bridge. ing on the firmness of the bank, we might easily find a to be tolerably well calculated to stand when considered Bridge. in a substance of inconsiderable length, we are sure of having more strength than we require. But to assert that an iron bridge of 600 feet span "is a lever exerting a vertical pressure only on the abutments," is to pronounce a sentence from the lofty tribunal of refined science, which the simplest workman must feel to be erroneous. But in this instance the error is not so much in the comparison with the lever, as in the inattention to the mode of fixing it; for a lever or beam of the dimensions of the proposed bridge, lying loosely on its abutments, would probably be at least a hundred times weaker than if it were firmly connected with the abutments, as a bridge is, so as to be fixed in a determinate direction. And the true reason of the utility of cast iron for building bridges consists not, as has often been supposed, in its capability of being united so as to act like a frame of carpentry, but in the great resistance which it seems to afford to any force tending to crush it.

QUESTION II. Whether the strength of the arch is affected, and in what manner, by the proposed increase of its width towards the two extremities or abutments, when considered vertically and horizontally. And if so, what form

should the bridge gradually acquire?

The only material advantage derived from widening the bridge at the ends, consists in the firmness of the abutments; and this advantage is greatly diminished by the increase of horizontal thrust which is occasioned by the increase of breadth, while the curve of equilibrium is caused to deviate greatly from a circular or parabolic arc, in consequence of the great inequality of the load on the different parts; and there seems to be no great difficulty in forming a firm connection between a narrow bridge and a wider abutment, without this inconvenience. The lateral strength of the fabric, in resisting any horizontal force, would be amply sufficient, without the dilatation at the ends. Perhaps the form was suggested to the inventor by the recollection of the partial failure of an earlier work of the same kind, which has been found to deviate considerably from the vertical plane in which it was originally situated; but in this instance there seems, if we judge from the engravings which have been published, to have been a total deficiency of oblique braces; and the abutments appear to have been somewhat less firm than could have been desired, since one of them contains an arch and some warehouses, instead of being composed of more solid masonry. (Plate CXLIII. fig. 8.)

QUESTION III. In what proportions should the weight

be distributed from the centre to the abutments, to make the

arch uniformly strong?

This question is so comprehensive, that a complete answer to it would involve the whole theory of bridges; and it will be necessary to limit our investigations to an inquiry whether the structure, represented in the plan, is actually such as to afford a uniform strength, or whether any alterations can be made in it compatible with the general outlines of the proposal, to remedy any imperfections which may be discoverable in the arrangement of the pressure.

There is an oversight in some of the official answers to this question, from quarters of the very first respectability, which requires our particular attention. The weight of the different parts of the bridge has been supposed to differ so materially from that which is required for producing an equilibrium in a circular arch of equable curvature, that it has been thought impossible to apply the principles of the theory in any manner to an arch so con-

beam of wood or a bar of iron strong enough to afford a as a frame of carpentry. The truth is, that it is by no passage over it, unsupported by any abutment, because, means absolutely necessary, nor often perfectly practicable, that the mean curve of equilibrium should agree precisely in its form with the curves limiting the external surfaces of the parts bearing the pressure, especially when they are sufficiently extensive to admit of considerable latitude within the limits of their substance. It may happen in many cases that the curve of equilibrium is much flatter in one part, and more convex in another, than the circle which approaches nearest to it; and yet the distance of the two curves may be inconsiderable, in comparison with the thickness of the parts capable of cooperating in the resistance. The great problem, therefore, in all such cases, is to determine the precise situation of the curve of equilibrium in the actual state of the bridge; and when this has been done, the directions of the ribs in the case of an iron bridge, and of the joints of the arch-stones in a stone bridge, may be so regulated as to afford the greatest possible security; and if this security is not deemed sufficient, the whole arrangement must be altered.

Considering the effect of the dilatation at the ends in increasing the load, we may estimate the depth of the materials causing the pressure at the abutments as about three times as great as at the crown; the plan not being sufficiently minute to afford us a more precise determination; and it will be quite accurate enough to take w = a $+bx^2$  (Prop. S.) for the load, w becoming = 3a when x

is 300 feet, whence 90,000 
$$b = 2a$$
, and  $b = \frac{1}{45,000}a$ ; we

have then 
$$my = \frac{1}{2} ax^2 + \frac{1}{540,000} ax^4$$
 for the value of the

ordinate. Now the obliquity to the horizon being inconsiderable, this ordinate will not ultimately be much less than the whole height of the arch, and its greatest value may be called sixty-four feet; consequently, when x = 300, we have  $64 m = \frac{1}{2} a \times 90,000 + \frac{1}{6} a \times 90,000$ , and the

radius of curvature at the vertex 
$$r = \frac{m}{a} = 937.5$$
 feet,

while the radius of the intrados is 725 feet, and that of a circle passing through both ends of the curve of equilibrium, as we have supposed them to be situated, 735 feet.

Hence y being 
$$=\frac{1}{1875}x^2\left(1+\frac{1}{270000}x^2\right)$$
, we may calculate the ordinates at different points and compare them

culate the ordinates at different points, and compare them with those of the circular curves.

50	е <i>у</i> .
15015·6615·4313·00 20028·1327·7024·50	
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30065.0064.0064.00	

Hence it appears that, at the distance of 200 feet from the middle, the curve of equilibrium will rise more than three feet above its proper place, requiring a great proportion of the pressure to be transferred to the upper ribs, with a considerable loss of strength, for want of a communication approaching more nearly to the direction of the curve. If we chose to form the lower part of the structure of two series of frames, each about four feet deep, with diagonal braces, we might provide amply for such an irregularity in the distribution of the pressure; but it would be necessary to cast the diagonals as strong stituted, at the same time that the structure is admitted as the blocks, in order to avoid the inequality of tension

Bridge.

Bridge. from unequal cooling, which is often a cause of dangerous accidents; it would, however, be much better to have the arch somewhat elliptical in its form, if the load were of necessity such as has been supposed.

QUESTION IV. What pressure will each part of the bridge receive, supposing it divided into any given number of equal sections, the weight of the middle section being given? And on what parts, and with what force, will the whole act upon

It appears, from the preceding calculations, that the weight of the "middle section" alone is not sufficient for determining the pressure in any part of the fabric; although, when the form of the curve of equilibrium has been found, its radius of curvature at the summit must give at once the length of a similar load equivalent to the lateral thrust; and by combining this thrust with the weight, or with the direction of the curve, the oblique thrust at any part of the arch may be readily found. Thus, since at the abutment  $w = a + bx^2 = 3a$ , and  $bx^2$ 

= 2a, we have 
$$y = \frac{1}{2} \frac{a}{m} x^2 + \frac{1}{12} \frac{b}{m} x^4$$
, and  $\frac{dy}{dx}$ , the tangent

of the inclination becomes 
$$=\frac{a}{m}x + \frac{1}{3}\frac{b}{m}x^3 = \frac{ax}{m} + \frac{2}{3}\frac{ax}{m}$$

$$=\frac{5 x}{3 r} = \frac{5}{3} \cdot \frac{300}{937 \cdot 5} = \frac{8}{15} = .5333$$
; consequently the hori-

zontal thrust will be to the weight of the half arch as fifteen to eight, and to that of the whole arch as fifteen to sixteen. Now the arch is supposed to contain 6500 tons of cast iron, and together with the road will amount, according to Professor Robison's estimate, to 10,100 tons; so that the lateral thrust on each abutment is 9470 tons; and since this is equal to the weight of 937.5 feet in length, of the thickness of the crown, the load there must be about ten tons for each foot of the length. Hence it appears, that although the thrust thus calculated is greater than the weight of a portion of equal length with the apparent radius at the crown, it is less than would be inferred from the angular direction of the intrados at the abutment; the inclination of the termination of the arch being 24° 27', while that of the true curve of equilibrium is 28° 4'; that is, about one tenth greater.

As a further illustration of the utility of this mode of computation, we may take the example of an arch of Blackfriars Bridge. The radius of curvature, as far as four fifths of the breadth, is here fifty-six feet; and we may suppose, without sensible error, the whole load to be that which would be determined by the continuation of the same curve throughout the breadth. Now, the middle of the arch-stones at the distance of fifty feet from the middle of the bridge, that is, immediately over the termination of the abutment, is about twelve feet above that termination, and at the crown about three feet above the intrados, so that we have only thirty-one feet for the extreme value of y, while the whole height of the arch is forty; and a being 6.58 feet, we find (Prop. U.) my

= 13,510 = 31m, whence 
$$m = 436$$
, and  $\frac{m}{a} = r = 66\frac{1}{4}$ ; we

also obtain the values of the ordinates of the curve as in the annexed table.

Ordinate $y$ .	Middle of the Arch-Stones.
	90
3-12	3.72
5·13	6.12
. <b></b> 7•71	8•75
15.81	16-81
31.00	31.00

Hence it appears that the greatest deviation is about

thirty feet from the middle, where it amounts to a little more than a foot. But if we suppose this deviation divided by a partial displacement of the curve at its extremities, as it would probably be in reality, even if the resistance were confined to the arch-stones, it would be only about half as great in all three places; and even this deviation will reduce the strength of the stones to two thirds, leaving them, however, still many times stronger than can ever be necessary. The participation of the whole fabric, in supporting a share of the oblique thrust, might make the pressure on the arch-stones somewhat less unequal, and the diminution of their strength less considerable; but it would be better that the pressure should be confined almost entirely to the arch-stones, as tending less to increase the horizontal thrust, which is here compressed by m = 436, implying the weight of so many square feet of the longitudinal section of the bridge: while, if we determined it from the curvature of the intrados, it would appear to be only 56a = 368.

In this calculation, the oblique direction of the joints, as affecting the load, has not been considered; but its effect may be estimated by merely supposing the specific gravity of the materials to be somewhat increased. Thus, since the back of each arch-stone is about one eighth wider than its lower end, the weight of the materials pressing on it will be about one sixteenth greater than would press on it if it were of uniform thickness; and this increase will be very nearly proportional to w, the whole load at each part; so that it will only affect the total magnitude of the thrust, which, instead of 436, must be supposed to amount to about 463. If also great accuracy were required, it would be necessary to appreciate the different specific gravities of the various materials constituting the load, since they are not altogether homogeneous; but so minute a calculation is not necessary in order to show the general distribution of the forces concerned, and the sufficiency of the arrangement for answering all the purposes intended.

QUESTION V. What additional weight will the bridge sustain, and what will be the effect of a given weight placed

upon any of the before-mentioned sections? When a weight is placed on any part of a bridge, the curve of equilibrium must change its situation more or less according to the magnitude of the weight; and the tangent of its inclination must now be increased by a quantity proportional to the additional pressure to be supported, which, if the weight were placed in the middle of the arch, would always be equal to half of it; but when the weight is placed at any other part of the arch, if we find the point where the whole thrust is horizontal, the vertical pressure to be supported at each point of the curve must obviously be equal to the weight of the materials interposed between it and this new summit of the curve. Now. in order to find where the thrust is horizontal, we must divide the arch into two such portions, that their difference, acting at the end of a lever of the length of half the span, that is, of the distance from the abutment, may be equivalent to the given weight, acting on a lever equal to its distance from the other abutment, to which it is nearest: consequently this difference must be to the weight as the distance of the weight from the end to half the span; and the distance of the new summit of the curve from the middle must be such, that the weight of materials intercepted between it and the middle shall be to the weight as the distance of the weight from the end to the whole span; and the tangent of the inclination must everywhere be increased or diminished by the tangent of the angle at which the lateral thrust would support the weight of this portion of the materials, except immediately under the weight, where the two portions of the curve

Bridge. will meet in a finite angle, at least if we suppose the weight strength of attachment to the abutments would, of course, Bridge.

to be collected in a single point.

If, for example, a weight of 100 tons, equal to that of about ten feet of the crown of the arch, be placed halfway between the abutment and the middle; then the vertex of the curve, where the thrust is horizontal, will be removed  $2\frac{1}{2}$  feet towards the weight; but the radius being 937.5 feet, the tangent of the additional inclination will

be  $\frac{2.5}{937.5} = \frac{1}{375}$ , and each ordinate of the curve will be in-

creased  $\frac{1}{375}$  of the absciss, reckoning from the place of

the weight to the remoter abutment; but between the weight and the nearest abutment the additional pressure at each point will be 10-2.5=7.5 feet, consequently

the tangent will be  $\frac{1}{125}$ , and the additions to the ordi-

to  $1\frac{1}{5}$  foot, and at the summit  $\frac{150}{375} = \frac{2}{5}$ , which being deducted, the true addition to the height of the curve will

appear to be 4. But the actual height will remain unal-

tered, since the curve is still supposed to be terminated by the abutments, and to pass through the middle of the key-stone; and we have only to reduce all the ordinates in the proportion of 64.8 to 64. Thus, at 200 feet from

the summit, the ordinate, instead of  $24.50 + \frac{200}{375} = 25.03$ ,

will be 24.72, so that the curve will be brought  $2\frac{1}{2}$  inches nearer to the intrados, which, in the proposed fabric, would by no means diminish its strength; while, on the opposite side, immediately under the weight, the ordinate 13 -

 $\frac{130}{375}$  = 12.6 will be reduced to 12.45, and the curve rais-

ed between six and seven inches, which is a change by no means to be neglected in considering the resistances required from each part of the structure. We ought also, if great accuracy were required, to determine the effect of such a weight in increasing the lateral thrust, which would affect in a slight degree the result of the calculation; but it would not amount, in the case proposed, to more than one eightieth of the whole thrust.

It is obvious that the tendency of any additional weight, placed near the middle of a bridge, is to straighten the two branches of the curve of equilibrium, and that, if it were supposed infinite, it would convert them into right lines; provided, therefore, that such right lines could be drawn without coming too near the intrados at the haunches, the bridge would be in no danger of giving way, unless either the materials were crushed, or the abutments were forced out. In fact, any bridge well constructed might support a load at least equal to its own weight, with less loss of strength than would arise from some such errors as have not very uncommonly been committed, even in works which have on the whole succeeded tolerably well.

QUESTION VI. Supposing the bridge executed in the best manner, what horizontal force will it require, when applied to any particular part, to overturn it, or press it out of the vertical plane?

If the bridge be well tied together, it may be considered as a single mass, standing on its abutments; its mean breadth being about 80 feet, and its weight 10,100 tons; and such a mass would require a lateral pressure at the crown of the arch of about 7000 tons to overset it. Any

make it still firmer, and any want of connection between the parts weaker; and since the actual resistance to such a force must depend entirely on the strength of the oblique connection between the ribs, it is not easy to define its magnitude with accuracy: but, as Professor Robison has justly remarked, the strength would be increased by causing the braces to extend across the whole breadth of the half arch. The single ribs, if wholly unconnected, might be overset by an inconsiderable force, since they stand in a kind of tottering equilibrium; and something like this appears to have happened to the bridge at Wearmouth. Dr Hutton, indeed, mentions some " diagonal iron bars" in this bridge; but these were perhaps added after its first erection, to obviate the "twisting," which had become apparent, since they are neither exhibited in the large plates of the bridge, nor mentioned in the specification of the

QUESTION VII. Supposing the span of the arch to remain nates at the abutments will be  $\frac{450}{375}$  and  $\frac{150}{125}$ , each equal the same, and to spring ten feet lower, what additional tensors the visual distances the result of the same and the same at the same and the same at the s strength would it give the bridge? Or, making the strength the same, what saving may be made in the materials? Or if, instead of a circular arch, as in the plates and drawings, the bridge should be made in the form of an elliptical arch, what would be the difference in effect, as to strength, dura-

tion, convenience, and expenses?

The question seems to suppose the weight of the materials to remain unaltered, and the parts of the structure that would be expanded to be made proportionally lighter; which could not be exactly true, though there might be a compensation in some other parts. Granting, however, the weight to be the same under both circumstances, if the ordinate y at the end be increased in the proportion of sixty-four to about seventy-three, the curvature at the vertex will be increased, and the lateral thrust diminished in the same ratio, the 9470 tons being reduced to 8300. The additional thrust occasioned by any foreign weight would also be lessened, but not the vertical displacement of the curve derived from its pressure; and since the whole fabric might safely be made somewhat lighter, the lightness would again diminish the strain-The very least resistance that can be attributed to a square inch of the section of a block of cast iron is about fifty tons, or somewhat more than 100,000 pounds. It is said, indeed, that Mr William Reynolds found, by accurate experiments, that 400 tons were required to crush a cube of a quarter of an inch of the kind of cast iron called gunmetal, which is equivalent to 6400 tons for a square inch of the section. But this result so far exceeds any thing that could be expected, either from experiment or from analogy, that it would be imprudent to place much reliance on it in practice; the strength attributed to the metal being equivalent to the pressure of a column 2,280,000 feet in height, which would compress it to about four fifths of its length, since the height of the modulus of elasticity (Prop.G.) is about 10,000,000 feet. The greatest cohesive force that has ever been observed in iron or steel does not exceed seventy tons for a square inch of the section, and the repulsive force of a homogeneous substance has not been found in any other instance to be many times greater or less than the cohesive. There cannot, however, be any doubt that the oblique thrust, which amounts to 10,730 tons, would be sufficiently resisted by a section of 215 square inches, or, if we allowed a load amounting to about one third only of the whole strength, by a section of 600 square inches; and since each foot of an iron bar an inch square weighs three pounds, and the whole length of the arch nearly a ton, the 600 square inches would require nearly as many tons to be employed in the ribs affording the resistance, upon this very low estimate

Bridge. of the strength of cast iron. The doubts here expressed general be "stronger than an elliptical arch of the same Bridge. respecting Mr Reynolds's results have been fully justified by some hasty experiments, which have been obligingly made by the son of a distinguished architect: he found that two parallelopipeds of cast iron, one eighth of an inch square, and a quarter of an inch long, were crushed by a force of little more than a ton. The experiments were made in a vice, and required considerable reductions for the friction. The mode of calculation may deserve to be explained, on account of its utility on other similar occasions. Supposing the friction to be to the pressure on the screw as 1 to m, and the pressure on the screw to the actual pressure on the substance as n to 1, calling this pressure x, the pressure on the screw will be nx, and the

friction  $\frac{nx}{m}$ ; but this resistance will take from the gross

ultimate pressure f a force, which is to the friction itself as the velocity of the parts sliding on each other is to the velocity of the part producing the ultimate pressure, a proportion which we may call p to 1; and the force remain-

ing will be the actual pressure; that is,  $f = \frac{pnx}{m} = x$ , and

 $x = \frac{m}{m + pn}f$ . In these experiments, the gross force f, as supposed to be exerted on the iron, was four tons; the friction  $\frac{1}{m}$ , was probably about  $\frac{1}{4}$ , the screw not having been lately oiled; the distance of the screw from the centre of motion was to the length of the whole vice as 3 to 4, whence n was  $\frac{4}{3}$ , and p was 8.44, the middle of the screw describing 4.22 inches, while the check of the vice

moved through half an inch: consequently  $\frac{m}{m+pn}$  was  $\frac{4}{4+11\cdot25} = \frac{1}{3\cdot81}$ , and the corrected pressure becomes

In several experiments made with still greater care, and with an improved apparatus of levers, the mean

force required to crush a cube of a quarter of an inch was not quite 4½ tons, instead of 400.

Calcareous freestone supports about a ton on a square inch, which is equal to the weight of a column not quite 2000 feet in height: consequently an arch of such freestone, of 2000 feet radius, would be crushed by its own weight only, without any further load; and for an arch like that of a bridge, which has other materials to support, 200 feet is the utmost radius that it has been thought prudent to attempt; although a part of the bridge of Neuilly stands, cracked as it is, with a curvature of 250 feet radius; and there is no doubt that a firm structure, well arranged in the beginning, might safely be made much flatter than this, if there were any necessity for it.

An elliptical arch would certainly approach nearer to the form of the curve of equilibrium, which would remain little altered by the change of that of the arch; and the pressure might be more equably and advantageously transmitted through the blocks of such an arch, than in the proposed form of the structure. The duration would probably be proportional to the increased firmness of the fabric, and the greater flatness at the crown might allow a wider space for the passage of the masts of large ships on each side of the middle. There might be some additional trouble and expense in the formation of portions of an elliptical curve; but even this might be in a great measure avoided by employing portions of three circles of different radii, which would scarcely be distinguishable from the ellipsis itself.

Those who have imagined that a circular arch must in sequence of such a stroke?

height and span," have not adverted to the distinction between the apparent curvature of the arch, and the situation of the true curve of equilibrium, which depends on the distribution of the weight of the different parts of the bridge, and by no means on the form of the archstones only; this form being totally insufficient to determine the true radius of curvature, which is immediately connected with the lateral thrust, and with the strength of the fabric.

QUESTION VIII. Is it necessary or advisable to have a model made of the proposed bridge, or any part of it, in cast iron. If so, what are the objects to which the experiments should be directed; to the equilibration only, or to the cohesion of the several parts, or to both united, as they will occur in the intended bridge?

Experiments on the equilibration of the arch would be

easy and conclusive; on the cohesion or connection of the parts, extremely uncertain. The form and proportion of the joints could scarcely be imitated with sufficient accuracy; and since the strength of some of the parts concerned would vary as the thickness simply, and that of others as the square or cube of the thickness, it would be more difficult to argue from the strength of the model upon that of the bridge, than to calculate the whole from still more elementary experiments. Some such experiments ought, however, to be made on the force required to crush a block of the substance employed; and the form calculated to afford the proper equilibrium might be very precisely and elegantly determined, by means of the method first suggested by Dr Hooke, that of substituting for the blocks, resting on each other and on the abutments, as many similar pieces forming a chain, and suspended at the extremities. It would, however, be important to make one alteration in the common mode of performing this experiment, without which it would be of little or no value; the parts corresponding to the blocks of the arch should be formed of their proper thickness and length, and connected with each other and with the abutments

by a short joint or hinge in the middle of each, allowing

room for a slight degree of angular motion only; and

every other part of the structure should be represented

in its proper form and proportion and connection, that form being previously determined as nearly as possible by

calculation; and then, if the curve underwent no material

alteration by the suspension, we should be sure that the

calculation was sufficiently correct; or, if otherwise, the

arrangement of the materials might be altered, until the required curve should be obtained; and the investigation

might be facilitated by allowing the joints or hinges connecting the block to slide a little along their surfaces, within such limits as would be allowable, without too great a reduction of the powers of resistance of the blocks. QUESTION IX. Of what size ought the model to be made. and what relative proportions will experiments made on the

model bear to the bridge when executed? The size is of little importance, and it would be unsafe to calculate the strength of the bridge from any general comparison with that of the model. There is an Essay of Euler in the New Commentaries of the Royal Academy of Petersburg (vol. xx. p. 271), relating expressly to the mode of judging of the strength of a bridge from a model; but it contains only an elementary calculation, applicable to ropes and simple levers, and by no means comprehending all the circumstances that require to be considered in the structure of an arch.

QUESTION X. By what means may ships be best directed in the middle stream, or prevented from driving to the side, and striking the arch? and what would be the conBridge.

seems the simplest and best, that they might be guided by means of a small anchor, dragged along the bottom of the river. The stroke of a ship might fracture the outer ribs if they were too weak, but could scarcely affect the whole fabric in any material degree, supposing it to be firmly secured by oblique bars, crossing from one side of the abutment to the other side of the middle; and if still greater firmness were wanted, the braces might cross still more obliquely, and be repeated from space to space.

A ship moving with a velocity of three miles in an hour, or about four feet in a second, would be stopped by a force equal to her weight when she had advanced three inches with a retarded motion; and the bridge could not very easily withstand, at any one point, a force much greater than such a shock of a large ship, if it were direct, without being dangerously strained. But we must consider that a large ship could never strike the bridge with its full force, and that the mast would be much more easily broken than the bridge. The inertia of the parts of the bridge, and of the heavy materials laid on it, would enable it to resist the stroke of a small mass with great mechanical advantage. Thus the inertia of an anvil laid on a man's chest enables him to support a blow on the anvil, which would be fatal without such an interposition, the momentum communicated to the greater weight being always less than twice the momentum of the smaller, and this small increase of momentum being attended by a much greater decrease of energy or impetus, which is expressed by the product of the mass into the square of the velocity, and which is sometimes called the ascending or penetrating force, since the height of ascent or depth of penetration is proportional to it when the resistance is given. And the same mode of reasoning is applicable to any weight falling on the bridge, or to any other cause of vibration, which is not likely to call forth in such a fabric any violent exertion of the strength of the parts, or of their connections. We must also remember, in appreciating the effect of a stroke of any kind on an arched structure, that something of strength is always lost by too great stiffness; the property of resisting velocity, which has sometimes been called resilience, being generally diminished by any increase of stiffness, if the strength, with

respect to pressure, remains the same.

QUESTION XI. The weight and lateral pressure of the bridge being given, can abutments be made in the proposed situation for London Bridge, to resist that pressure?

Since this question relates entirely to the local circumstances of the banks of the Thames, the persons to whom it has been referred have generally appealed to the stability of St Saviour's Church, in a neighbouring situation, as a proof of the affirmative; and it does not appear that there have been any instances of a failure of piles well driven, in a moderately favourable soil. Professor Robison, indeed, asserts that the firmest piling will yield in time to a pressure continued without interruption; but a consideration of the general nature of friction and lateral adhesion, as well as the experience of ages in a multitude of structures actually erected, will not allow us to adopt the assertion as universally true. When, indeed, the earth is extremely soft, it would be advisable to unite it into one mass for a large extent, perhaps as far as 100 yards in every direction, for such a bridge as that under discussion, by beams radiating from the abutments, and resting on short piles, with cross pieces interspersed; since we might combine, in this manner, the effect of a weight of 100,000 tons, which could scarcely ever produce a lateral adhesion of less than 20,000, even if the materials were semifluid; for they would afford this resistance if they

For the direction of ships, Professor Robison's suggestion one foot in five of horizontal extent, which anything short Bridge. of an absolute quicksand or a bog would certainly do in perfect security. The proper direction of the joints of the masonry may be determined for the abutment exactly as for the bridge, the tangent of the inclination being always increased in proportion to the weights of the successive wedges added to the load; and the ultimate inclination of the curve is that in which the piles ought to be driven, being the direction of the result, composed of the lateral thrust, together with the joint weight of the half bridge and the abutment.

QUESTION XII. The weight and lateral pressure of the bridge being given, can a centre or scaffolding be erected over the river, sufficient to carry the arch, without obstructing the vessels which at present navigate that part?

There seems to be no great difficulty in the construc-tion of such a centre. When the bridge at Wearmouth was erected, the centre was supported by piles and standards, which suffered ships to pass between them without interruption; and a similar arrangement might be made in the present case with equal facility.

QUESTION XIII. Whether would it be most advisable to make the bridge of cast and wrought iron combined, or of cast iron only? And if of the latter, whether of the hard white metal, or of the soft gray metal, or of gun metal?

A bridge well built ought to require no cohesive strength of ties, as Mr Southern has justly observed in his answer to the eighth question; and for repulsive resistance, in the capacity of a shore, cast iron is probably much stronger than wrought iron; and it has also the advantage of being less liable to rust, and of expanding somewhat less by heat. But wherever any transverse strain is unavoidable, wrought iron possesses some advantages, and it is generally most convenient for bolts and other fastenings. The kind of iron called gun metal is decidedly preferred by the most experienced judges, as combining in the greatest degree the properties of hardness and toughness; the white being considered as too brittle, and the gray as too soft. Dr Hutton, however, and Mr Jessop, prefer the gray; and if we allow the strength of the gun metal to be at all comparable to that which Mr Reynolds attributes to it, we must also acknowledge that a much weaker substance would be amply sufficient for every practical purpose, and might deserve to be preferred, if it were found to possess a greater degree of tenacity.

QUESTION XIV. Of what dimensions ought the several members of the iron work to be, to give the bridge sufficient strength?

See the answers to Questions VII. and XI.

QUESTION XV. Can frames of cast iron be made sufficiently correct to compose an arch of the form and dimensions shown in the drawings, so as to take an equal bearing as one frame, the several parts being connected by diagonal braces, and joined by an iron cement, or other substance?

Professor Robison considers it as indispensable that the frames of cast iron should be ground to fit each other; and a very accurate adjustment of the surface would certainly be necessary for the perfect co-operation of every part of so hard a substance. Probably, indeed, any very small interstices that might be left would in some measure be filled up by degrees, in consequence of the oxidation of the metal, but scarcely soon enough to assist in bearing the general thrust upon the first completion of the bridge. The plan of mortising the frames together is by no means to be advised, as rendering it very difficult to adapt the surfaces to each other throughout any considerable part of their extent. They might be connected either as in the bridge at Wearmouth, by bars of wrought iron let into the slides, which might be of extremely moderate were capable of standing in the form of a bank, rising only dimensions, or, as in some still more modern fabrics, by

Bridge. being wedged into the grooves of cross plates adapted to similar joint would be required at the abutment, where it Bridge. tion of the whole force of the blocks, and which have the surface.

considerable length and breadth, would it be more advisable to cast each member of the ribs in separate pieces of considerable lengths, connecting them together by diagonal braces, both horizontally and vertically?

No joint can possibly be so strong as a single sound piece of the same metal; and it is highly desirable that the curve of pressure should pass through very substantia. frames or blocks, abutting fully on each other, without any reliance on lateral joints; but for the upper parts of the works, single ribs, much lighter than those which form the true arch, would be sufficiently firm.

QUESTION XVII. Can an iron cement be made which shall become hard and durable, or can liquid iron be poured into the joints?

Mr Reynolds has observed that a cement composed of iron borings and saline substances will become extremely hard; and it is probable that this property depends on the solidity which is produced by the gradual oxidation of the iron. It would certainly be injurious to the strength of the fabric to interpose this cement between perfectly smooth and solid surfaces, but it might be of advantage to fill up with it any small interstices unavoidably left be-tween the parts. To pour melted iron into the joints would be utterly impracticable.

QUESTION XVIII. Would lead be better to use in the whole or any part of the joints?

Lead is by far too soft to be of the least use, and a saline cement would be decidedly preferable.

QUESTION XIX. Can any improvement be made in the plan, so as to render it more substantial and durable, and less expensive? And if so, what are these improvements?

The most necessary alterations appear to be the omission of the upper and flatter ribs; the greater strength and solidity of the lower, made either in the form of blocks or of frames with diagonals; a curvature more nearly approaching to that of the curve of equilibrium; and a greater

obliquity of the cross braces.

It would be necessary to wedge the whole structure very firmly together before the removal of the centres; a precaution which is still more necessary for stone bridges, in which a certain portion of soft mortar must inevitably be employed, in order to enable the stones to bear fully on each other, and which has been very properly adopted in the best modern works. In this manner we may avoid the inconvenience pointed out by Professor Robison, who has remarked, that the compressibility of the materials, hard as they appear, would occasion a reduction of three inches in the length of the bridge, from the effect of the lateral thrust, and a consequent fall at the crown of fifteen; a result which will not be found materially erroneous if the calculation be repeated from more correct elements, derived from later experiments and comparisons. For obviating the disadvantageous effects of such a depression, which he seems to have supposed unavoidable, as well as those of a change of temperature, which must in reality occur, though to a less considerable extent, Professor Robison suggested the expedient of a joint to the middle of the bridge, with an intermediate portion, calculated to receive the rounded ends of the opposite ribs, somewhat like an interarticular cartilage; but it is impossible to devise any kind of joint without limiting the pressure, during the change of form, to a very small portion of the surfaces, which could not bear fully on each other throughout their extent if any such liberty of motion were allowed, unless all friction between them were prevented; and a

receive them, which very effectually secure the co-opera- would be still more objectionable, as extending to a wider

advantage of employing cast iron only.

The arrangement of the joints between the portions of the ribs in one or more transverse lines would be a matter The arrangement of the joints between the portions of of great indifference. Some have recommended to break the joints, as is usual in masonry, in order to tie the parts more firmly together; others to make all the joints continuous, as a safer method, on account of the brittleness of the materials; but if the fabric were well put together, there would be neither any want of firm connection, nor any danger of breaking from irregular strains, in whatever way the joints may be disposed.

QUESTION XX. Upon considering the whole circumstances of the case, agreeably to the resolutions of the committee, as stated at the conclusion of their third report, is it your opinion that an arch of 600 feet in the span, as expressed in the drawings produced by Messrs Telford and Douglas, or the same plan, with any improvement you may be so good as to point out, is practicable and advisable, and capable of being

made a durable edifice?

The answers that have been returned to this question are almost universally in the affirmative, though deduced from very discordant and inconsistent views of the subject. The only reasonable doubt relates to the abutments: and with the precautions which have been already mentioned in the answer to the 11th question, there would be no insuperable difficulty in making the abutments sufficiently firm.

QUESTION XXI. Does the estimate communicated herewith, according to your judgment, greatly exceed, or fall short of, the probable expense of executing the plan proposed?

specifying the general grounds of your opinion.

The estimate amounts to L.262,289, and it has generally been considered as below the probable expense. The abutments are set down at L.20,000, but they would very possibly require five times as much to be properly executed; while some other parts of the work, by a more judicious distribution of the forces concerned, might safely be made so much lighter, as considerably to lessen the expense of the whole fabric, without any diminution either of its beauty or of its stability.

## Sect. V.—Application of the theory to existing Bridges.

Southwark bridge, the very masterly design of Mr Rennie, exhibits an excellent specimen of firmness of mutual abutment in the parts constituting the chief strength of the arch, which has been shown in this essay to be so essential to the security of the work, and which the architect had probably been in a great measure induced to adopt from his practical experience of the comparative merits of different arrangements. (Plate CXLIV. fig. 4, 5.)

An act of parliament for the erection of this bridge was passed in 1811, but it was not begun till 1814, the act having directed that no operations should be commenced until L.300,000 out of the required L.400,000 should be raised by subscription. The subscribers were allowed to receive ten per cent. annually on their shares, and the remainder of the receipts was to accumulate until it should become sufficient to pay off to the proprietors the double amount of their subscriptions after this time the bridge was to remain open without &... The middle arch is 240 feet in span, the side arches 210 feet each. The abutment is of firm masonry, connected by dowels to prevent its sliding, and resting on gratings of timber supported by oblique piles. The piers stand on foundations nine or ten feet below the present bed of the river, in order to provide against any alterations which may hereafter take place in its channel from the operation of various causes; and they are abundantly secured by a flooring of timber resting on a great number of piles.

Bridge.

Weight of half of the middle arch of Southwark Bridge.

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	t.	cwt.	t.	out.	t.	cwt.	t.	cut.	t.	cwt.	t.	cwt.
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Span 240 feet; rise 24; depth of the blocks or plates at the crown 6 feet, at the pier 8 feet.

It is evident from the inspection of this statement of the weights, that their distribution is by no means capable of being accurately expressed by any one formula; but it will be amply sufficient for the determination of the thrust to employ the approximation founded on the supposition of a parabolic curve (Prop. T.); and if we afterwards wished to find the effect of any local deviation from the assumed law of the weight, we might have recourse to the mode of calculation exemplified in the answer to the fifth question. But, in fact, that answer may of itself be considered as sufficient to show that the effect of a variation of a few tons from the load appropriate to each part would be wholly unimportant.

We must, therefore, begin by finding the weight of a portion of the arch corresponding to a quarter of the span; and the whole angle, of which the tangent is  $\frac{24}{120} = 2$ , being 11°  $18\frac{1}{2}$ , its sine is 1961; and the angle, of which the sine is 09805, being 5°  $37\frac{1}{2}$ , we have to compute the weight of  $\frac{337.5}{678.5}$  or  $\frac{1}{2.01}$  of the angular extent, beginning from the middle of the arch; and this will be  $48\frac{1}{20} + 88\frac{1}{20} + 95\frac{1}{20} + (87\frac{1}{20}) \times 7345 = 297$  tons. Now the weight of the covering-plates, cornice, palisades, roadway, and pavement, is distributed throughout the length, without sensible inequality, making 879 tons, from which the part immediately above the piers might be deducted; but it will be safer to retain the whole weight, especially as something must be allowed for the greater extent of the upper surface of the wedges. We shall therefore have for the interior quarter 297 + 439.5 = 736.5 tons, and for the exterior 1523 - 736.5 = 786.5, the difference being fifty tons; one sixth of which added to 736.5 gives 744.8 for the reduced weight, which is to the lateral thrust as the rise to the half span. But for the rise we must take twenty-three feet, since the middle of the blocks next to the piers is a foot more remote from the intrados than that of the blocks at the crown; and the true half span, measured from the same point, will be  $4 \times \frac{120}{312}$  greater than that of the intrados, amounting to 121.6. We have therefore 23:121.6 = 745.8: 3942 tons, for m, the lateral thrust; and for  $\frac{1}{2}$  ax, 736.5  $-\frac{50}{6}$  = 728.2; whence,  $\frac{1}{2}x$  being 60.8, a = 11.98, and

 $r = \frac{m}{a} = 329$  feet, the radius of curvature of the curve of

equilibrium at the vertex, while that of the middle of the

blocks is 334. In order to determine the ordinate y, we

have  $my = \frac{1}{2} ax^2 + \frac{1}{12} bx^4$ ; but  $\frac{1}{2} ax$  for the whole arch is

728.2 and  $\frac{1}{4}bx^3 = 50$ ; consequently  $my = 728.2x + \frac{50}{3}x$ , the . Bridge. first portion varying as  $x^2$ , and the second as  $x^4$ ; and the sum y being 23 = 22.49 + .51, the ordinate at  $\frac{1}{4}x$  or 30.4feet is  $\frac{1}{16}$  × 22.49 +  $\frac{1}{256}$  × 51 = 1.41; and, in a similar manner, any other ordinate may be calculated, so that we

æ.	y.	Middle of the Blocks.
30.2	1.41	1.40
· <b>60·</b> 8	5.65	<b>5•</b> 67
91.0	13.02	12.89
121.6	23.00	23.00

Hence it appears that the curve of equilibrium nowhere deviates more than about two inches from the middle of the blocks, which is less than one fortieth of the whole depth.

The half weight of the smaller arches is probably about 1300 tons, and their lateral thrust 3500; and, since the abutment weighs 11,000 tons, the foundation ought to have an obliquity of  $\frac{3500}{12300}$  or more than one in four, if it were intended to stand on the piles without friction; but in reality it rises only sixty-six inches in 624, or nearly one in nine; so that there is an angular difference of one in seven between the direction of the piles and that of the thrust, which is

probably a deviation of no practical importance. It remains to be inquired how far the series of masses of solid iron, constituting the most essential part of the arch, is well calculated to withstand the utmost changes of temperature that can possibly occur to it in the severest seasons

(Prop. K.) For this purpose we may take the mean depth 
$$a = 7$$
 feet,  $h$ , being 23; then  $1 + \frac{4h}{a} = \frac{99}{7} = 14.14$ , and

 $+\frac{16hh}{15aa} = \frac{9199}{735} = 12.52$ : consequently the greatest actual compression or extension of such a structure is to the mean change which takes place in the direction of the chord, as 14.14 to 12.52, or as 1.129 to 1; and if, in a long and severe frost, the temperature varied from 52° to 20°, since

the general dimensions would contract about  $\frac{1}{5000}$ , the extreme parts of the blocks near the abutments would vary  $\frac{1}{5000}$  of their length; and the modulus M being about

10,000,000 feet, this change would produce a resistance equivalent to the weight of a column of the same substance 2258 feet high; that is, to about three tons for each square inch, diminishing gradually towards the middle of the blocks, and converted on the other side into an opposite resistance; so that this force would be added to the general pressure below in case of contraction, and above in case of extension. Now, the lateral thrust is derived from a pressure equivalent to a column about 329 feet high, of materials weighing 1523 tons, while the blocks themselves weigh 357; that is, to a column equal in section to the blocks, and 1400 feet high; it will therefore amount to about two tons on each square inch; consequently such a change of temperature as has been supposed, will cause the extreme parts of the abutments to bear a pressure of five tons, where, in the ordinary circumstances, they have only to support two-

The ingenious architect proposed to diminish this contingent inconvenience, by causing the blocks to bear somewhat more strongly on the abutments at the middle than at the sides, so as to allow some little latitude of elevation and depression in the nature of a joint; and, no doubt, this expedient would prevent the great inequality of pressure which might otherwise arise from the alternations of heat and cold.

Bridge.

Bridge. But it cannot be denied that there must be some waste of strength in such an arrangement, the extreme parts of the abutments, and of the blocks near them, contributing very little to the general resistance; and when we consider the very accurate adjustment of the equilibrium throughout the whole structure, we shall be convinced that there was no necessity for any thing like so great a depth of the solid blocks, especially near the abutments; and that the security would have been amply sufficient if, with the same weight of metal, they had been made wider in a transverse direction, preserving only the form of the exterior ones on each side, if it had been thought more agreeable to the eye. In carpentry, where there is often a transverse strain, and where stiffness is frequently required, we generally gain immensely by throwing much of the substance of our beams into the depth; but in a bridge perfectly well balanced, there is no advantage whatever from depth of the blocks. We only want enough to secure us against accidental errors of construction, and against partial loads from extraneous weights; and it is not probable that either of these causes, in such a bridge, would ever bring the curve of equilibrium six inches, or even three, from its natural situation near the middle of the blocks.

> We cannot conclude our inquiries into this subject with a more striking example than by applying the principles of the theory to the magnificent edifice, by the same judicious and experienced architect, which now bears the triumphant appellation of Waterloo Bridge; a work not less pre-eminent among the bridges of all ages and countries, than the event which it will commemorate is unrivalled in the annals of ancient or modern history. It consists of nine elliptical arches, each of 120 feet span, and thirty-five feet rise. The piers are twenty feet thick, the road twenty-eight feet wide, besides a foot pavement of seven feet on each side. The arches and piers are built of large blocks of granite, with short counter-arches over each pier. The haunches are filled up, as is usual in the most modern bridges, by spandrels, or longitudinal walls of brick, covered with flat stones, and extending over about half the span of the arch; the remainder being merely covered with earth or gravel, which is also continued over the stones covering the spandrels. The hollow spaces between the walls are carefully closed above, and provided with outlets below, in order to secure them from becoming receptacles of water, which would be injurious to the durability of the structure. The mean specific gravity of the materials is such, that a cubic yard of the granite weighs exactly two tons, of the brick work one ton, and of the earth a ton and an eighth. Hence the weight of the whole may be obtained from the annexed statement. (Plate CXLV., fig. 1, 2, 3.)

Contents of the materials in half an arch of Waterloo Bridge, from the middle of the pier to the crown, beginning from the springing of the arch.

Cubic Feet. Half of the arch stones......25,311

	Cubic Feet
Half of the inverted arch	. 2555
Square spandrel between them	. 1994
Outside spandrel walls	. 4374
Spandrels of brick4976 (=	<b>= 2489</b> )
Kirbels of the brick spandrels	. 1271
Flat stone covers	969
Earth10,260 (=	= 5771)
Foot pavement	. 620
Friezes, E. and W	. 1586
Cornice, E. and W	. 1120
Plinth of balustrade	. 510
Solid in parapet	. 416
Balusters 72, 151 cwt	
Coping, E. and W	. 142

From this statement, and from a consideration of the ar-

rangement of the materials, exhibited in the plate, we may

infer that the half arch, terminated where the middle line of the arch-stones enters the pier, is equivalent in weight to about 34,000 cubic feet of granite; its inner half containing in round numbers 13,000, and its outer 21,000, whence we have 14,333 for the reduced weight of the quarter arch (Prop. T.) The extreme ordinate will be about twenty-one feet; the middle of the blocks being somewhat more than sixteen feet above the springing of the arch, and the keystone being four feet six inches deep; consequently the horizontal thrust will be expressed by 14,333  $\times \frac{60}{21} = 40,952$ cubic feet, weighing 3033 tons. But  $\frac{1}{2}$  ax being 11667, and  $\frac{1}{2}x = 30$ , a = 389, and  $\frac{m}{a} = r = \frac{40952}{388} = 105$  feet; while the radius of curvature of the ellipse at the crown is  $\frac{60 \times 60}{2}$  = 103 feet. It is obvious, therefore, that the curve of equilibrium will pass everywhere extremely near to the middle of the blocks, and there can be no apprehension of any deficiency in the equilibrium. It is true that, as it approaches to the piers, it acquires an obliquity of a few degrees to the joints; but the disposition to slide would be abundantly obviated by the friction alone, even if the

joints were not secured by other precautions. In building the arches the stones were rammed together with very considerable force, so that, upon the removal of the centres, none of the arches sunk more than an inch and a half. In short, the accuracy of the whole execution seems to have vied with the beauty of the design, and with the skill of the arrangement, to render the Bridge of Waterloo a monument of which the metropolis of the British empire will have abundant reason to be proud for a long series of successive ages.

See also the articles SKEW, IRON, and SUSPENSION BRIDGES.

# EXPLANATION OF THE PLATES.

Plate CXLIII. fig. 1. If AB represent the distance of any two particles of matter, and BO, DE, FG, the repulsive forces at the distances AB, AD, AF, respectively, and BC, DH, FI, the corresponding cohesive forces, then GI must be ultimately to EH as FB

to BD. (Sect. I. Prop. A.)
Fig. 2. The block will support twice as great a pressure applied at A as at B. (Prop. B.)

, Fig. 3. It is obvious that ABC - ADE = ABC - CFG, HI being = HK, and HG = HA, and the difference ABFHA is always equal to DB x KH. (Prop. C.)

Fig. 4. It is evident that AB is to CD as AE to CE, or as  $z+\frac{1}{2}$  a to z. (Prop. E.) It is also obvious that as z or CE is to CD, so is EF to FG. (Prop. F.)

Fig. 5. Supposing the arch AB to be so loaded in the neighbourhood of C as to require the curve of equilibrium to assume the form ADCEB, the joints in the neighbourhood of D will be incapable of resisting the pressure in the direction of the curve CD, and it must tend to turn on their internal terminations as centres, and to open

externally. (Prop. Y.)

Fig. 6. A, B, C, different steps in the fall of a weak arch. (Prop. Y.) Fig. 7. Elevation and plan of Messrs Telford and Douglas's proposed iron bridges over the Thames. (Sect. IV.)

Fig. 8. Elevation of Mr Burdon's bridge at Wearmouth. (Sect. IV.) Fig. 9. Elevation of Mr Darby's iron bridge at Colebrook Dale.

Fig. 10. Elevation of Mr Telford's bridge at Buildwas.

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Bridge Bridgewater.

Figs. 11 and 12. Enlarged views of scrolls. Fig. 13. Bridge of the Trinity at Florence.

Plate CXLIV. fig. 1. Elevation of the bridge of the Louvre at

Fig. 2. Comparative size of the arches of Blackfriars, Waterloo, and the new London Bridge.

Fig. 3. Elevation of Vauxhall Bridge.

Fig. 4. Elevation of Southwark Bridge. (Sect. V.)

Fig. 5. Plan of Southwark Bridge. (Sect. V.)

Fig. 6. Elevation of the old London Bridge. Fig. 7. Elevation of the new London Bridge.

Fig. 8. Plan of the new London Bridge.

Plate CXLV. fig. 1. Elevation of Waterloo Bridge. (Sect. V.)
Fig. 2. Plan of Waterloo Bridge. (Sect. V.)
Fig. 3. Section of an arch of Waterloo Bridge, showing the foundations of the piers and the spandrel walls of brick, together with the centre supporting it. The dotted line represents the direction of the curve of equilibrium. (Sect. V.)

Bridgewater Bridle.

Bridge, in Gunnery, the two pieces of timber which go between the two transoms of a gun-carriage.

The term Flying-bridge is applied to a kind of floatingbridge constructed of pontoons, casks, or the like, for transporting an army across a river. It is sometimes anchored in the middle of the stream, and is so contrived as to be moveable from one side of the river to the other. See Pontoon.

BRIDGE, in Music, that part of a stringed instrument over

which the strings are stretched.

BRIDGEND, a market-town in Glamorganshire, Wales, 18 miles W.N.W. of Cardiff. The river Ogmore divides it into two parts called the Old and New Castle, connected by two bridges. It has a town-hall, county-hall, mechanics' institute, savings-bank, dispensary, &c., and is the seat of the county elections. The manufacture of flannels and woollen shawls is successfully conducted here, and there are numerous coal and iron mines in the vicinity. Marketday Saturday. The South Wales railway has a station here.

BRIDGENORTH, a parliamentary and municipal borough and market town of England, in the county of Salop, on both sides of the Severn, 18 miles S.E. by E. of Shrewsbury. The river, which is here crossed by a handsome stone bridge of six arches, separates the upper from the lower town. The former is built on the acclivities and summit of a rock rising abruptly from the river to the height of On the summit is the tower of the old castle, leaning 17 degrees from the perpendicular, two parish churches, and a large public reservoir. It has a grammarschool, with three exhibitions to Christ Church, Oxford; blue-coat, national, and infant schools, mechanics' institute, public library, savings bank, infirmary, dispensary, jail, theatre, and a considerable number of charities. It has manufactures of carpets, worsted, nails, and tobacco-pipes, and some trade in agricultural produce by the river. It is governed by a mayor, four aldermen, and twelve councillors, and returns two members to parliament. Pop. (1851) of parliamentary borough 7610; of municipal, 6172.

BRIDGEPORT, a seaport-town in the county of Fairfield, Connecticut, United States, is situated on an arm of Long Island Sound, 78 miles S.W. of Hartford. It has extensive manufactures, and a considerable coasting and fishing trade. The bar at the mouth of the harbour has 13 feet at high water. Bridgeport is connected with the Albany and Boston railway, and steam-boats ply between it and

New York. Pop. 7538. BRIDGE-TOWN. See BARBADOES.

BRIDGEWATER, a municipal and parliamentary borough and seaport in the county of Somerset, 29 miles S.S.W. of Bristol. It is pleasantly situated in a level and well wooded country, having on the east the Mendip range, and on the west the Quantock hills. The town, which is neat and well built, is situated on both sides of the Parret, here crossed by a handsome iron bridge. It has an ancient Gothic church with a spire 174 feet in height, a town-hall, jail, marketplace, savings-bank, infirmary, free grammar-school, other endowed schools, and some alms-houses. The river is navigable for vessels of 700 tons up to the town. In 1849, 2838 vessels of 133,021 tons entered, and 1274 vessels of 56,959

tons cleared at the port; and at the end of that year, 127 vessels of 10,231 tons belonged to the port. The customs-duties were L.10,500. Chief imports—grain, coals, wine, hemp, tallow, and timber; exports-agricultural produce and bathbricks, which last constitute the staple trade of the town. Market-days, Tuesday, Thursday, and Saturday. The town is governed by a mayor, six aldermen, and eighteen councillors, and returns two members to parliament. Pop. (1851) 10,317. Admiral Blake was born here in 1599.

Bridgewater, Francis Egerton, Duke of, who has sometimes been styled "the Father of British Inland Navigation," was born in the year 1736. An account of his navigable canal, which (with the exception of the Sankey canal) was the first great undertaking of the kind executed in Great Britain in modern times, will be found in this work under the biographical notice of Brindley, the able engineer to whose skill its construction was committed. The untiring perseverance displayed by the Duke in surmounting the various difficulties that retarded the accomplishment of his project, together with the pecuniary restrictions he imposed on himself in order to supply the necessary capital, afford an instructive example of that energy and self-denial on which the success of great undertakings so essentially depends. His Grace, though a steady supporter of Mr Pitt's administration, never took any prominent part in politics. He died March 8. 1803.

Bridgewater Treatises. The Right Hon. and Rev. Francis Henry, Earl of Bridgewater, who died in 1829, devised by will the sum of L.8000, at the disposal of the president of the London Royal Society, to be paid to the author or authors selected by the president, to write and publish 1000 copies of a treatise "On the Power, Wisdom, and Goodness of God, as manifested in the Creation." Mr Davies Gilbert, who then filled the office, selected eight individuals, each to undertake a branch of this subject, and each to receive L.1000 as his reward, together with any benefit that might accrue from the sale of his work, according to the will of the testator. These treatises were published as follows:—1. "The Adaptation of External Nature to the Moral and Intellectual Condition of Man;" by the Rev. Thomas Chalmers, D.D. 2. "The Adaptation of External Nature to the Physical Condition of Man;" by John Kidd, M.D. 3. "Astronomy and General Physics considered with reference to Natural Theology;" by the Rev. William Whewell, D.D. 4." The Hand, its Mechanism and Vital Endowments as evincing Design;" by Sir Charles Bell. 5. "Animal and Vegetable Physiology considered with reference to Natural Theology; by Peter Mark Roget. 6. "Geology and Mineralogy considered with reference to Natural Theology;" by the Rev. William Buckland, D.D. 7. "The Habits and Instincts of Animals with reference to Natural Theology;" by the Rev. William Kirby. 8. "Chemistry, Meteorology, and the Function of Digestion, considered with reference to Natural Theology;" by William Prout, M.D. All these are works of great though unequal merit, alike creditable to their authors, and to the intentions of the noble testator.

BRIDLE (Saxon bridl, or bridel), the instrument by which a horse is guided and restrained, consisting of a headBridlington || Brieg.

Bridling- stall, a bit and reins, with other appendages, according to ton its particular form and uses.

Pelethronius, king of the Lapithæ, according to Pliny, was the inventor of the bridle and saddle; and Virgil ascribes the invention to the Lapithæ, whom he styles *Pelethronii*, from *Pelethronium*, a mountain in Thessaly, where horses were first broken.

Horses were originally managed only with a rope or a switch, and by the sound of the voice. This was the practice of the Numidians, Getulians, Libyans, and Massilians. The Roman youth were also taught to ride without bridles, as an exercise in the manège. On Trajan's column soldiers are represented riding on horseback at full speed without bridles.

BRIDLINGTON, or Burlington, a market-town of England, in the east riding of York, 39 miles E.N.E. of York, and about a mile from the coast. It consists chiefly of one long narrow street of irregularly built houses. The priory erected in the early part of the twelfth century, and now used for the parish church, is a magnificent specimen of ecclesiastical architecture, and has recently been in course of restoration. It has also a town-hall, corn-exchange, temperance hall, mechanics' institute, two public subscription libraries, and grammar, national, and endowed schools. Bridlington has an active trade in corn, malt, and bones for manure; also several breweries, and a hat manufactory. Pop. (1851), including Bridlington Quay, 2432.

BRIDLINGTON Quay is situated on the coast about a mile from Bridlington, and is much frequented during the bathing season. The harbour is inclosed by two substantial stone piers; and there is good anchorage in the bay. Besides hot and cold baths, it possesses a chalybeate spring that is

much esteemed for its medicinal properties.

BRIDPORT, a parliamentary and municipal borough and market-town in the county of Dorset, 13 miles W. by N. from Dorchester, between two branches of the river Brit, a little above their confluence. It consists of three wide and wellpaved streets, and has a town-hall, mechanics' institute, with reading and lecture rooms, market-house, jail, custom-house, savings-bank, national and infant schools, alms-houses, and several charities, with manufactures of sailcloth, cordage, twine, fishing-nets, &c. The parish church is an ancient cruciform edifice in the perpendicular style. The harbour, which lies about a mile south of the town, has by extensive improvements been rendered safe, and accessible to vessels of 250 tons burden. In 1849, 279 vessels of 19,405 tons entered, 149 vessels of 7795 tons cleared, and 20 vessels of 2428 tons belonged to the port. The customs-duties that year amounted to L.2821. Bridport is governed by a mayor, six aldermen, and eighteen councillors, and returns two members to parliament. Pop. (1851) 7566.

BRIEF, in Law, an abridgment of the client's case, made out for the instruction of counsel on a trial at law; wherein the case of the litigant is to be briefly but fully stated.

BRIEF, or Brieve, in Scots Law, is generally applicable as a preliminary step in the authentication of genealogical facts, or those which relate to descent and inheritance. It may be briefly defined as a writ issued from the Chancery, directing the proper judicial officer to empanel a jury to find a verdict in the fact.

Apostolical Briefs, letters which the pope despatches to princes or other magistrates, relating to any public affair. A brief is distinguished from a bull in being more concise, written usually on paper, sealed with red wax, and impressed with the seal of the fisherman, or St Peter in a boat. A bull is more ample, is written on parchment, and sealed with lead or green wax. (Ciampini, Dissertatio de Abbrev. Munere, cap. iii.)

BRIEG, the capital of a circle of the same name in the Prussian province of Silesia, and government of Breslau, is situated on the left bank of the Oder, and on the Breslau and Oppeln railway, 27 miles S.E. of the former. It is well

built, and has a castle (the residence of the old counts of Brieg), a lunatic asylum, a gymnasium with a good library, and several churches and hospitals. Its fortifications were destroyed by the French in 1807. Brieg carries on a considerable trade, its chief manufactures being linen, cotton, and woollen goods, hats, &c. Important cattle-markets are held here. Pop. (1849) of town 12,115, of circle 46,976.

BRIEL, or BRIELLE, a fortified seaport-town of Holland, province of South Holland, and capital of an arrondissement of the same name, stands on the north side of the island of Voorne, near the mouth of the Maese, 14 miles west of Rotterdam. Lat. 51. 54. 11. N. Long. 4. 9. 51. E. The town is well built and strongly fortified, having many military magazines, and a good harbour. It is remarkable in history as having been the first place captured in the struggle that resulted in the independence of Holland. Admiral Van Tromp was born here. Pop. 5000, principally engaged as fishermen and pilots.

BRIENNE LE CHATEAU, a town of France, department of Aube, 14 miles N.W. of Bar-sur-Aube. Pop. 2000. It has a fine castle, but is chiefly celebrated as being the place where Napoleon received the rudiments of his military education, and where in 1814 a bloody battle was fought between the French and the allied forces of Russia

and Prussia.

BRIEUC, Sr, a seaport-town of France, capital of the department of Côtes-du-Nord, on the right bank of the Gouet, near its mouth in the bay of St Brieuc. Lat. 48. 31. 1. N. Long 2. 45. 6. W. The cathedral is a fine Gothic edifice of the thirteenth century. It has also a town-hall, hospital, theatre, a handsome stone bridge of three arches over the river, communal college, and public library. St Brieuc is the seat of a bishopric, and of tribunals of commerce and primary jurisdiction. Its port at the village of Ligue, at the mouth of the river, has a fine quay, and is accessible to vessels of from 300 to 400 tons. Pop. 9398.

BRIG (from *brigantine*, a kind of undecked vessel), a decked vessel with two masts and a boom mainsail, being otherwise square-rigged nearly like the mainmast and foremast of a ship. The term, however, is variously applied by

the mariners of different countries.

BRIGADE, the union of several squadrons or battalions under the command of a colonel, who has also the rank of brigadier-general. A brigade of artillery consists of a certain number of cannon or field-pieces, with the necessary munitions, stores, and gunners. The soldiers attached to these guns are also collectively denominated a brigade, and are under the command of a superior officer of artillery. A brigade of cavalry consists of different regiments, making together eight or ten squadrons, and commanded by a colonel of cavalry, who has the rank of brigadier-general in the army. A brigade of dragoons consists of different regiments of dragoons, making together eight squadrons or more, and commanded by a colonel of dragoons, who has also the rank of brigadier-general in the army. A brigade of infantry consists of two or more regiments of foot, making together four, five, six, eight, or more battalions, commanded by a colonel of foot, who has the rank of brigadier-general in the army. And, generally, according to the most modern arrangement of troops, two or more regiments constitute a brigade, two or more brigades a division, two or more divisions a corps d'armée, and two or more corps d'armée a grand army

BRIGADE-Major, an officer appointed by the brigadier to

assist him in the management of his brigade.

BRIGADIER, a military officer, next in rank above a colonel, and who is intrusted with the command of a brigade. In Great Britain this rank is in abeyance during peace, but revived in actual service in the field. Every brigadier marches at the head of his brigade upon duty. The brigadier des armées of the French service corresponds to our

Briel || | Brigadier. Brigandine brigadier-general, and, like him, has the command of a brigade of cavalry, dragoons, or infantry.

Briggs.

BDICANDINE a cost of mail a kind of ancient de-

BRIGANDINE, a coat of mail, a kind of ancient defensive armour, consisting of thin jointed scales of plate, pliant and easy to the body.

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BRIGANTES, a powerful people of ancient Britain, inhabiting the country between the rivers Humber and Tyne. Eborăcum (York) was their capital.

There was also a tribe of Brigantes in the S.E. of

BRIGANTII, a tribe of the Vindelici, on the Lacus Brigantinus. They were noted robbers: Hence the term brigands.

BRIGG, or GLANDFORD BRIGG, a market-town, parish of Wrawby, county of Lincoln, 156 miles from London, on the river Ancolme, which is navigable to the Humber. It has a grammar-school, and some trade in corn, timber, coal, and rabbit-skins. Market-day Thursday. Pop. (1851) 3097.

BRIGGS, HENRY, one of the greatest mathematicians of the sixteenth century, was born in 1556 at Warley Wood, near Halifax in Yorkshire. He studied at Oxford, where in 1592 he was appointed examiner and lecturer in mathematics; soon afterwards reader of the physical lecture founded by Dr Linacre; and in 1596, first professor of geometry in Gresham College. In 1609 he contracted with Usher, afterwards archbishop of Armagh, an intimacy which was kept up chiefly by letters, two of which, written by the subject of this notice, are still extant. In one of these letters, dated in August 1610, he tells his friend he was engaged on the subject of eclipses; and in the other, dated in March 1615, he acquaints him with his being wholly employed about the noble invention of logarithms, then lately discovered, and in the improvement of which he had afterwards a large share. In his lectures at Gresham College, he proposed the alteration of the scale of logarithms, from the hyperbolic form which Napier had given them, to that in which unity is assumed as the logarithm of the ratio of ten to one; and soon afterwards he wrote to the inventor to make the same proposal to himself. In 1616 Briggs paid a visit to Napier at Edinburgh, in order to confer with that eminent person respecting the suggested change; and next year he repeated his visit for a similar purpose. During these conferences the alteration proposed by Briggs was agreed upon; and on the return of the latter from his second visit in 1617, he accordingly published the first chiliad of his logarithms. In 1619 he was appointed Savilian professor of geometry at Oxford, and resigned his professorship of Gresham College on the 25th of July 1620. Soon after his settlement at Oxford he was incorporated master of arts in that university, where he continued a laborious and studious life, employed partly in discharging the duties of his office, and partly in the computation of logarithms and in other useful works. In 1622 he published a small tract on the "North-west Passage to the South Seas, through the continent of Virginia and Hudson's Bay;" and in 1624 he printed at London his Arithmetica Logarithmica, in folio, a work containing the logarithms of thirty thousand natural numbers to fourteen places of figures besides the index. He also lived to complete a table of logarithmic sines and tangents for the hundredth part of every degree to fourteen places of figures besides the index, with a table of natural sines to fifteen places, and the tangents and secants for the same to ten places; all of which were printed at Gouda in 1631, and published in 1633, under the title of Trigonometria Britannica. In the construction of these works, the author, besides immense labour and application, displayed great powers of genius and invention; and in his investigations may be detected the germs of discoveries in mathematics which are generally considered as of later invention, namely, the binomial theorem, the differential method and construction of tables by differences, the B R I

interpolation by differences, together with angular sections, and several other things of scarcely inferior importance. Mr Briggs terminated his laborious and useful life on the 26th of January 1630, in the seventy-fourth year of his age. Dr Smith gives him the character of being a man of great probity, a contemner of riches, and contented with his own station, preferring a studious retirement to all the splendid circumstances of life.

His works are, 1. A Table to find the Height of the Pole, the Magnetical Declination being given, London, 1602, 4to; 2. Tables for the Improvement of Navigation, printed in the second edition of Edward Wright's treatise entitled "Certain Errors in Navigation detected and corrected," London, 1610, 4to; 3. A Description of an Instrumental Table to find the part proportional, devised by Mr Edward Wright, London, 1616 and 1618, 12mo; 4. Logarithmorum Chilias prima, London, 1617, 8vo; 5. Lucubrationes at Annotations in opera posthuma J. Neperi, Edinburgh, 1619, 4to; 6. Euclidis Elementorum VI. libri priores, London, 1620, folio; 7. A Treatise on the North-west Passage to the South Sea, London, 1622, 4to, reprinted in Purchas's Pilgrims, vol. iii. p. 852; 8. Arithmetica Logarithmica, London, 1624, folio; 9. Trigonometria Britannica, Goudæ, 1663, folio; 10. Two Letters to Archbishop Usher; 11. Mathematica ab Antiquis minus cognita; and some other works, as his Commentaries on the Geometry of Peter Ramus, and Remarks on the Treatise of Longomontanus respecting the quadrature of the Circle, which have not been published.

Briggs, William, an eminent physician, born at Norwich about 1650. He studied at the university of Cambridge; and then went to France, where he attended the lectures of the celebrated anatomist Vieussens at Montpellier. After his return he published his Ophthalmographia, in 1676. The year following he was created doctor of medicine at Cambridge, and soon after was made fellow of the College of Physicians at London. In 1682 he resigned his fellowship in favour of his brother; and the same year his Theory of Vision was published by Hooke. The ensuing year he sent to the Royal Society a continuation of that discourse, which was published in their Transactions; and the same year he was appointed by Charles II. physician to St Thomas's Hospital. In 1684 he communicated to the Royal Society two remarkable cases relating to vision, which were likewise printed in their Transactions; and in 1685 he published a Latin version of his Theory of Vision, at the desire of his illustrious friend Isaac Newton, with a recommendatory epistle from that philosopher prefixed to it. He was afterwards appointed physician in ordinary to King William, and continued in great esteem for professional skill till his

death, which took place in September 1704.

BRIGHTON (formerly Brighthelmstone), a parliamentary borough, seaport, and watering-place of England, county of Sussex, on the English Channel, 50 miles south of London; Lat. 50. 50. N. Long. 0. 8. W. It is situated between and on the slopes of two ranges of chalk hills. It has a seafront of three miles in length, with a pavement and carriage road of great width, flanked by houses of a superior class, rendering it undoubtedly the finest marine promenade in the kingdom.

Brighton is noted for the salubrity of its climate.

In 1750 it was only a small fishing village, with but one church. It owes its rise in the first instance to its being the chosen residence of George IV. when Prince of Wales At the census of 1801 its population was 7339; in 1841 48,567; and in 1851 it was 69,673, when the number of in habited houses amounted to 10,843. It has returned two members to Parliament since 1832.

The salubrity of the climate has rendered Brighton a favourite place for education, and there are accordingly upwards of 250 schools, many of them of a high degree of excellence. A college similar to those of Eton and Harrow has been lately established.

The town has a good hospital, two dispensaries, and numerous societies and institutions for the relief of suffering and distress, as well as for religious and educational purposes.

Briggs

**Brigittins** Bril.

It has a literary and scientific society, an athenæum, chiefly designed for young men engaged in business, and a mechanics' institution, all well supported. There are no public buildings of much beauty, but the Royal Pavilion lately purchased by the town from the Commissioners of Woods and Forests for L.53,000 deserves special notice, from its unique and fantastic appearance. It was built by George IV., then Prince of Wales—was commenced in 1784, completed in 1787, and subsequently enlarged in 1802 and 1817. It has a frontage to the east of 300 feet. The principal rooms are, the Chinese gallery, 162 feet long, and 17 feet wide; dining-room, 60 feet long, 42 feet wide, and 45 feet high; the saloon, 55 feet long and 30 feet wide; two drawing-rooms, each 50 feet long and 20 feet wide; and a music-room, 62 feet long, 42 wide, and 41 high. Every room has been gorgeously decorated in Eastern style; and the whole suite, which is used for balls, assemblies, &c., presents an aspect at once singular and effective.

The royal stabling, now forming part of the town property, is one of the most magnificent piles ever erected for such a purpose in Europe. It has the form of an octagon without, and a circle within, and is lighted by a glazed dome with a diameter only 20 feet less than that of the dome of

St Paul's Cathedral, London.

The old parish church stands on the summit of a hill, and was formerly used as a sea beacon. It is at present (1854) undergoing extensive repairs. There are 15 other churches and chapels of ease belonging to the Established church, and 21 dissenting chapels of various denominations.

The suspension chain pier, constructed by Captain Sir Samuel Brown, R.N., at an expense of L.30,000, is 1134 feet in length, extending into the sea 1034 feet. It was commenced in October 1822, and opened to the public in

November 1823

The sea-wall, which protects the whole eastern part of Brighton, is 60 feet in height, and having a terrace raised 15 feet from the beach, there is a sheltered walk resembling in temperature the undercliff of the Isle of Wight. There is a chalybeate spring near the town, and the German waters are successfully imitated at the Spa. The cavalry and infantry barracks have accommodation for above 1000

Since 1825, above L.200,000 have been expended in im-

proving and embellishing the town.

BRIGITTINS, or BRIDGETINS, a religious order founded by St Brigitta, or Birgit (Anglice, Bridget), a Swedish visionary of the fourteenth century, whom Fabricius represents as the daughter of King Birgenes, legislator of Upland. Brigittins are sometimes called the Order of St Saviour, from their pretending that Christ himself dictated to St Brigitta the rules and constitutions observed by them. In the main, the rule is the same as that of St Augustin, with certain additions. This order spread considerably through Sweden, Germany, the Netherlands, and other parts. In England we read but of one monastery of Brigittins, which was built by Henry V. in 1415, opposite to Richmond, and is now called Sion House. The revenues amounted to L.1495 per annum.

BRIGNOLES, the capital of an arrondissement of the same name in the department of Var, France, is situated in a fertile and pleasant valley on the right bank of the Calami, 22 miles N.N.E. of Toulon. It is neat and well built, and has a magnificent fountain, public library, normal school, some manufactures of silk filatures and leather, and an active trade in wines, brandy, liqueurs, and excellent prunes. Pop. (1851) of town 5581, of arrondissement 68,664.

BRIHUEGA, a town of Spain, province of Guadalajara, situated among hills on the right bank of the river Tajuña, 20 miles E.N.E. of Guadalajara. Pop. 4464. Here Vendôme; with a force immensely superior, defeated Stanhope, Dec. 9. 1710.

BRIL, PAUL, a Flemish painter, born at Antwerp in

1554. The success of his elder brother Matthew, in the Brilliant Vatican, induced him to repair to Rome. Paul far surpassed his brother, and on his death he succeeded to his pension and employments. He painted landscapes with a depth of chiar-oscuro then little practised in Italy; and introduced into them figures well drawn and finely coloured. Many of his pictures are extant in Italy. One of his best compositions is the martyrdom of St Clement, in the Sala Clementina of the Vatican. He died at Rome in 1626. (Lanzi, Stor. P.

BRÍLLIANŤ, bright or sparkling. The word, in a substantive form, is used to denote a fine diamond which has been rendered more lustrous by being cut with a flat surface, and in angles below, so as to refract the light. See

DIAMOND.

BRIM, the rim or border of anything, especially of such vessels as have a round shape. The use of the brims of vessels is to prevent liquors, when poured out, from running down the side of the vessel.

BRINDISI (the ancient Brundusium), a fortified city and seaport of Naples, in the province of Otranto, is situated at the head of a bay of the Adriatic, in Lat. 40. 37. 50. N. Long. 17. 58. 32. E. Brundusium was early a place of great importance, and was the usual port of communication with Greece and the East. It was at first governed by its own kings, but was conquered and colonized by the Romans B.C. 245. Virgil died here B.C. 19. The modern town is encircled by extensive walls, but the inclosed space is not above half occupied. The streets are narrow and crooked, and the houses generally in a ruinous state. The decay of this city arose principally from the entrance to its inner harbour being filled up about the fifteenth century; to remedy which, attempts have recently been made. outer harbour is deep and capacious, affording good anchor-

age. Pop. 6300.

BRINDLEY, JAMES, a man celebrated for mechanical inventions, and particularly skilful in planning and conducting inland navigation, was born in 1716, at Tunstead in Derbyshire. Through the mismanagement of his father, his education was totally neglected; and at seventeen he bound himself apprentice to a mill-wright, near Macclesfield in Cheshire. After completing his apprenticeship, he began the world on his own account, and by various inventions and contrivances carried the business of the mill-wright to a degree of perfection which it had not previously attained. His fame as an ingenious mechanic spreading widely, his genius was no longer confined to the business of his profession. In 1752 he erected a very extraordinary water-engine at Clifton in Lancashire, for the purpose of draining coal mines; and in 1755 he was employed to execute the larger wheels for a new silk-mill at Congleton in Cheshire. The potteries of Staffordshire were also about this time indebted to him for several valuable additions to their mills for grinding flintstones. In 1756, he undertook to erect a steam-engine upon a new plan, near Newcastle-under-Line; and it is believed that he would have brought this engine to a great degree of perfection, if some interested engineers had not opposed him.

His attention, however, was soon after called off to another object, which in its consequences has proved of high importance to trade and commerce; namely, the projecting and executing of artificial canals. The Duke of Bridgewater, having at Worsley, about seven miles from Manchester, a large estate abounding with coal, which had hitherto lain useless because of the expense of land-carriage, perceived the necessity of constructing a canal from Worsley to Manchester. Brindley was consulted on the matter; and having declared the scheme practicable, an act for this purpose was obtained in 1754 and 1758. But as it was afterwards discovered that the navigation would be more beneficial if carried over the river Irwell to Manchester, another act was

Brindley.

Brinvilliers Brisson.

obtained to vary the course of the canal agreeably to the new plan, and likewise to extend a side branch to Long-ford Bridge in Stretford. Brindley, in the mean time, had begun these great works, the first of the kind ever attempted in England with navigable subterraneous tunnels and elevated aqueducts; and, in order to preserve the level of the water, and free it from the usual obstructions of locks, he carried the canal over rivers and many large and deep valleys. When it was completed as far as Barton, where the Irwell is navigable for large vessels, he proposed to carry it over that river by an aqueduct of thirty-nine feet above the surface of the water; and though this project was treated as wild and chimerical, yet, supported by his noble patron, he began his work in September 1760, and the first boat sailed over it in July 1761.

The success of the Duke of Bridgewater's undertakings encouraged a number of gentlemen and manufacturers in Staffordshire to revive the idea of a canal navigation through

that country, and Brindley was therefore engaged to make a survey from the Trent to the Mersey. This canal was begun in 1766, conducted under Brindley's direction as long as he lived, and finished after his death by his brother-inlaw Mr Flemshall in May 1777. The proprietors called it the Canal from the Trent to the Mersey; but the engineer, more emphatically, the Grand Trunk Navigation, on account of the numerous branches, which, as he justly supposed, would be every way extended from it. (See the article NAVIGATION, INLAND.) The scheme of this inland navigation had employed the thoughts of the ingenious part of the community for upwards of twenty years, and some surveys had been made; but Harecastle Hill, through which the tunnel is constructed, could neither be avoided nor overcome by any expedient which the most able engineers could devise. It was Brindley alone who surmounted this, and other difficulties arising from the variety of strata and quick-

Brindley died at Turnhurst in Staffordshire, September 27.1772, in his fifty-sixth year. He is said to have shortened his days by too intense application, and to have brought on a hectic fever, which continued in his system for some years before it finally cut him off. He never relaxed his labours, nor indulged in the common diversions of life; and though once prevailed on to see a play in London, yet he declared that he would on no account be present at another, because it so disturbed his ideas for several days after as to render him unfit for business. When any extraordinary difficulty occurred to him in the execution of his works, he generally retired to bed, and has been known to lie there one, two, or three days, till he had surmounted it. He would then get up and execute his design without drawing or model; for his memory was so powerful as to enable him to dispense with notes or memoranda of any kind.

sands, which no one but himself would have attempted to

BRINVILLIERS, MARCHIONESS OF, a woman notorious for the enormity of her crimes, in the time of Louis XIV. An account of the practices of this arch-poisoner is given

under the head AQUA TOFANA.

BRIOUDE, a town of France, in the department of Haute Loire, capital of an arrondissement of the same name, is situated on the left bank of the Allier, 30 miles N.W. of Puy. The town is ill built, but has a fine old Gothic church, a college, public library, &c. At Old Brioude, about 3 miles S.S.E., are the remains of a bridge over the Allier, which consisted of a single arch 88 feet high, and 206 feet in span. This fell in 1822; but a new bridge of one arch, 182 feet in span, was built in 1845. Pop. (1851) of town 4635, of arrondissement 83,024.

BRISSON, MATHURIN JACQUES, a French zoologist and natural philosopher, was born at Fontenay-le-Comte, 3d April 1723. He was originally intended for the church, but he had acquired at an early age a taste for natural history,

which was particularly encouraged by the advantage that Brisson. he enjoyed of passing his holidays with the justly-celebrated Réaumur, who had an estate near Fontenay. At the age of twenty-four he had made great progress in his theological studies, and had fully qualified-himself for the rank of a subdeacon; but his courage failed him at the time appointed for taking orders, and he then determined to confine himself to the study of the physical sciences. Réaumur had the direction of the chemical laboratory of the Academy of Sciences, and had given up the salary attached to it to several young men in succession, whom he appointed as his assistants, and of whom Pitot and Nollet became afterwards the most distinguished. He now chose Brisson for the situation, which served him, as it had done his predecessors, rather as a step in his advancement with respect to general science, than in enabling him to pursue any objects more immediately chemical; and he followed his passion in attaching himself almost exclusively to natural history. The collection of Réaumur furnished him with ample materials for his studies, and with the principal subjects described in his works on the Animal Kingdom. The first of these, published in 1756, contained quadrupeds and cetaceous animals. It consists of simple descriptions of the different species, together with synonyms in various languages, more in the nature of a prodromus than of a complete history. His Ornithologie appeared in 1760, forming six volumes, and containing a number of well-executed plates. But upon Réaumur's death, the collection having been added to the royal cabinet, Messrs Buffon and Daubenton, the directors of that cabinet, not affording him all the accommodations that he expected, he discontinued the work, and renounced the study of natural history in favour of natural philosophy.

M. Brisson had been chosen a member of the Academy of Sciences in 1759: he soon afterwards associated himself with the Abbé Nollet in delivering lectures on experimental physics, and obtained the reversion of his appointments of professor in the college of Navarre, and instructor of the royal family in natural philosophy and natural history. subject of electricity was at this time warmly debated between Nollet and Franklin; and M. Brisson had a difficult task to perform, in discussing the merits of a mistaken friend and an overbearing opponent; but, in fact, this department of science was at that time too little understood to make it disgraceful for Nollet to be in error with respect to the utility of conductors, or for Brisson to remain neutral upon this and other similar questions. He seems, however, by no means to have adhered to the character of neutrality in his anonymous Translation of Priestley's History of Electricity, published in 1771, and accompanied by notes, which exhibit a spirit of acrimonious criticism, not at all calculated to enhance the merit of the work which he wished to introduce to the notice of his countrymen. He also attempted, in an Essay on Waterspouts, published in the Memoirs of the academy, to explain a variety of electrical phenomena, by means of the different currents of fluid imagined by Nollet,

but certainly with very little success.

He afterwards undertook a course of experiments on the Specific Gravity of Alcohol and Water, mixed in different proportions, which led him to a conjecture, at that time somewhat singular, that water was not a homogeneous substance. He assisted M. Trudaine and other observers in the experiments which they made on Heat and Light with the powerful lens of Bernière; and, in conjunction with M. Cadet, he endeavoured to disprove the opinion of Beccaria, that electricity has a power of reviving the metallic oxides. He also made experiments on the refractive powers of fluids which might be substituted for flint-glass in the objectglasses of telescopes; on the utility of different kinds of steel for magnetical purposes; and on the mode of renewal of the shells of some species of snails.

In 1772, M. Brisson published a memoir on the Specific

Brissot. Gravities of Metals, a subject which, in all its extent, occupied a great portion of his attention during twenty years of his life. The results of his experiments on a great variety of substances were collected into a single volume of Tables of Specific Gravities, which was published in 1787. It was principally for the use of the students who attended his lectures that he published his Traité de Physique and his Dictionnaire, both of them containing elementary and popular information, rather calculated exclusively for the immediate purpose which they were intended to serve, than for being of permanent utility in the promotion of the sciences. At a late period of his life he renewed his attention to the subject of chemistry, when the discoveries of his junior contemporaries had given greater certainty and precision to its laws; and his last work was an Elementary Treatise on that science, intended for the use of his pupils in the central school.

BRISSOT, PIERRE, a very celebrated French physician, born at Fontenay-le-Comte, in Poitou, in 1478. After taking his doctor's degree at Paris, he bent his thoughts on reforming physic, by restoring the precepts of Hippocrates and Galen, and exploding the maxims of the Arabians; for which purpose he publicly explained Galen's works, instead of those of Avicenna, Rhases, and Mesvé. He afterwards resolved to travel, to acquire a knowledge of plants; and going to Portugal, he practised physic in the city of Evora. His new method of bleeding in pleurisies, on the side where the pleurisy was situated, occasioned a memorable controversy among the Portuguese physicians, and was brought before the university of Salamanca, which at last gave judgment, that the opinion maintained by Brissot was the pure doctrine of Galen. The partisans of Denis, his opponent, appealed in 1529 to the emperor, to prevent the practice, as being fraught with dangerous consequences; but in consequence of the death of the eldest son of Charles III. duke of Savoy, from a pleurisy at this very time, after having been bled on the opposite side, the prosecution dropped. Brissot died at Lisbon in 1522. He wrote an apology for his practice, which was published at Paris, in 8vo, in 1525, by his friend Antonio Luceas. Renatus Moreau printed a new edition at Paris in 1622, and annexed to it a treatise entitled De Sanguinis Missione in Pleuritide, together with a life of Brissot.

Brissot de Warville, Jean Pierre, the chief of the Brissotine or pure republican party in France during the early stages of the revolution of 1789, was born at Chartres, Jan. 14.1754. His father, who was a pastry-cook, gave his son a liberal education, and Brissot became an author when he had scarcely left college. The boldness of his writings against the inequality of ranks excited the displeasure of the government, and subjected him to a prosecution and imprisonment in the Bastile.

On regaining his liberty he visited England, and endeavoured, though unsuccessfully, to maintain himself in London by his literary talents. He then returned to France; and having again rendered himself obnoxious to the government by an attack on the administration of the Archbishop of Sens, he escaped a second imprisonment by a journey to Holland. In the beginning of 1788 he repaired to America; but on the approach of the revolution he returned to Paris. He commenced his revolutionary career in 1789, by the publication of some pamphlets, and particularly of a journal entitled Le Patriote François. He belonged to the Représentation des Communes, which was formed in the capital a short time previous to the memorable 14th of July. On the storming of the Bastile, the keys were deposited with him. He was elected president of the Jacobin Club; and, in consequence of his zeal and activity in the revolutionary cause, he was appointed president of the Comité des Recherches, which served as the model of all those similar committees which were afterwards successively formed. On Bristles Bristol.

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the flight of the royal family in 1791, Brissot, in concert with the Chevalier de Laclos, drew up the famous petition of the Champ de Mars. At this period the republican faction began to assume a consistent form, and to utter their sentiments with freedom and boldness. Brissot, who had been one of its first and most zealous apostles, was returned to the National Assembly, in spite of the opposition of the court, to which he had become extremely formidable; and from this time he displayed an implacable enmity to the king. The Assembly attributing to him talents which he does not appear to have possessed, appointed him a member of the diplomatic committee, of which he became the habitual organ; and in this capacity he was the constant advocate of the most violent public measures, and never ceased to demand a declaration of war against all the powers of Europe. In order to attain this object, he denounced all the ministers whose dispositions were favourable to peace, but particularly the foreign minister M. Delessart; and at length succeeded in obtaining a decree of accusation against him. His place was supplied by Dumouriez, under whose administration war was declared against the Emperor of Germany, on the 20th of April 1792. From this period, however, the political influence of Brissot began to decline. Robespierre, with whom he bad previously been intimately connected, now declared himself his enemy, denounced him at the Jacobin Club as a traitor and an enemy of the people, and thenceforth persecuted him with unrelenting rancour. Alarmed at the storm which was gathering around him, Brissot, in concert with the other leaders of his party, attempted to effect a reconciliation with the constitutional royalists; but this attempt having proved abortive, he reverted to his former line of conduct, and continued to denounce to popular vengeance all those whom he knew to be attached to the king. As the organ of the diplomatic committee, he obtained the declaration of war against England and Holland, on the 1st of February 1793. The Mountain party had now acquired a complete ascendency, and the destruction of the Girondists was determined on. Brissot, among the rest, was proscribed, after the revolution of the 31st of May. He was arrested at Moulins while attempting to make his escape into Switzerland, and after a mock trial, was beheaded at Paris on the 31st of October 1793.

BRISTLES, the strong hairs which grow along the spine of the hog and wild boar. These are extensively used by the brushmaker, saddler, shoemaker, &c. The best come from the Ukraine.

BRISTOL, a seaport-town in the west of England, situated in Long. 2. 35. 28.6. W. Lat. 51. 27. 6.3. N., 108 miles from London, and 12 miles N.W. of Bath. It lies partly in the county of Somerset, partly in that of Gloucester, and was by Edward III. erected into an independent city and a county of itself. The rivers Avon and Frome run through it. The situation of Bristol is very delightful. in the midst of a rich and healthy country, surrounded by verdant hills; and in its immediate vicinity are many handsome and pleasantly situated villages, interspersed with seats of the nobility and gentry. The site of the town is very unequal. Some parts of it are built on steep aclivities; King's Down, St Michael's Hill, and Brandon Hill, rising nearly 250 feet perpendicular above the bed of the river. Bristol is nearly eight miles in circumference, and is supposed to cover about 1600 acres, containing with its suburbs nearly 800 streets and ten market-places.

Bristol contains thirty-seven churches, besides a considerable number of chapels belonging to various bodies of Dissenters. The cathedral was originally a monastery dedicated to St Augustin. The gateway is to be considered. the only vestige of the original structure, and, from its great beauty, has attracted much notice. The present building consists of a neat choir, fitted up in the Gothic style, with part of the nave and the two side aisles, all ou

Bristol.

equal height. Bristol was erected into a bishop's see by Henry VIII., who annexed to its jurisdiction the whole of the county of Dorset, part of Gloucestershire, and three churches formerly in the see of Wells. Several eminent men have held the bishopric of Bristol, amongst whom may be mentioned the names of Secker, Butler, and Newton. Bishop Warburton was once dean of this cathedral. The church of St Mary Redcliff is built on a red sandy rock or cliff, from which it derives its name. The majestic and venerable appearance of this edifice, its lofty vaulted roof of stone, everywhere carved with devices of curious workmanship, and the tower nearly two hundred feet in height, and richly ornamented with a variety of carved work, fully justify the statement which has often been made—that it is the finest parish church in England. Over the north porch there is a kind of muniment-room, in which were deposited six or seven chests, in one of which Chatterton pretended that the papers which he endeavoured to pass off as the manuscripts of Rowley were found. Of the other churches, the Mayor's chapel is celebrated for the beauty of its architecture, and the splendour of its internal decorations.

The public buildings of Bristol, taken as a whole, are in nowise remarkable, the most important of them having been destroyed by fire during the Bristol riots in 1831. The exchange is a fine quadrangle, with a piazza. It was erected in 1740-41, at the expense of the chamber of Bristol, and

cost nearly L.50,000.

The public schools and educational societies of Bristol are both numerous and flourishing. The most important of these institutions is the Bristol College, the object of which is to afford a classical and scientific education on the most moderate terms. There are two societies in Bristol for the purpose of educating young men for the ministry; the one in connection with the Church of England, and the other with the Baptist denomination. The Philosophical and Literary Institution, though only recently established, possesses a library, a room for the exhibition of paintings, a lecture-room with chemical apparatus, and a large museum with a good mineralogical cabinet. By the union of the Bristol Mechanics' Institute with the Church of England Book Society, and the Bristol Athenæum, the institution now known under that latter name was organized. It possesses an extensive library of books on all subjects; and the shareholders have recently erected a handsome building at a cost of more than L.5000. It has lecture and reading rooms, lending and reference libraries, and several classes for the study of languages, elocution, &c. The Bristol Library, founded in 1772, now contains about 18,000 volumes, and has three hundred subscribers. The Bristol Law Library possesses 495 sets of books, including complete copies of all the reports, and the best professional treatises. There are

about thirty charity day-schools in Bristol, twelve of which are endowed, and their income amounts to nearly L.7000.

The Bristol Adult School Society is especially deserving of notice. In the course of twenty-one years 120 schools have been opened, 13,000 scholars admitted, and nearly 700 are now receiving instruction, without preference to any religious sect or party.

Bristol abounds in hospitals, alms-houses, and other charitable institutions. The Bristol Infirmary is an excellent institution, possessing accommodation for about 200 patients, and is supported by subscriptions and donations. The Bristol Dispensary, the General Hospital, and the Asylum for the Blind, are also institutions deserving of notice. The endowed charities are estimated at L.23,000 per annum. There are likewise about forty voluntary charitable societies, which collect and distribute annually, in various forms, amongst the poor, about L.15,000. Bristol Hot Well has long been celebrated. The spring rises from the bottom of rocks overhanging the picturesque village of Clifton, and is pumped up in the Hot Well House, at temp. 74°. The water is slightly saline, and contains free carbonic acid. Its sp. gr. = 1.00077. A pint contains 3.5 cubic inches of carbonic acid, 1.5 grain of sulphate of soda, 1.5 gr. sulphate of lime, 0.5 gr. muriate of soda, 1 gr. muriate of

magnesia, or 6 grains of solid contents.

Bristol carries on a considerable foreign trade with the British colonies in the West Indies, Australia, America, and Newfoundland, and also with France, Spain, and Portugal. Large quantities of foreign corn are brought into this port. The imports consist chiefly of grain, sugar, wine, rum, brandy, hides, colonial and Baltic timber, tallow, hemp, dye-woods, fruits, &c. In former years the trade of the port was much restricted by the heavy and unwise taxation imposed upon ships and imported goods; but since the removal of this in 1848, it has immensely increased. In 1845 the customs receipts were L.919,149, while in 1853 they rose to the sum of L.1,194,921, notwithstanding the great reductions which have taken place in duties, &c.; and this latter amount, there is little doubt, might be enormously increased but for the entire absence of dock accommodation at the mouth of the river, owing to which steamers and other large ships are compelled to incur the dangers of the Irish Channel by proceeding to Liverpool. Bristol has also a very large inland trade, especially with the western counties, and with North and South Wales, though the want of direct railway connection with the latter district materially interferes with this important branch of her trade, and is very favourable to the growth of other ports on the western side of the Bristol Channel. The tonnage of the port has increased so greatly of late years that it is difficult to give any average. It may be stated as follows:-

Number and Tonnage of Ships entered inwards from Foreign parts at the port of Bristol, during the years ended January 5—

3	18 <b>49.</b>	1850.		1850.		18 <b>51</b> .		1852.		1953.		1854.	
Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.	Vessels.	Tons.		
541	<b>124,</b> 340	646	129,922	728	137,642	665	139,582	631	134,739	788	175,571.		

The same account outward is as follows:-

٢	1849. 1850.		-	1851.	1852.		1853.		1854.			
1	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
	137	34,674	177	47,793	190	52,188	209	64,065	191	63,104	262	87,190

Bristol

Bristol. Besides the above, a very large coasting and Irish trade is carried on, amounting in the aggregate to upwards of 600,000 tons per annum. The increase in the number of ships belonging to this port has been very remarkable, having risen from 299 ships, with a tonnage of 38,939 tons in 1849, to 424 ships, with a total of 70,364 tons in 1853. Among the imports of 1853 we find 610,429 cwt. of sugar, 102,480 hides, 203,000 qrs. of corn, 56,000 cwt. of flour, nearly 90,000 loads of timber, &c.

A large amount of emigration has likewise taken place from this place to Australia and America during the last few years. The principal exports are manufactured goods, refined sugar, bricks, iron, tin, cotton goods, and glass bottles. The principal local manufactures are glass, sugar, iron, brass, copper, lead, zinc, floor-cloth, earthenware, tobacco, &c. The Bristol docks, which were originally formed in pursuance of the act 43d Geo. III., c. 142, at an expense of L.600,000, were purchased in 1847-8 by the corporation, and are now the property of the citizens, the charges being greatly reduced by the aid of a rate of 4d. in the pound on fixed property.

Bristol is directly connected with the metropolis by means of the Great Western Railway, the capital of which has risen from L.2,500,000 to upwards of 11 millions. There is also a railway from Bristol to Gloucester, and another from Bristol to Exeter, thus connecting it with every part of the United The city is supplied with water by a water company, who draw their supply from springs in the Mendip Hills. The water is considered very good, but the concern is not yet remunerative in a financial sense. There is also a gas-company formed by the junction of the Bristol and Clifton Gas Companies, with a united capital of L.179,800. There are six banking establishments in Bristol, including a branch of the Bank of England; and there is also a savings bank. Some of the largest vessels ever launched have been built in Bristol; among which may be noticed the Great Western, the first of the large ocean steamers, upwards of 2000 tons burthen, and the Great Britain of 3500 tons.

Bristol is divided for municipal purposes into ten wards, and its government is vested in a mayor, 16 aldermen, and 48 councillors. It returns 2 members to parliament. The population in 1811 amounted to 76,952; in 1821 to 95,758; in 1831 to 117,016; and in 1851 to 137,328.

Bristol is a city of great antiquity. There is indeed good reason to believe that it was an inhabited place as early as the time of the Roman invasion; though scarcely any notice is taken of it until about the era of the Norman conquest, when a powerful fortress was erected there by the Earls of Gloucester, which, after it had stood about six centuries, was demolished in 1655, by order of Oliver Cromwell. During the contest between King Stephen and the Empress Maude, Bristol became a mere stronghold of banditti, who plundered the neighbouring counties, and were guilty of great excesses and cruelties. The son of Maude, Henry II., was educated at Bristol, having been brought thither when nine years of age; and when he afterwards came to the crown, he created Robert Fitzharding, at that time governor of Bristol, Lord of Berkeley. King John, having become Lord of Bristol by marrying Isabel, daughter of William Earl of Gloucester, renewed the Bristol charters, and pointed out the limits of the city. In 1312 a violent commotion took place in Bristol, and hostilities were carried on between the castle and the town for a period of upwards of two years, when the latter submitted to the royal authority. On the 8th of August 1373, Edward III. rewarded the loyalty of the inhabitants of Bristol to his father, by bestowing on them a charter which conferred peculiar immunities, and constituted the town a county of itself. As a memorial of

gratitude, the corporation of Bristol erected a cross in High Street, 39 feet 6 inches in height, adorned with rich Gothic ornaments, and having the statues of King John, Henry Diamonds. III., and Edward III., placed in niches. When the Duke of Lancaster, afterwards Henry IV., invaded England, he marched to Bristol, besieged the castle, took it, and ordered Lord Scroop, Sir John Busby, and Sir Henry Greene, three of the king's counsellors, to be beheaded without a trial. Henry VII. frequently visited Bristol; and in 1550 he granted it a new charter, and also presented his own sword to be borne before the mayor. On the breaking out of the civil war in the reign of Charles I., Bristol was garrisoned for the parliament; but being a place of great importance. from commanding the western counties, the king was desirous to obtain possession of it; and Prince Maurice, the Marquis of Hertford, and Prince Rupert, having united their forces, invested it on the 24th of July 1643, and after a vigorous resistance, carried it by storm. After the defeat of Charles at Naseby, Prince Rupert threw himself into Bristol, and it was confidently expected that he would make a vigorous defence; but when Sir Thomas Fairfax besieged the city, the prince capitulated after a resistance of only twenty-one days. At this period the city suffered severely from the combined effects of war and pestilence. In 1749, and again in 1792, several riots took place, which were not quelled without much bloodshed. But the most memorable event in the modern annals of Bristol, is the celebrated riot which took place in October 1831, during the excitement created by the reform bill. When Sir Charles Wetherell, recorder of Bristol, went to make the usual jail delivery in that city, the populace rose in great numbers, and having succeeded in gaining possession of the city, burned the bishop's palace, the mansion-house, the customhouse, the excise-office, the jails, bridewell, and nearly fifty private houses and warehouses. Many lives were lost during these unhappy tumults, and the damage done to property was estimated at L.70,000. A special commission was appointed to try the prisoners, 114 in number, charged with being concerned in these riots. Eighty-one were found guilty, four of whom were executed, and of the rest some were sentenced to transportation, others to imprisonment and hard labour for various periods. Subsequently to the riot, a bill was introduced into parliament for the purpose of providing compensation for the sufferers. The property destroyed was valued by twelve commissioners at L.68,208, which was borrowed from government upon a

Bristol, a seaport-town of Rhode island, capital of a county of the same name. It has a considerable coasting trade and extensive fisheries. The shipping belonging to the port amounts to 13,198 tons. Pop. 4616. It is situated on the east side of Narragansett bay, 18 miles S.S.E. of Providence. Mount Hope, which lies about two miles north-east of Bristol, within the township, is a hill of a conical form, famous for having been the residence of the Indian king, Philip, who for so long a period retarded the progress of the young colony by his repeated and sometimes succesful attacks.

mortgage of the poor-rates of the city.

BRISTOL, a town of the United States in Bucks county, Pennsylvania, 11 miles S.S.E. from Newton, and twenty N.E. from Philadelphia.

There are several other smaller towns of this name in the United States.

Bristol Channel, a portion of the Atlantic Ocean, on the coast of Great Britain, lying between the south coast of Wales, and the counties of Somerset, Devon, and Cornwall.

BRISTOL DIAMONDS, small and brilliant crystals of capartz, found near Bristol; hence the name.

# BRITAIN, OR GREAT BRITAIN,

British and Roman Period.

THE most considerable of all the European islands, is situated between fifty and fifty-eight and a half degrees of north latitude. It is bounded on the north by the North Sea, on the east by the German Ocean, on the south by the English Channel, and on the west by St George's Channel and the Atlantic Ocean. From north to south it extends about five hundred and eighty miles in length; its greatest breadth, from the North Foreland in Kent to the Land's-End in Cornwall, is about three hundred and seventy miles; and its superficial area is computed at eighty-seven thousand five hundred square miles. The figure of this island is irregular, somewhat resembling that of a wedge, to which indeed it was compared by the ancients, from its gradually narrowing towards its northern extremity; and its whole line of coast is deeply indented by bays, creeks, and estuaries, which, notwithstanding its boldness and ruggedness in many parts, afford safe and commodious harbours. From its geographical position, therefore, no less than from its natural advantages, this island seems to have been destined by nature to become the seat of a great and powerful nation.

#### CHAP. I.

#### BRITISH AND ROMAN PERIOD.

Origin of the names Albion and Britain.-The Gauls, Kelts, or rigin of the names Albon and Britain.—The Gaus, Kens, or Celts.—Their migrations and incursions.—Portion of Europe occupied by them at the dawn of history.—Distinctive characters of the race.—Branches of the great Celtic family.—Celts the earliest inhabitants of Britain.—Followed by invaders of the Gothic or Teutonic race.—Predominance of the latter.—Aboriginal Celtic population of Scotland succeeded by the Gothic.— Condition of the Britons in the time of Cæsar.—Druidism.— Character and habits of the Britons.—Commerce and War. Roman Period .- Cæsar's Expeditions .- Subsequent attempts of the Romans.—Aulus Plautius.—Ostorius Scapula.—Gallant struggle of Caractacus.—His defeat in South Wales.—Betrayed.—Aulus Didius.—Attack on Anglesea by Suetonius Paulinus.
—Revolt of the Britons under Boadicea.—Campaigns of Agricola.—Extent of the Roman Conquests in Britain.—Introduction of Christianity.-Hadrian, Severus, and Caracalla.-Constitution of the Roman Provincial Government.—Usurpations of Carnusius and Allectus.—Constantine.—Cruelties of Paulus. Scots and Picts.—Their inroads and ravages.—Departure of the Romans from Britain.—Distresses of the Natives.—Arrival of the Saxons under Hengist and Horsa.-Saxon Conquest.

Various etymologies have been proposed of the words Albion and Britain; the former being the ancient name of the island; the latter that which superseded it, and in time became the appellation by which it was universally known.

Originally Albion was considered as only one of the British islands, and it is described as such both by Agathemerus and Ptolemy; but being by far the largest and most important of the group, the particular name was in course of time laid aside, and the general denomination used in its stead. The etymological origin of both, however, is involved in uncertainty. Some derive that of Albion from the Greek Aloos or Almos, identical with the Latin Albus and the Sabine Alpus, signifying White, and being obviously mere variations of the Celtic Alb or Alp, which has the same meaning; conceiving, with Festus, that as the mountains which separate France and Italy

this island was denominated Albion on account of the British chalky cliffs and soil of its southern shores, which were the portions that appeared to those who viewed it from the coast of Gaul; and this conjecture derives some countenance from the fact that the ancient Britons themselves called it *Inis-wen* or *Eilanban*, the *White Island*. Others, again, have recourse to the Phœnician, in which Alp signifies High, and contend that the name Albion was originally bestowed upon the island by the adventurous navigators of Phænicia, who first visited its shores, by reason of the bold and precipitous aspect of its headlands and coasts, and that hence it is descriptive, not of the colour, but of the physical conformation, of these coasts.

Of the word Britain a still greater variety of etymologies have been proposed. Nennius derives it from Brutus, whom he likewise calls Brito, the fifth in descent from Æneas. Camden supposes it a compound of Brith or Brit, a Celtic word signifying painted, and rana, a Greek word denoting a region; so that, according to him, the island was called Britannia from its being the country of painted people. Carte, founding on the circumstances that the ancient Britons called themselves Prydhain, and their country Inis-prydhain, or the Isle of the Prydhain, conceives that Britanni and Britannia are only latinized forms of the original word Prydhain in the British or Celtic tongue. Somner, disliking Camden's etymology, conjectures that Britain is derived from brydio, which in the ancient language of the island signified rage, and, according to him, was intended to indicate its position in the midst of a tempestuous sea. Whittaker is equally or even more fanciful than Somner, contending that the true etymon of the word is brith, briet, brit, bris, or brig, which he says means striped or divided. And Bochart, whose love of the Phænician was such that he found it every where and in every thing, conceives that this island and some others near it were denominated Barut Anac by the Phœnicians, that is, the country of tin, which, contracted into Bratanac, passed from them to the Greeks and Romans, and ultimately emerged in the softened forms of Britanni and Britannia. This, at least, has the merit of ingenuity to recommend it. Of the others, that of Carte seems to us to be the most natural and probable; although it leaves unexplained the word Prydhain, the analysis of which is essential to complete the etymology. It has been assumed by some that the name was originally bestowed on the island by foreigners; and, on this supposition, they have endeavoured to resolve it into its elements, or at least to offer a conjectural explanation of the circumstance which led to its primary application. But for our own part, we see no grounds whatever for entertaining such a notion, and think it much more likely that foreigners varied, according to their respective idioms and modes of articulation, the name in use among the natives, than that they invented, applied, and rendered general a new one, constructed on a remote and fanciful analogy, and having reference to accessory circumstances or particular localities.1

At the period when the Greek and Roman writers began to turn their attention to the west of Europe, they found it, from the remotest extremity of Ireland to the banks of the Danube, peopled by a race called Gauls, Kelts, or Celts, who, before the practice of tillage bound were called Alpes, by reason of their snowy covering, so them to the soil, had overspread a large portion of Spain

Period.

British

Roman

British and Roman in the course of their armed migrations, and, through the detecting the peculiarities, of each successive immigration. passes of the Julian and Rhætian Alps, had poured predatory bands on the great plain of northern Italy, where they established themselves, and afterwards struck a heavy blow at the rising power of Rome, stretching their dominions as far as the Appennines. This remarkable race, believed with reason to be of oriental origin, extended along the Danube till they reached the Sarmatians on the one hand, and the Thracians and Illyrians on the other; and from the central position which they thus occupied, they appear to have diverged by various natural channels to the different countries of Europe where their descendants are still to be found. How they came to establish themselves originally in such a position is uncertain. Their early migrations, undertaken for plunder rather than conquest, occurred anterior to the period of history; and we have but slender grounds for probable conjecture respecting either their extent or their antiquity. But some of the later incursions of this people into Italy and Greece are fortunately better known to us. A numerous body of Gauls, for example, deserting the bands of their countrymen who ravaged Greece, established themselves in Asia Minor under the successors of Alexander, and gave their name to the country they occupied, which was accordingly called Galatia. In the opinion of some, this body of invaders consisted wholly of Celts, while others maintain that they were of the Teutonic race; but it seems at least equally probable that they were composed of both races. With regard to the causes which produced these fierce and extensive irruptions, the learned have lost themselves in speculation, and wearied their readers with endless conjectures. The motives which led to them were in all likelihood different at different times, and they may therefore be variously ascribed to the restless and adventurous spirit of such tribes, to the ambition and rapacity of their chiefs, to the necessity which, after a certain period, urges on an unproductive race to seek new settlements, or to the resistless pressure of invading barbarians from behind, or perhaps to the simultaneous operation of several of these causes.1

The Rhine formed the northern boundary of the Gauls, and separated them from the Germanic or Teutonic race, which spread into Scandinavia, towards the last retreat of the Finnish tribes in the Arctic solitudes, and extended, on the other side, from the shores of the Atlantic to the vast plains inhabited by the Sarmatians and Dacians. The Garonne divided them from the Aquitanians, a people who, from various circumstances, as the testimony of the ancients, and the names of rivers and mountains, appear to have been the original inhabitants of the Spanish peninsula; whilst a portion of this primitive Iberian race occupied the southern coast of Gaul from the Pyrenees to the frontier of Italy.

The intermingling, followed by the gradual fusion and amalgamation of the various races by which most countries have been successively overrun, renders it exceedingly difficult, if not impossible, to discriminate the first inhabitants from the more civilized visitants, as well as to distinguish between the different tribes of the latter. Greece, from its position near the earliest seats of civilization, was open to conquest and colonization from numerous points both by sea and land; on the side of Thrace, on that of Asia Minor, from Egypt, and from the countries of the East. Europe, Africa, and Asia, appear at different times to have discharged portions of their population into this favoured spot; and hence has arisen the difficulty of ascertaining the number, and much more of

Italy, again, being accessible to colonists by sea from Greece, Asia Minor, and Egypt, and always exposed to the inroads of the tribes who inhabited or were able to make, themselves masters of the principal passes of the Alps, was occupied by a greater diversity of races than any other country of the West; and hence has arisen a confusion in the genealogy of its tribes, which even the profound sagacity and varied learning of Niebuhr have not succeeded in disentangling. Population appears to have originally flowed into this country from its two extremities; but in process of time the opposite streams met, and became so thoroughly intermingled, that no moral or intellectual chemistry can ever decompose them. With regard to the colonies of the Phænicians, they encircled the Mediterranean as far as Carthage and Cadiz, whilst no Grecian colonists had as yet established themselves farther to the west than Massalia, Massilia, or Marseilles. In circumstances and times like these, the natural boundaries of nations were often irregularly changed. The course of migration was frequently diverted from its ordinary channels, and sometimes forced back towards its original source. Races were mingled so that their distinctive marks became no longer discoverable; and even languages were changed, or altogether disappeared. Of this confusion the Galatians in Asia Minor, and the Keltiberians in Spain. afford examples. Even the Belgic inhabitants of northern Gaul have been thought a mixed race, and it seems pretty certain that, from whatever cause, Teutonic tribes were generally classed amongst them. Again, although the natural tendency of an unwritten language be to break down first into dialects and afterwards into distinct languages, yet languages originally different sometimes run into each other, and coalesce in a very remarkable manner. Of this the Hindustanee and Anglo-Norman have afforded examples at the opposite extremities of the globe, both having been formed out of jargons used in intercourse between the conquerors and the conquered. The victors sometimes impose their language, with little mixture, on the vanquished; but in India every variety of dialect has been deeply tinctured with Sanscrit, the original as well as the sacred language of that country; and nothing can be imagined more heterogeneous or dissimilar than the roots of most of the forms of speech which actually obtain

It may not be out of place to observe here, that the term race, as used in civil history, has a very different acceptation from that which is given to it by naturalists. The latter, confining their view to the physical form and organization of man, and making no account of language, and of those other minor varieties and peculiarities which the civil historian is obliged to notice, admit at present only five races of men; the Caucasian, the Mongolian, the Ethiopian, the American, and the Malay. Colour is considered as one of their tests or characters. The Caucasian is accounted the primitive stock, and it deviates into two extremes, equally remote and different from each other, namely, the Mongolian and the Ethiopian. But although the Mongol and the Negro differ from the European much more deeply and radically than the Hindu and the Arab, yet if the lesser difference be admitted to be the result of physical causes, operating throughout a long tract of ages, it will be difficult to prove that the greater may not at length have been produced by similar causes acting during a greater period of time. Be this as it may, however, it must be obvious that, from lengthened separation, and the natural divergency of language, the historical divisions **British** Period. not always corresponding with the political distribution of territory among nations, and that, as the same state may contain tribes of various race, so the same race may be

subject to many distinct rulers.1

The Celtic race may be considered as subdivided into two distinct portions, with languages which, though certainly derived from a common stock, are not, it is believed, reciprocally understood. One of these cognate languages or dialects, called the Gaelic, is still spoken by the native Irish, by the Highlanders of Scotland, and in the Isle of Man; the other is the common speech of Wales and Lower Bretagne, and, till a period comparatively recent, it was spoken in Cornwall; whilst, in each branch or subdivision, the parent language seems only to differ by provincial variations, which, accumulating in a long series of ages, have produced a greater divergence than is generally found to exist between affiliated dialects. The Gaulish tribes are unable to converse with the Cimbric, yet there is abundant evidence that the Gaelic and Cymraig or Welsh are branches of the same family. Indeed it is supposed by some that the Cimbric or Cymraig followed, at a considerable interval, the Gaulish settlers; and it seems not improbable, that the tribes who spoke this form or dialect of Celtic were, as Sir James Mackintosh observes, "the same Cimbri who, in conjunction with their Teutonic allies, were expelled from the Roman territory with a slaughter so enormous, and after atrocities so unmatched, as to be suspected of exaggeration;" although it should be borne in mind "that the adversaries of the Romans were not armies, but migratory nations, bringing into the field women and children, and fierce animals," which all contributed to swell the horrors of the butchery, and first taught the Romans to dread the arms of the northern barbarians.2

That the aboriginal, or at least the earliest inhabitants of these islands were a people of Celtic origin and race, seems to be admitted on all hands, and is rendered highly probable, both from the intimations of history and the evidence of language. The former leave little doubt that the migrations and settlements of the Celtic tribes preceded those of the Scythian or Gothic nations by whom they were almost everywhere displaced; and this conclusion derives additional probability from the consideration, that the greater part of the names of mountains, lakes, and rivers, in both the British islands, are still descriptive and significant in some dialect of the Celtic language. "The appellations of these vast and permanent parts of nature," says Sir James Mackintosh, "are commonly observed to continue as unchanged as themselves." Of all the languages that ever existed, the Celtic is perhaps the richest in an appropriate and expressive nomenclature for physical objects; and the facility with which its elementary forms admit of combinations descriptive of the varieties observable in external nature, must have greatly tended to impress and perpetuate the appellations which it originally supplied. Hence it is that, after the revolution of ages, and the fluctuations of conquest, dominion, and race, together with all the changes which time and usage insensibly operate in language, the names in question are still distinctly traceable; whilst the extent to which they still obtain in both parts of Britain seems to argue the original ascendancy of the race from whose language they were derived. Had the Gothic preceded, instead of following, the Celtic colonists, the case would in all probability have been exactly, or at least very nearly, the reverse of this. As it is, however, the fact here mentioned appears to be

of mankind become broken into portions or subdivisions incompatible with any other supposition than that of Britain being originally peopled by a Celtic race; and as the Gaelic dialect explains many more of the names of external objects than that spoken by the other branch of the race, the same principle leads us to conclude, that those who employed that variety of the common or parent language were the first settlers. Beyond these probabilities the most ancient period of our history is involved in impenetrable darkness.

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To the Celtic population of Britain succeeded the Gothic, by whom they were, at a very early period, displaced to a considerable extent. Advancing from the northern parts of Asia and Europe, where they had enjoyed a wild independence, the Scythians or Goths drove the Cimbri or northern Celts before them, and, seizing upon that part of Gaul which is nearest to Britain, they crossed over into England. The period of this immigration is uncertain; but at the time of Cæsar's invasion, the primitive or Celtic inhabitants had been driven into the interior and more inaccessible parts of the island, while the southeastern portion was peopled with colonies of Gothic descent, who may, therefore, be regarded as the chief ancestors of the English nation. The expulsion of the aboriginal population from the south-eastern coasts and lowland districts of the whole island was complete; so much so, in fact, that, but for the tenacity with which the names of natural objects adhere to them, and some other indications of a still fainter kind, not a trace or vestige of their original ascendancy would have remained. The Saxon conquest was of a different character. The invaders, inconsiderable in number, sought political supremacy rather than a settlement by means of extermination, and used the privileges of conquest with more moderation than their predecessors of the same race. There no longer existed between the conquerors and the conquered that radical diversity of physical conformation, habits, and customs, which, in a barbarous age, is the source of inextinguishable hostility; they accordingly enslaved, but forebore from exterminating or utterly expelling the natives; a gradual amalgamation took place; and, from the commingled Gothic dialects of both, at length sprung the Anglo-Saxon, which is the parent of the English language Some, indeed, have maintained that, at the period of Cæsar's invasion, the population of Britain still continued Celtic. But this opinion labours under serious objections. The Anglo-Saxon and the English language, in its elder and simpler form, exhibit scarcely a trace of Celtic in their composition; and they have even less of that peculiar dialect of Gothic which the Angles and Saxons must have spoken at the period of their arrival in Britain, than of the Belgic and Dutch dialects, which are in all probability of Scandinavian origin. To this it may, indeed, be objected that Druidism, which is rightly considered as a Celtic superstition, is mentioned by Cæsar in the earliest authentic records of the island which has reached our times. But, in the first place, Cæsar never speaks of having actually seen Druids, nor does it appear that any one of this class of priests was discovered until the Romans had penetrated into South Wales; and, secondly, forms of superstition often survive the races or nations amongst which they originated, and pass indifferently from the conquered to the conquerors, and conversely, by the operation of causes totally distinct from those which determine the fate of communities of men.

The expulsion of the Celts from the eastern coast of Britain long preceded the arrival of Cæsar. This may be inferred from the account of Tacitus, whose description

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British of the inhabitants of the lowland parts of Scotland as a is difficult to say. From all that we learn, however, we are British red-haired and large limbed race, clearly indicates their Gothic origin; whilst, in the interval between Cæsar and Agricola, no material change appears to have occurred in the relative distribution of the various tribes by whom Scotland was then inhabited. It would be vain to attempt to ascertain the epoch of a revolution which seems to have been effected long anterior to the period of history; but if the time of its occurrence be uncertain, the fact itself is nevertheless indisputable; and this is connected with another, sufficiently remarkable, namely, that every trace or vestige of the original Celtic population of the Lowlands has been obliterated, and that there is neither monument, record, tradition, nor circumstance of any kind which can lead to a conjecture as to their fate. It is natural, indeed, to suppose that in Scotland, as elsewhere, those who escaped the fury of the invaders sought shelter in the mountains or Highlands, where a people chiefly Celtic still exists; but it seems as well established as any fact of the kind can ever be, that the occupation of the Highlands by a Celtic population does not date much earlier than the sixth century, and that the first settlers of this race were a reflux of the Celts from Ireland, not a remnant of the aboriginal inhabitants of the Lowlands. The Dalriads or Attacotii are indeed said to have established themselves in Argyleshire about the middle of the third century; but they were driven back to Ireland in the fifth century, and did not return till the following one, when they effected a second and permanent settlement. Extravagant pretensions to antiquity have, it is true, been set up in favour of the Celtic Scots by Boyce, Buchanan, and others, who gravely affirm that this people reigned in Scotland a thousand years before the Christian era. But the fabulous millennium with which these writers gratified the credulous nationality of their countrymen in an uninquiring age has found no supporters in more modern times.

The condition of the Britons in the time of Cæsar very much resembled that of the Gauls from whom they sprung. They were divided into a number of petty kingdoms or states, each of which was again subdivided among subordinate chieftains, who governed their respective tribes or clans with more than feudal authority. On great emergencies, indeed, they united under a common leader; but this "king of kings" had only a limited and precarious rule; and the confederacies of the ancient Britons, like those of the ancient Greeks, were neither numerous nor lasting. Like the mutually repellant atoms of the Epicurean philosophy, their union was fortuitous; and as there existed no principle of compression to retain them in the situation into which accident or a sense of common danger sometimes threw them, a separation speedily followed. It was this which gave the Romans so great an advantage in their contests with these warlike nations. Never consulting together for the benefit of the whole, it was rare that even two or three of them united against the common enemy. They fought, for the most part, separately, and, as a necessary consequence, were beaten in detail. Of the limits of the regal authority among the Britons little is known with any degree of certainty, though much probably depended on the personal character of the individual who exercised it. Hereditary right seems to have been recognised, and extended even to female succession, but it was not strictly observed or enforced; and instances were not rare of the exclusion of a son by his father, whom he had offended, from any share in his dominions. It has been conjectured that the power of the people was considerable; but this is merely conjecture. Among the Gauls the few had not succeeded in excluding the many from all participation in the conduct of their own affairs. But whether the Britons resembled them in this respect or not, it the Celtic colonists who originally settled in Gaul and

inclined to think that here the similarity failed. But whatever may have been the power of the kings or

the influence of the people, there existed an order which exercised an authority paramount to that of either, or of both united. This was the Druidical or sacred caste, which, in relation to the rest of society, occupied a station and enjoyed privileges in Britain, analogous to those possessed by the Brahmins of India at the period of their greatest glory. The power of the Druids was absolute, exclusive, and peculiar to them as a body. Their sanction was necessary to all public transactions, which otherwise were of no validity. They could pardon malefactors who had been judicially condemned, or ordain victims to the sacrifice without the intervention of any trial or judgment but their own. From the Druids the Romans seem to have borrowed the aquæ et ignis interdictio, which became the most terrible sentence of their law. It was, in fact, the Druidical excommunication slightly varied. An individual debarred from attending the holy rites, and interdicted the use of fire, received sentence of eternal banishment from the fellowship of his kind; and this sentence, more formidable than the excommunication of the Roman Catholic church in aftertimes, they could pronounce at pleasure. Their ceremonies were at once mysterious and inhuman. The mistletoe, which they accounted peculiarly sacred, was gathered by them from the leaves of the oak with circumstances of extraordinary solemnity, though for what purpose or with what view is unknown. They dwelt in the centre of concentrated woods, and their retreats were defended from intrusion or violation by the power of a dark and gloomy superstition. On their rude but horrid altars they sacrificed human victims; and from the course of the blood as it flowed under the knife of the officiating priest, they prognosticated future events. They were the lawgivers, physicians, poets, and philosophers of their country. They are said to have been acquainted with letters and the art of writing, though in what particular form is uncertain. Cæsar, probably from misinformation, says that they employed the Greek letters, which is very They taught their disciples the doctrine of improbable. transmigration, and inculcated on them the duty of despising death in defence of their country. They practised celibacy, and continued their order by kidnapping children, whom they trained up and initiated in their mysteries. Some of their observances are described as excessively revolting; others would seem to have been of a more innocent and even humane character. Britain was the great sanctuary of this superstition. Originally imported from Gaul, it seems to have found a congenial soil in this country, where it struck its roots so firmly, and insinuated itself so deeply, into the general character, that traces of it are still discoverable in several of the popular superstitions which the "schoolmaster" has not yet succeeded in effacing.

The Druidical system is not without oriental features. "So much subserviency of one part of a nation to another," says Sir James Mackintosh, "in an age so destitute of the means of influence and of the habits of obedience, is not without resemblance to that system of ancient Asia, which confined men to hereditary occupations, and consequently vested in the sacerdotal caste a power founded in the exclusive possession of knowledge. The Egyptian and Phœnician colonists who settled in the Hellenic territory were, by some fortunate accident unknown to history, set free from those Asiatic restrictions which, having probably long subsisted as usages, were at length sanctioned among their ancestors by law and by religion as the sole security against a relapse into unskilfulness and barbarism." But British and Roman Period. Britain were not equally fortunate. Having imported, long before the period of record, the oriental system, with its restrictive and stationary spirit, they submitted to its yoke in their new settlements, where it withstood the example of a more generous polity afforded by the neighbouring republics of Hellenic origin, and only yielded at length to the ascendancy of the benignant genius of the Christian religion.

The prevalence of such a system is, even under the most favourable circumstances, incompatible with an advanced state of civilization; and in Britain it co-existed with a condition of society which, anterior to the Roman occupation, was but little elevated above absolute barbarism. The south-western shores of the island had, it is true, been early resorted to by foreigners for purposes of traffic; the Phœnicians and Massilians, for example, traded in the tin of Cornwall, and from them geographers spoke of the Cassiterides or Tin Islands; but this traffic was too limited in extent, and too confined in its sphere, to have any material influence on the general character of the people, who accordingly derived small benefit from their occasional intercourse with foreigners. Their scanty clothing consisted of untanned skins; and the parts of the body left exposed were bedaubed with an azure colouring matter extracted from a particular herb. Tillage, which had been introduced by the Belgic Gauls, was not altogether unknown; but the principal articles of food were the milk and flesh of their herds. Superstition, with its usual blind absurdity, had forbidden them the use of fish, which abounded on all the coasts of the island. Their towns were merely clusters of wigwams, covered with turf, boughs, or skins, and situated in the midst of some forest or morass, with the avenues defended by ramparts of earth and felled trees. In their persons they were large and tall, excelling the Gauls alike in stature and in strength; but their features were heavy, their figures clumsy, and, according to Strabo, they did not stand firm on their legs. Large men, indeed, are seldom handsome or elegantly formed. But although barbarians in point of art and industry, the ancient Britons commanded respect by their intellectual and moral qualities. According to Tacitus, they possessed a quicker apprehension than the Gauls; and Diodorus Siculus commends their integrity as greater than that of the Romans. A custom abhorrent to natural morality is indeed said to have prevailed amongst them; we are told that societies of ten or twelve persons possessed wives in common. But the supposition of such a custom might be easily, though erroneously, formed, by a Roman stranger, from the circumstance of the barbarians sleeping promiscuously in their hovels, as the peasantry do to this day in some parts of Scotland; and the fact, when rightly understood, by no means warrants the conclusion which seems to have been drawn from it. On the contrary, the chastity of the sexes, and the purity of domestic intercourse, may have been as rigidly observed and maintained among these simple barbarians as in periods of society when the guards of virtue are multiplied, and modesty is sheltered by factitious sentiment and conventional ceremony.

The trade in tin of Cornwall, carried on either directly or indirectly by the Phœnicians and Massilians, has been already noticed. Prior to the Roman conquest, however, the exports must have been inconsiderable; and it is even doubtful whether those early navigators were acquainted with the mainland of Britain, since we hear only of the Cassiterides, or adjacent islands, to which their mercantile adventures appear to have been confined. But after the Romans had firmly established themselves in their conquest, copper, tin, lime, chalk, pearls, corn, cattle, hides, horses, cheese, dogs, and slaves, began to be exported by

them, and we may conclude that the products of other countries were imported in return or exchange for these commodities. The only manufacture we read of was that of baskets, in which, as we learn from various authorities, the Britons greatly excelled. Some of the more useful but baser metals seem not to have been found in Britain before the time of Cæsar, who informs us that even their brass was imported; and their skill in manufacturing such as they had must have been very small indeed, since, as we learn from the same authority, their ornamental trinkets were supplied by strangers. But their warlike habits had not left them ignorant of the coarser craft of the armourer. Man has never been found, in any state or condition of his existence, altogether unprovided with weapons of defence. Those of the Britons consisted of small targets and swords, spears, and chariots armed with iron scythes projecting from the extremities of the axle-tree; and they were also provided with noisy rattles, intended to strike terror into their enemies. Their chariots they managed with considerable dexterity, and, on several occasions, succeeded in breaking the Roman line by means of these vehicles; but, on the whole, they proved unavailing against the admirable discipline of the legions, and were no more heard of after the Romans gained a footing in the island. It is even wonderful that they should ever, in any instance, have been found in the least degree dangerous or formidable, except to the Britons themselves; for as these vehicles could only act on level unbroken ground, and as the extreme mobility of the legion gave it the choice of its own position, whether for attack or defence, nothing but the grossest misconduct on the part of its commander could ever have placed it in a situation to be successfully assaulted by such clumsy and unmanageable engines.

Such are the principal notices supplied by historians respecting the ancient inhabitants of this country prior to the Roman conquest. The first events in the authentic history of Britain are the landing of Cæsar on the southern shores, in the fifty-fifth year before the Christian era, and his invasion of the country in the following year. The course of his conquests in Gaul had brought him in sight of an island hitherto known only by name, and, being probably desirous of dazzling the people of Rome by a new achievement, as well as of seeming to be engaged in objects remote from internal aggrandizement, he resolved on attempting a descent upon this unexplored region, on the pretence that the Britons had rendered some assistance to the Gauls in their struggle for independence. Another and more secret motive for this expedition may have been, that it would enable him to prolong his provincial command, and, above all, to keep up an army devoted to its chief, until the fulness of time should come for the execution of his projects against liberty. On the first occasion, when he disembarked near Deal, his landing was warmly disputed by the natives; but discipline and skill at length prevailed over wild valour, and after a sanguinary struggle the Britons were defeated, and forced to sue for peace. Deputies were accordingly sent to lay their submission before Cæsar, and learn the conditions on which they were to be forgiven for the crime of defending their native soil. But having ascertained the number of the invaders, and learnt that accidents arising from ignorance of the navigation had damaged the Roman fleet, they acceded to whatever terms Cæsar thought proper to dictate, and secretly resolved to renew the attack. They were again repulsed, however, though not without inflicting a severe loss on the enemy; and Cæsar, surprised at the resistance he had encountered, as well as anxious to secure his return to Gaul, which the approach of winter had endangered, readily accepted the nominal submission proffered by the islanders. Thus ended the first descent of the Romans

British and Roman Period.

Roman

Period.

A. D. 51.

British and Roman Period.

в. с. 55.

on Britain. After a brief but fierce struggle of little more too formidable to be seriously passed; reinforcements than three weeks, Cæsar embarked his whole army, and returned to Gaul, glad to escape from a situation where his means were insufficient to enable him to keep his ground, and where the slightest reverse would undoubtedly have proved fatal.

In the ensuing spring the same commander again appeared on the British coast, with an armament of 800 vessels, having on board five legions and 2000 auxiliary horse. The sight of so formidable a fleet made the Britons despair of resisting the landing of the invaders, and they accordingly withdrew to their forests, where they could act with better chance of success. The Romans, therefore, disembarked without opposition, penetrated into the country, and passing the Thames above Kingston, entered the country of the Trinobantes, whose territory included the site of the present metropolis of Britain. The advance was bravely disputed, and in the course of this forest campaign, the military qualities of the invaders were put to a severe trial, by the incessant activity, the daring courage, and the rapid movements of the hardy natives. Cassivelaunus, a British chief, particularly distinguished himself by his gallantry and enterprise, as well as by a natural talent for war, which was strikingly exhibited in the bold design of cutting off Cæsar from his fleet. But genius and science asserted their usual superiority. The Britons were at length vanquished; and the chief's having promised to pay tribute, and to abstain from hostility against those of their countrymen who had abetted the Romans, the latter withdrew, content with the barren glory of having gained a victory without result, and conquered a country which they could not retain. In fact, it is not easy to divine the real object of these expeditions. It has been said that Cæsar showed no signs of an intention to establish himself in Britain, and probably regarded his expeditions only as a means of flattering the Romans, and of displaying the complete reduction of Gaul. This may be true; but it was never the character of Roman policy to fight useless battles, or lavish unprofitably the blood of the legions. The more probable supposition appears to be, that Cæsar considered the entire conquest and subjugation of a country covered with forests, without roads, and inhabited by a hardy, warlike race, as a hopeless task, or at least as one which, in his particular situation, and with the means at his disposal, it would be unwise or imprudent to persevere in. One benefit, however, resulted from his enterprise; he first laid open the country to history, and collected those invaluable notices of the character, condition, habits, manners, customs, and religion of the people, which he has preserved in his Commentaries, and which still afford instruction and delight to every

Britain was threatened with invasion by Augustus, who thereby extorted presents and tribute from the insular chiefs; Tiberius employed no menace, but exacted the tribute; and Caligula, in one of his insane freaks, landed at the head of a body of troops, whom he commanded to charge the ocean, and collect cockle-shells as fit emblems of his imaginary triumph over that boisterous enemy. The visit of the imperial madman took place ninety years after Cæsar's expedition, and formed a subject of derision to the whole Roman world. But the next attempt was of a more serious character, and productive of graver results. In the reign of Claudius, the adventurous and hitherto unprofitable enterprise was resumed under two distinguished officers, Aulus Plautius and Vespasian, who, landing at the head of an army 50,000 strong, marched through the territories of the Cattivelauni, and defeated Caractacus and Trocodumnus, the British leaders, in three successive engagements. But the retreating enemy was still

were demanded by the emperor's lieutenants; and seven years elapsed before they succeeded in reducing the country southward of the Thames. This partial conquest cost the blood of thirty battles, in which the Romans were not

always victorious. Ostorius Scapula, who succeeded Aulus Plautius in the provincial government of Britain, extended the province to the banks of the Severn, and built a chain of forts to check the incursions of the independent tribes. But Caradoc or Caractacus still lived. This renowned chief had lost his dominions; but, notwithstanding all his reverses, the ascendancy he had acquired over the minds of his countrymen remained unshaken, and, great in adversity, he was still formidable. Despairing of success in the open country, he transferred the war to the mountains of Wales, and at the head of the Silures and other tribes, who had arms in their hands and the love of liberty in their hearts, he prepared to make another effort in defence of his country. The position he selected for this final stand shows him to have been possessed of that instinctive military genius which anticipates science and often defeats its combinations. It consisted of a rising ground or eminence, with a rapid and scarcely fordable river, which it commanded in front, and was incapable of being turned by either flank, whilst its defensive strength was increased by a stone rampart built along the brow of the hill. Here he resolved to await the attack of the Romans; and exhorting his followers to remember that Cæsar himself had been driven from the shores of Britain, he called upon them to maintain by their valour the liberty which they had inherited from their ancestors. They vowed fidelity to the cause of their country, and promised that they would conquer or die where they stood. The Roman general was astonished. He saw that he had to encounter a desperate enemy, skilfully posted, and unassailable except where his position was strongest; and, in viewing the difficulties of his situation, his mind almost misgave him. But the spirit of his soldiers was roused, and they cried out that no position was impregnable to the brave. Having forded the river with extreme difficulty, they formed the testudo, or close column, covered overhead with their shields, to protect them from the missile weapons of the natives; ascended the hill in this compact order; broke through the rampart of loose stones; and charging home upon the Britons, overthrew them with great slaughter. The brothers of the British prince surrendered; his wife and daughter were made captive; and the hero himself, who had escaped the casualties of the field, and taken refuge among the Brigantes in Yorkshire, was afterwards basely betrayed into the hands of the enemy by their queen Cartismandua, his inhuman stepmother. He was sent captive to Italy, whither the fame of his achievements had preceded him; and the people flocked to behold the man who for nine years had defied the power of Rome. His family supplicated for mercy; but the magnanimous chief, sustaining in misfortune true greatness of character, stooped not to prefer any solicitation, and, addressing the emperor with a manly dignity, equally removed from abject submission and insolent defiance, made so great an impression on the mind of Claudius, that his

and himself treated with the most distinguished regard. Meanwhile the Silures, beaten but not subdued, renewed their attacks on the Romans, and kept up the animosity of their countrymen by their example. They cut to pieces some cohorts employed in building forts in their country; harassed the enemy with continual skirmishes; and, although defeated in a general action which they afterwards risked, they escaped without entire rout under

fetters were ordered to be struck off, and both his family

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warfare, barren of glory and productive of little save fa-Aulus Didius. The latter checked the incursions of the Britons, who had again become formidable under a new leader; but not till after they had defeated a Roman legion, and reaped some other advantages of a minor description. Unfortunately for himself, however, Venusius, the leader in question, and chief of the Huiccii of Warwick and Worcestershire, had married the betrayer of Caractacus, a woman as licentious in her personal conduct as she had proved herself devoid of principle or patriotism. Having scandalized her subjects by admitting Villocatus, her armour-bearer, to a share of her bed and throne, Cartismandua implored the aid of the Romans against her husband, who had collected a force to expel the usurper. But the promised assistance proved too scanty for the protection of the adultress, who, in the end, was driven from her kingdom; and although this civil war operated as a seasonable diversion, the efforts of the Romans were for several years confined to the preservation of what they had already acquired.

But the season for action in due time arrived. Suetonius Paulinus, an officer of high reputation, but ambitious, and prone to cruelty, having obtained the province of Britain, resolved to destroy the sacred seat of Druidism in the island of Mona or Anglesea, where the head of that order resided, considering it as the centre of the British nation, and the source whence emanated that spirit of resistance which had already cost the Romans so much blood. The project was equally bold and well conceived. Having crossed the strait, however, he found a host drawn up in order of battle to receive him, the declivities bristling with arms, soldiers occupying every defile, and women, in funeral apparel, running along the ranks like furies with burning torches in their hands, whilst Druids clustered around, imprecating the wrath of heaven on the sacrilegious intruders into their holy of holies. Awed by the spectacle, the legions for a moment stood powerless; but ashamed of their momentary panic, they rushed forward to the attack, drove all before them, and, after demolishing the altars and groves, burned the Druids in their own fires.

In the midst of this havoc, however, Suetonius received intelligence of a general insurrection of the conquered tribes. The immediate causes of an outbreaking so little expected were the gross injustice done to the family of Prasutægus, king of the Icini, and the atrocious outrages offered to his queen Boadicea, who, having remonstrated against the fraudulent exheredation of her children, was publicly whipped, and constrained to witness the violation of her daughters. Wrongs so great, and insults so intolerable, required not the general spoliation which followed to kindle up the spirit of an indignant people, and to turn their vengeance on the oppressors. The standard of the injured queen was raised, and numerous tribes rallied round it. The infant colony of Camelodunum (Malden or Colchester) was destroyed; the infantry of the ninth legion were annihilated; and in the more flourishing colony of Verulamium (St Alban's) seventy thousand persons are said to have been put to death with all the cruelties of a barbarous revenge. Suetonius flew to the assistance of his countrymen, and soon succeeded in bringing the Britons to a general action on open ground, where their superiority in point of numbers was of little avail against discipline and science. They were defeated with prodigious slaughter, whilst the victors, by their own account, lost only five hundred men. The disproportion was doubtless but unencumbered with baggage. In his second campaign

cover of night. Weary of an obscure and destructive great; but this is probably an exaggeration in both directions. The Britans seem to have fought gallantly, though tigue and anxiety, Ostorius died, and was succeeded by not successfully; and hence the historian says, that "the glory won on that day was equal to that of the most renowned victories of the ancient Romans," a statement inconsistent with the notion that it had been either easily or cheaply purchased. Boadicea ended her miseries by taking poison; and Posthumus, the commander of a legion, fell on his sword, indignant at not having a share in so glorious a victory.

Broken by this blow, the spirit of the Britons would have soon been quenched had it not been kept alive by oppression. Suetonius, with all his abilities, was injudiciously vindictive, and frequently lost by his cruelty the advantages which he had gained by his talents. He was therefore recalled by Nero; and, under his more immediate successors, the Britons enjoyed a short interval of repose. But the Roman energies revived under Vespasian, who had gathered his first laurels in Britain. The Brigantes, commanded by Venusius, were at length overcome; and the Silures, after a gallant but hopeless resistance, were in like manner subdued. In this double contest Cerealis and Frontinus employed no less than seven years, a fact which sufficiently indicates the persevering energy with which these powerful tribes contended for independence.

These successes paved the way for the subjugation of the greater part of the island under Cnæus Julius Agricola, who was now appointed to the government of the province. The administration of this distinguished Roman would probably have been as little known to us as that of any of his predecessors, if it had not been for the circumstance of having as his son-in-law the most able and philosophical of the ancient historians; "a singular instance," as Sir James Mackintosh observes, "of the power which genius, in ages where historical materials are scanty, may exercise over the allotment of fame." In the character of Agricola is exhibited an example of the union of great capacity for war, with prudence, moderation, and judgment in the administration of civil affairs. "His well-balanced mind," says the very eminent writer just cited, " was averse from all excess, but it was without those brilliant peculiarities in which the biographer delights. The only general maxim by which the historian attempts to exalt his character is, that there is a conduct, even under tyrannical reigns, equally distant from servility and turbulence, by which an eminent man may serve his country with safety and innocence. The work in question ought rather to be regarded as the funeral panegyric than as the life of Agricola. The age of Tacitus afforded him few opportunities to acquire a talent for praise by frequent exercise: his style did not easily descend to ordinary particulars; and his affection in this case cramped his freedom." Hence the indistinctness of the outline presented to us by the historian may be ascribed both to the generality of his language and to the limits of his information; circumstances often render it difficult to extract a precise meaning from his words, and, particularly, to fix the localities of some of the most interesting events he relates.

Agricola began his military career in Britain by subduing the Ordovici of North Wales, and reducing Mona, which, after the fierce vigour of Suetonius was withdrawn in consequence of the insurrection under Boadicea, had regained its independence and religious pre-eminence as the grand seat of Druidism. This he effected without the aid of ships, by causing a sufficient force to swim across the narrowest part of the strait with their arms and horses,

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he carried his arms to the northward, and subdued tribes solation succeeded to the noise of conflict. The pursuit British who had never as yet come into contact with the Romans; showing clemency to such as submitted to the power of Rome, and never, in any instance, abusing victory for purposes of cruelty or oppression. To secure these advanced conquests, he built a chain of forts or military stations from sea to sea, in nearly the same line where the rampart of Hadrian and the wall of Severus were afterwards erected.

In his third campaign Agricola entered the country of the Caledonians by the head of the Solway, and traversed it as far as the Tay without encountering an enemy. Believing that the invaders would retire on the approach of winter, they abstained from committing any hostilities; but in this expectation they were deceived, for, when winter set in, they found the Romans established in fortified towns, well provided with all necessary stores, and secure alike against surprise or assault. Next year the Roman general built a line of forts between the friths of Forth and Clyde, with the double view of excluding the contagion of revolt, and of protecting the inhabitants of the province against the inroads of the northern barbarians. In his fifth campaign he crossed the frith of Clyde; and, after a variety of skirmishes with the wild natives of Cantyre, Lorn, Argyleshire, and Lochaber, obtained a view of the coast of Ireland, which, from the information he collected as to the force necessary for subduing and retaining, he meditated adding to the Roman empire; but this design was never put in execution. During his sixth campaign he passed the friths of Forth and Tay, and led his army, which was attended and supported in all its movements by a fleet, along the eastern coast of Scotland. The Caledonians hung upon his line of march, and harassed him considerably; but, awed by the presence and sight of the fleet, which was to them a novel spectacle, they generally kept at a respectful distance. In a night attack, however, they threw a portion of his army into confusion; and, having penetrated into the camp of the ninth legion, would have overwhelmed them entirely if Agricola had not come with great celerity to their aid, and driven the assailants back to their woods and morasses. After this action, Agricola retired into winter quarters, and left the Caledonians a short respite to prepare for the final struggle in defence of their rude independence.

When the Roman commander took the field in his seventh campaign, he found the native host encamped in a position the exact locality of which has been much disputed (some fixing it at the base of the central and others at that of the eastern portion of the Grampian chain), under a barbarians were estimated at near 30,000 men, whilst the Roman army was little, if at all, inferior in number. But every possible advantage was on the side of the latter; for with what conceivable chance of success could a disorderly mass or rabble of 30,000 barbarians contend against an equal number of highly-disciplined and veteran troops, led on by a general of consummate ability and great experience in the art of war? The elaborate description of Tacitus has caused an importance to be attached to this battle, which, in reality, does not belong to it. The issue was never even for an instant doubtful. The Caledonians were defeated with great slaughter, ten thousand having fallen either in the battle or in the pursuit, whilst the loss of the Romans scarcely exceeded three hundred men. After the defeat of their main body, a reserve of the Caledonians moved to take the Romans in flank; but the attempt was defeated by Agricola in person at the head of a strong body of legionaries, and the flight then became universal. The inhabitants mingled with the fugitives after setting fire to their dwellings, and the silence of de-

was soon discontinued; the vanquished found refuge in their mountain fastnesses; and as the Grampian range which towered in front constituted the advanced bulwark of a country wholly unknown, Agricola did not attempt to penetrate into its dangerous defiles, but, marching into the country now called Angus, took it from the Horesti, whom he had previously subdued. Meanwhile his fleet returned from a voyage of discovery which it had prosecuted as far as the Orcades, and even Thule, supposed to be Foula, the most northerly of the Zetland islands; and Agricola established his winter quarters on the most level district, which lay to the northward of the natural frontier formed by the two friths. But in the reign of Domitian it was difficult for the most prudent general to be long successful with safety. Agricola was recalled; and, on his return to Rome, all the arts by which he shunned popularity proved insufficient to lull the suspicions of a jealous tyrant, by whose directions his days seem to have been shortened by poison.

Under Agricola the Roman dominion reached its utmost extent in Britain, and the natives, as we have seen, were driven into the rugged and inhospitable regions be-yond the Grampians. From this time till the close of the third century the island is seldom noticed by the Roman historians. We know, indeed, though chiefly by the evidence of medals, that the mountaineers broke into the Roman province, and were driven back into their fastnesses by the vigorous arm of Hadrian, who erected a second wall, the remains of which are still traceable from the Solway Frith to the mouth of the Tyne. Under Antoninus the same species of fortification was constructed on the more northern frontier of the friths; while Severus, abandoning Agricola's rampart, which Antoninus had caused to be repaired, erected a stone wall almost parallel with that of Hadrian already mentioned, and in a manner equally solid and durable. These frontier works, executed on so large a scale, and requiring a numerous body of troops at the different stations for their defence, sufficiently attest the persevering and formidable character of the assaults of our rude ancestors on the Roman power in Britain. They might be beaten, but they could not be subdued; they might be driven back, but in a little time they were sure to return to the attack. The progress of the Roman arms in the reduction of Britain was singularly slow; and, notwithstanding all their defensive precautions, the tenure by which the northern part of the province was held seems to have been exceedingly insecure. Gaul was conquered by one great effort, and retained in chief whose name has been latinized into Galgacus. The subjection without difficulty. Britain, on the other hand, though peopled by a race of kindred origin, was only carried as it were foot by foot, and kept under by the direct ascendancy of military power. And this difference produced another, which, in its results, often influenced the destinies of the Roman world. Its insular situation, and the large force which it was necessary to maintain for the support of order and government, offered irresistible temptations to irregular ambition; it became "an island fertile in usurpers;" and the commander who assumed the purple had always at hand powerful means to enforce his pretensions. It was alike the object and the theatre of all manner of intrigues and contentions; the first, though not the highest, prize in the lottery of ambition. Hence the Roman cultivation was extended to it in a much less degree than to Spain and Gaul. The writers of the latter province were respectable, those of the former the most celebrated of the time; but Roman Britain did not produce a single literary name. In what degree the prevalence of the Latin might have paved the way for that disappearance of the ancient language of Britain in the larBritish 211.

ger and more fertile portion of the island, which was com- ways so fortunate as so be provided with such instruments. which warrant us to hazard a conjecture. The Roman remains seem rather to indicate the luxury of the military stations of that people, than a desire to adorn their province with civil architecture; whilst, in the convenience and magnificence of their roads, they only contemplated the security of their power or the extension of their conquests.

The precise period of the introduction of Christianity into Britain is uncertain. About the end of the second century, however, we find Tertullian boasting that the gospel had subdued tribes yet unconquered by the Romans; and from this circumstance, as well as from our more accurate information respecting the diffusion of Christianity in Gaul, it may be reasonably supposed that its first planting in our island was considerably earlier. Two centuries afterwards, theological controversy had become so prevalent, that Pelagius and Celestius, the one a Welchman and the other a Scotchman, agitated all Christendom by their heretical notions on the subjects of original sin and free will. The received opinion, which ascribes to Constantine, who began his reign at York, the introduction of Christianity into Britain towards the middle of the fourth century, is founded upon the palpable error of confounding the first preaching of the gospel with the formal recognition or establishment of Christianity, upon the ruins of Paganism, as the religion of the empire. Long before that time intrepid and dauntless missionaries had carried the faith of the cross to the hearths and the homes of our barbarous ancestors; and the policy of Constantine only kept pace with, instead of outrunning, the natural course of events.

When Severus died at York, Caracalla, then known by his original name of Bassianus, concluded a peace with the Caledonians, and, along with his brother Geta, hastened to Rome to plunge into all the debaucheries of the capital. There now occurs in the history of Britain a chasm of seventy years, during which the silence of the Roman writers would lead us to infer that the island enjoyed peace. In the reign of Diocletian, Carnusius, intrusted with the command of a naval armament, fitted out to repress piracy on the coasts of Britain, usurped the purple, and maintained his assumed dignity for eight years. But while Constantius, the coadjutor of the emperor, was preparing to attack him, he was assassinated by Allectus, who, imitating the example of his master, usurped the sovereignty, and maintained it for three years. He was, however, defeated and slain by Constantius, who put an end to the rebellion, and dispersed the followers of the usurper. In the division of the empire between Galerius and Constantius, Britain fell to the share of the latter, who, in consequence, fixed his residence in the island, and, after some contests with the Caledonians, of which little is known, died at York, leaving his son Constantine his successor in the empire. This prince, not unjustly surnamed the Great, assumed the purple at York, where he staid some time to pay the last honours to his father's ashes, and to finish the war with the Meætæ and Caledonians, who at this time began to be known by the names of Picts and Scots. Called afterwards to a higher destiny, and recognized as the undisputed master of the Roman world, he overthrew the altars of Paganism, and established Christianity as the religion of the empire, including that portion of it where he had first been invested with the ensigns of the imperial dignity. About eighteen years after the accession of Constantine, Britain took part with the unsuccessful usurper Magnentius. This entailed on it the bitter resentment of Constantius, who sent into the island one Paulus, a Spaniard, with instructions to discover and punish those who had been concerned in the rebellion. Tyranny is not al-

pleted under the Saxons, there are no memorials extant This inquisitor, surnamed Catena, from his expertness in connecting criminal charges, entered at once on his career, and soon filled all the western parts with tortures, confiscations, and murders. Martinus, the British governor, unable to restrain his cruelties, attempted his life, but unhappily missing the aim, was obliged to pay the forfeit of his own. On the accession of Julian to the purple, that event was signalized by an act of exemplary justice; the inhuman Paulus was ordered to be burned alive.

A few words may be necessary here respecting the constitution of the provincial government of Britain. This was generally intrusted to a prefect, who exercised the civil and military power, subject only to the control of the questors, whose peculiar department was finance. The prefect acted as imperial lieutenant or viceroy, and appointed the governors of the six provinces into which Roman Britain was divided. These were, first, Britain to the south of the Severn and the Thames; second, Britain along the Severn, including Wales and the adjoining districts; third, Flavia Cæsariensis, from the two former provinces to the German Ocean, the Humber, and the Don; fourth, Maxima Cæsariensis to the north of the Humber, from its mouth, as far as the mouths of the Tyne and the Eden; fifth, Valencia, from the Tyne to the Clyde and the Forth; and, sixth, Vespasiana, the country beyond the friths, a precarious and ill-defined conquest, continually disturbed by the inroads of the barbarians. Such were the territorial divisions of this country under the Romans. They seem to have been adopted gradually as conquest extended, and afterwards rounded off by natural limits for the convenience alike of the general and of the local government.

For about a century and a half the southern part of the Roman province in Britain had suffered but little disturbance from the northern tribes, whose inroads were generally checked by the frontier defences and garrisons. About ten years, however, after the judicial campaign of Paulus, the Scots and Picts, recovering from the chastisement inflicted on them by the commanders of Julian, attacked with greater force the legions of Valentinian and Valens, and for three years ravaged the province with impunity. They were at length driven back by Theodosius, governor of Britain, and father of the celebrated emperor of that name, who defeated them in several battles, and forcing them beyond the rampart of Agricola, once more extended the province to its utmost ancient limits. But the progressive decline of the empire having exposed its northern frontier to invasion at every point, the Roman troops were gradually withdrawn from this island for the more urgent purpose of protecting the seat of dominion; and about the middle of the fifth century Britain was abandoned to her own resources. Gallio of Ravenna commanded the last detachment of troops that Rome ever sent to this island. This was under Honorius. After repelling a furious inroad of the Scots and Picts, the Roman general, assembling the British chiefs, told them frankly, that, since the empire, labouring under its own weight, could no longer afford them protection, they must henceforth take courage and defend themselves; and, in the name of the emperor, he formally absolved the different cities or townships of the province from their allegiance to Rome. Lastly, having repaired the wall of Severus, erected useful forts, and supplied the natives with military weapons and engines, the Romans took their final departure from Britain exactly four hundred and seventy-five years after Julius Cæsar first landed on its shores.

These bequests, however, proved unavailing. The British youth who had been trained in the Roman army more than once drove back the barbarous tribes of their own

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and  $\mathbf{R}$ oman Period. 431.

at length "broke through their walls, like wolves into a See also the article SCOTLAND. sheep-fold, retired with their booty, and returned every succeeding year." In their distress they made a vain appeal to Ætius, who for a moment propped the falling empire. "The barbarians," said they in a letter entitled the Groans of the Britons, " drive us into the sea, and the sea drives us back upon the swords of the barbarians." But Ætius had to do with Attila, and, however much he might pity the suppliants, he could afford them no relief. Disappointed of aid in this quarter, and despairing of their ability any longer to resist their northern invaders, the British states were led to employ in their defence auxiliaries who soon became more formidable than the enemies against whom they had been called in to combat. mercenaries, who gradually rose to be conquerors, consisted chiefly of Saxons, intermingled with Angles, Jutes, and Frisians from the Cimbric Chersonesus, or peninsula of Jutland. The Saxons, who appear to have had their chief seat on the Elbe, were previously known to the Britons only by predatory descents on their coasts; and, certainly, it does seem rather extraordinary that they should have thought of calling in the aid of such perilous auxiliaries. But, under the pressure of urgent danger or actual calamity, men are more inclined to seek present relief than to calculate remote consequences; and it should be recollected that the Britons, denied all assistance by their former masters, and wholly unable to defend themselves against the desolating inroads of the fierce tribes of the north, were in a situation to close with any scheme which promised even a chance of deliverance. That the invitation given to this marauding race was as formal as it afterwards proved fatal to the native population, may safely be doubted, notwithstanding the direct testimony of the Saxon historians. They were probably at hand, and being always ready to embark in any enterprise which held out a prospect of booty, they in all likelihood required but little solicitation to induce them to join the Britons against their northern enemies. Accordingly, in the middle of the fifth century, the Saxon ships arrived on the British coast, where they disembarked a few hundred wild warriors of that roving nation under their leaders Hengist and Horsa. These fabled descendants of Oden immediately took the field at the head of their followers, and by their aid the Picts and Scots were completely defeated. One evil was thus averted, but another, and, if possible, a greater, succeeded. The Saxons, acquiring a liking for the country they had been hired to defend, and eager to exchange the bleak shores and sandy wastes of the north for the rich fields and more genial climate of Britain, invited fresh bodies of their countrymen to join them, and, in a little time, from being the auxiliaries, they became the conquerors and masters, of the ill-fated Britons. But the latter did not yield without a struggle. Displaying, when it was too late, a valour which, more opportunely exerted, would have spared them the miseries of this contest, they resisted their new tyrants, and occasionally with success. Horsa fell in battle; and so slow was the progress of the Saxon arms, that Hengist, with all his boasted victories, never penetrated beyond the county of Kent. The invaders, however, clung with desperate tenacity to the soil. By degrees the Saxon power reduced the natives to entire submission, or drove them to seek shelter in the mountains of Wales, Cornwall, and Cumberland. Many emigrated to avoid the horrors of this conquest; and some settling in Armorica, the peninsula between the Seine and the Loire, laid the foundation of that singular resemblance in language and manners to the insular Britons which has ever since distinguished the inhabitants of Bretagne. For the history of England from this period until

British island; but the latter increasing in numbers and audacity, the union of the crowns, we refer to the article England.

Reign of James I. 1603.

## CHAP. II.

#### REIGN OF JAMES I.

Accession of James to the English throne.-State of the nation at this time.—Origin of the patriotic party.—Grievances of the nation.—James's arbitrary system of government.—Puritans. Attempt to establish Episcopacy in Scotland.-Iniquity and folly of the project.—First Parliament.—Peace with Spain.— Proposed union with Scotland.—Difference between the King and the Parliament.—New Parliament convoked.—Execution of Sir Walter Raleigh.—Gunpowder Plot.—Policy in regard to Ireland.—Death of Henry Prince of Wales.—Affairs of the Palatinate.—Spanish match proposed.—Remonstrance of the Commons, and dispute consequent thereon.-Marriage with the Infanta resolved on .- Prince Charles sets out for Madrid. His reception there.-Articles of the Marriage treaty.-Faithlessness of the Prince.—Marriage with the Infanta broken off.— New match proposed with Henrietta of France.—War declared against Spain.-Affairs on the Continent.—Death and character of James.

The history of Britain as one kingdom commences with the union of the crowns in the beginning of the seventeenth century. In 1603 the kingdoms of Scotland and England fell under the dominion of one sovereign, by the accession of James VI. of Scotland to the English throne. He derived his title to the latter from being the greatgrandson of Margaret, eldest daughter of Henry VII.; and, on the failure of the male line, his hereditary right remained incontestible. Queen Elizabeth, with her last breath, had recognised him for her successor; and the parliament, conformably to her dying request, had settled the succession on the heirs of Henry VII.; so that few sovereigns ever ascended a throne with more general approbation, or greater hopes of a peaceable and happy reign. The memory of a disputed succession was yet fresh in the minds of the English; and as the title of James was unquestionable, the accession of a protestant sovereign, who was to extinguish the hostility of Scotland, and unite two kingdoms intended by nature to form one, was regarded as a new and auspicious era in the history of both countries.

But the popularity of James hardly survived his arrival in England; the hopes which had been so eagerly cherished were soon blighted; and the history of this monarch's reign consists of little else than a detail of disputes and contentions between him and his parliament. minute account of these transactions would scarcely conduce either to entertainment or instruction; but it is nevertheless of importance to know their origin, as out of them sprung those succeeding events which make so conspicuous a figure in the annals of Britain.

In the ages which preceded the period upon which we are now entering, the human mind, enervated by superstition, and degraded by ignorance, seemed to have surrendered all pretensions to liberty, either religious or civil. Unlimited and uncontrolled despotism everywhere prevailed; and although England suffered less in this respect than almost any other nation, the numerous examples of arbitrary power exercised by her sovereigns show that the country was then very far indeed from enjoying liberty in any rational sense of the term. As a proof of this, and as an evidence how little restraint was at that time imposed on the authority of the sovereign, it is only necessary to mention, that the proceedings of parliament were accounted of so little consequence, that no journals were kept of them; nor was it till 1607, four years subsequent to the accession of James, that parliamentary journals were commenced, on the motion of Sir Edwin Sandys, a meniber of great authority in the house.

· Reign of

James I. consequence, it is no wonder that the sessions were not of patriotism tended to redress. This disposition, how-James I. regular, and that little attention was paid to the choice or continuance of the members. In the reign of Elizabeth and her predecessors the sessions of parliament seldom exceeded in duration a twelfth part of the vacations. When parliaments were prolonged beyond one session, it was usual for the Chancellor to exert a discretionary authority of issuing new writs to supply the place of such members as he judged incapable of attending, either by reason of business, sickness, or any other impediment. No practice could be more dangerous to liberty than this; yet so little were the rights and interests of the nation then understood, that the Commons, of their own accord, confirmed reigns, not considering the military force by which their the Chancellor's power in this respect by the 23d of Elizabeth; nor did they proceed any further in the assertion of their privileges, than to vote, that during the sitting of parliament no writ should issue for the choosing or returning of any member without the warrant of the house.

But towards the end of the sixteenth and beginning of the seventeenth century, a great though insensible revolution took place throughout all Europe. Arts and sciences began to flourish; commerce and navigation were greatly extended; and learning of all kinds began to be diffused. More enlarged views naturally gave birth to generous sentiments; a love of freedom, in England especially, was implanted in the breasts of most people of birth and eduwith the ancient Greek and Latin writers. The examliberty, produced a powerful impression; and a desire of reasons to be inserted in the council-book. circumscribing the excessive prerogative and arbitrary proceedings of the crown began to be secretly formed ing the king and parliament was, that during this reign throughout the nation.

Nor was this desire unreasonable, or without a solid foundation. During the last years of Queen Elizabeth's reign, the commerce, navigation, and number of seamen in England, had sensibly decayed. A remonstrance from the Trinity-house in 1602 bears, that since 1588, the number of seamen and shipping had decayed about a third. Every species of domestic industry was fettered by monopolies, and exclusive companies, which are only another species of monopoly; almost all foreign trade, except that to France, was in the hands of a few; and any prospect of future improvement in commerce was for ever sacrificed to the temporary advantage of the sovereign. These companies, though arbitrarily erected, had carried their privileges so far, that almost all the commerce of England centred in London; the customs of that port alone amounted to L.110,000 a year, whilst those of the rest of the kingdom amounted only to L.17,000; and the whole trade of London itself was confined to about two hundred citizens, who, by combining together, were easily enabled to fix whatever price they pleased both on the exports and imports of the nation. Besides this, the subjects were burdened by wardships and purveyances. The latter constituted an old prerogative of the crown, by which the officers of the household were empowered to take, without consent of the owners, provisions for the king's family, and carts and horses for the removal of his baggage, upon paying a stated price for them. The king had also a power of sending any person, without his own consent, on whatsoever message he pleased; and thus he could easily compel an individual to pay any sum of money he chose, rather than be sent out of the country on a disagreeable mission. Money extorted from individuals by this or by any other method was usually called, doubtless in derision, a "benevolence."

The proceedings of parliament being held as of so little nation at this time laboured, and which the rising spirit Reign of ever, the severe government of Elizabeth had confined within very narrow limits. But when James, a foreign prince, less dreaded and less beloved, succeeded to the throne, symptoms of a freer and more independent genius immediately appeared. Happily, James neither perceived the alteration, nor had sufficient capacity to check its early advances. He had established in his own mind a speculative system of absolute government, which few of his subjects, and none but traitors and rebels, as he thought, would make any scruple to admit. He thought himself entitled to equal prerogatives with other European sovedespotism was sustained. The almost unlimited power which for upwards of a century had been exercised by the English sovereigns, he considered as the prerogative of royal birth, and not as the result of peculiar circumstances skilfully improved. In his person, therefore, he imagined all legal power to be centred by a hereditary and divine right; and so fully was he persuaded of his absolute property in his subjects, that in his speech to the parliament in 1621, he told them that he "wished them to have said that their privileges were derived from the grace and permission of him and his ancestors." And when the same parliament protested that "the liberties, franchises, privileges, and jurisdictions of parliament, are the ancient cation; and this was greatly promoted by an acquaintance and undoubted birthright and inheritance of the subjects of England," he was so enraged, that, sending for the ple of the republics of Greece and Rome, the members journals of the Commons, he, with his own hand, before of which had so often sacrificed their lives in defence of the council, tore out this protestation, and ordered his

The consequence of such opposite dispositions actuatthe prerogatives of the crown were openly and violently attacked. But the chief grounds of discontent were money and religion. The king's high notions of the royal prerogative made him imagine that he had a right to whatever sums he pleased to demand; whilst his profusion caused him to dissipate in a short time the scanty supplies which he succeeded in extorting from the parliament. With regard to religious matters, the nation was at that time greatly infected with Puritanism. Though the severities of Elizabeth had almost totally suppressed the Papists, it had been otherwise with the Puritans. So much had they increased by the very means which had diminished the number of Catholics, that no less than seven hundred and fifty clergymen of that persuasion signed a petition to James on his accession to the English throne. They hoped that the king, having received his education in Scotland, and always professed an attachment to the church established there, would at least abate the rigour of the laws enacted against the Puritans, if he did not show them particular favour and encouragement. But in this they were grievously mistaken. He had observed in their Scottish brethren a decided turn towards republicanism, and a zealous attachment to civil liberty. In his capacity of monarch as well as of theologian, he had experienced the little complaisance they were disposed to show him. They controlled his commands; disputed his tenets; and to his face, before the whole people, censured his conduct and behaviour. This superiority assumed by the Presbyterian clergy, the monarchical pride of James could never digest. Although he had been obliged, while in Scotland, to court their favour, he treasured up, on that account, the stronger resentment against them; and he was determined to make them feel, in their turn, the full weight of his authority. He therefore not only rejected the petition of the clergymen above mentioned, but throughout his whole reign re-These were a few of the grievances under which the fused to relax in the least the severity of the laws against

Reign of Protestant nonconformists, although often petitioned to ing that, for the object contemplated, there was no need of Reign of James I. the contrary by his parliament.

1603.

The same principles which produced in James such an aversion to the Puritans, prompted him to favour the Episcopalians, and even the Catholics, as being greater friends to despotism. In his youth he had been suspected of a bias towards the ancient religion; and it is certain that when he ascended the throne of England, he often endeavoured to procure some mitigation of the laws against them, if not an absolute toleration. But in this he was constantly opposed by the parliament; and indeed the strong inclination shown by James to establish Episcopacy throughout the whole of his dominions, tended very much to alienate the minds of his subjects, especially in Scotland, and to create that suspicion of his intentions which accompanied him to the grave.

The first intercourse between King James and his English parliament discovered at once the character of the new monarch, and the spirit of the people over whom he had been called to reign. Vain, pedantic, garrulous, mean, and accessible to flattery, however gross; arbitrary in his principles, and in his own opinion the greatest master of king-craft that ever lived; "the wretched Solomon of Whitehall" found in his English ministers, Cecil, Suffolk, and Northampton, devoted parasites and ready tools. His address to the parliament bespoke his own opinion of himself, and showed that he believed himself an absolute king, whose proclamations were to have the force of laws. But it was only with his courtiers and bishops that James passed for that paragon of wisdom and policy which he devoutly believed himself to be. The House of Commons already contained many men of free, fearless, and intelligent minds; nor were the principles of independence, which in several instances had been asserted against all the power and energy of Elizabeth, likely to be veiled before the mock dignity of such a regal punchinello as James. His first parliament, accordingly, reminded him of their privileges; resisted the arbitrary issue, by the Chancellor, of new writs for elections; and made some laudable attempts to check the spirit of monopoly which paralysed the trade and manufactures of the kingdom, as well as to relieve the landed interest from some remnants of feudal oppression.

The accession of James was speedily followed by the conclusion of peace with Spain. The tendency of his disposition was pacific, not so much from principle, as from the want of all energy, vigour, and force of character, if not positive cowardice. But whilst the nation was thus delivered from the evils of war, a deadly blow was meditated against the government in all its branches, and against the religion of the country. This was the famous Gunpowder Plot, which the habitual fears of the king, sharpened by the scenes he had witnessed in his youth, enabled him to "nose out," as he called it, and to read the true meaning of the threats contained in a letter from one of the conspirators, after it had eluded the sagacity of his wisest counsellors. The common danger which the king and the parliament had escaped kept them for a time in good humour with each other; and a supply of L.400,000 was voted by the Commons to relieve the king from the embarrassments in which his thoughtless profusion had involved him, and to enable him to give a suitable reception to his brother-in-law, the king of Denmark.

But the most important subject of discussion which occupied the attention of this first parliament was a project for incorporating the kingdoms whose crowns were already united on the head of James. A motion to this effect was made by Sir Francis Bacon, the king's solicitor, who supported it with all the ability, ingenuity, and eloquence for which he was so greatly distinguished; maintain-

uniformity in the laws or religion of the two countries, -- James L. and that, with Ireland subdued, Scotland united, and the navy duly supported, the English monarchy would become the most formidable in the world. It is to the honour of James, and reflects credit on the sagacity which he at intervals displayed, that he was eager in forwarding this measure. But the Commons remained inflexible, and the project consequently failed. In conformity, however, with an opinion obtained from the judges, the post-nati, that is, all Britons born since the death of Queen Elizabeth, were declared to be naturalized subjects in either kingdom.

Pecuniary difficulties, from which the king was never free, brought him again as a suppliant for aid from this parliament. Squandering with reckless prodigality, he was continually in want; and, in the present instance, his embarrassments were aggravated by the expense incurred in maintaining his government in Ireland. The parliament acceded to his solicitations; but, in return, demanded a redress of grievances, and amongst these the suppression of the High Commission Court, which had become odious by the severities it exercised against the Puritans. James refused the supply tendered on such conditions, and the dispute ended by his dissolving the parliament; on which occasion the royal pedant told them " not to meddle with the main points of government-that was his craft; nor pretend to instruct a king who had been thirty years at the trade in Scotland, besides an apprenticeship of seven years in England.'

But James found it impossible to dispense altogether with this "meddling" body. His usual extravagance soon reduced him to straits, notwithstanding the discreditable shifts he had recourse to for raising money; and, in 1613, he was obliged to convoke another parliament, for the sake of obtaining a supply. At this time Robert Carre, whom he had raised through several gradations of dignity to be Earl of Somerset, engrossed the favour of the monarch, and merited the hatred of the nation. The sums spent on this worthless minion, and the countenance shown him after the murder of Sir Thomas Overbury, at once degraded the king in the eyes of the people, and drained the scanty resources of his ill-supplied exchequer. The consequence was, that his second parliament proved still more refractory than the first. On their assembling, the king proposed to them to vote a supply, and then proceed to the consideration of such grievances as required to be redressed. But the Commons inverted this order of procedure, and began with the redress of grievances. king's wrath was kindled at their obstinacy. He dismissed them, and imprisoned some of the members who had particularly signalized themselves in resisting the supply; a proceeding of fatal example, as the son and successor of James afterwards found to his bitter experience, and which Lord Coke justly describes as the greatest violence ever done to the constitution by an English

In 1617 the king revisited Scotland, with the design of establishing Episcopacy in that kingdom. He did not, however, propose to abolish Presbytery entirely, and set up Episcopacy in its room. He meant to content himself with establishing the royal authority above the ecclesiastical, and introducing some ceremonies into the public worship, such as kneeling at the sacrament, private communion, private baptism, confirmation of children, the observance of Christmas, and the like. But as his design was fully seen through from the beginning, every advance towards Episcopacy produced the greatest discontent, and the ceremonies in question were rejected as so many

Reign of 1603.

ceedingly great; and the severe spirit with which they fulness into the spirit of devotion which then prevailed, James I. little calculated to operate in the way of conciliation. Every ecclesiastical court possessed the power of excommunication, which was then attended with serious temporal effects, to say nothing of the spiritual consequences which were supposed to flow from it. The person excommunicated was shunned by every one as profane and impious; and his whole estate during his life-time, with all his movables for ever, were forfeited to the crown. A sentence of excommunication might be pronounced in a summary manner, even by an inferior ecclesiastical court, against a person, whether he lived within the bounds of their jurisdiction or not; and as its effects were in every instance the same, the power which the clergy thus exercised was truly formidable. But they were not satisfied with this unbounded authority in ecclesiastical matters; they assumed a censorial power over every part of the administration; and, mingling politics with religion in their sermons, and even in their prayers, they inculcated principles which were accounted alike turbulent and seditious. But however much we may revolt at this intermixture of sacred and secular things, there was something in the spirit and circumstances of the time which went far to justify it. The pulpit was then the only place whence the people could derive instruction, and their sole teachers and guides were the clergy. No public press as yet existed. Books were few and expensive, appearing at distant intervals, and wholly inaccessible to the mass of the people. Journals were wholly unknown. In such circumstances the clergy naturally became the political as well as the religious instructors of the people; the defenders of their civil rights as well as the guardians of public morals, and of the purity of ecclesiastical discipline.

That a monarch like James should have hated an order of men whom he could neither intimidate by his power nor cajole by his flatteries, is most natural. But this forms a poor justification for the faithless and hypocritical course he pursued; whilst his maxim of "No bishop, no king," shows that his understanding was as confined as his character was mean and grovelling. He began his attack upon Presbytery by discontinuing the General Assembly, and banishing those clergymen who had the spirit to remonstrate. He procured a decree restoring thirteen bishoprics; and, at a packed meeting of the subservient part of the Scottish clergy, the holders of these unenviable preferments were appointed perpetual mode-rators within their presbyteries. And to complete the degradation of the people, a high commission was given to the prelates, conferring upon them inquisitorial and discretionary powers of citing and punishing for religious opinions, laymen as well as clergymen. But this tyrannical and iniquitous project utterly failed. James aimed at nothing less than subverting the established religion of the country, and he was unable to introduce a single ceremony borrowed from Episcopacy, Not a rag of the surplice would the stern Presbyterians of that age consent to tolerate. Enough, however, was done to envenom the hatred of the people, and to treasure up vengeance against the coming day of retribution. James, it has been truly said, was one of those kings whom God seems to send for the express purpose of hastening revolutions.

Nor was he in any degree more successful in the opposition which he attempted to the puritanical innovations in England. He had observed, in his progress through that kingdom, that a rigid, or, as some called it, Judaical observance of the Sabbath gained ground every day; and that by this means the people were debarred from such sports and

At this time the power of the Scotch clergy was ex- ment. Imagining that it would be easy to infuse cheer- Reign of were actuated prompted them to exercise it in a manner he issued a proclamation to allow and encourage, after divine service, all kinds of lawful games and exercises. But this proclamation was regarded by his subjects as an instance of the utmost profaneness and impiety. In 1620 a bill was brought in by the Commons for the more strict observance of the Sunday, which they called the Sabbath. One Shepherd opposed this bill, objecting to the appellation of Sabbath, as puritanical, and justifying indulgence in sports and amusements on that day. For this he was expelled the house on the motion of Mr Pym; and in the sentence pronounced against him his offence is described as "great, exorbitant, and unparalleled." The men of that day were in earnest, and seldom did things by halves.

1605

From this sketch, imperfect as it necessarily is, a tolerable idea may be formed of the situation of affairs during the reign of James I., as well as of the character and designs of that weak, wavering, and on the whole mischievous prince. It now becomes our duty to proceed to the more proper business of the present article, and to give some account of the remarkable transactions of this period.

The first thing of any consequence was a conspiracy formed, or alleged to have been formed, in the year of the king's accession to the throne, to displace him, and be-stow the kingdom on Arabella Stuart, a near relation of his own, and equally descended from Henry VII. Every thing regarding this pretended conspiracy, except that some such plot was favoured by one or two priests, remains nearly in its original obscurity. What renders it remarkable, however, is the concern Sir Walter Raleigh was said to have in it. For this he was tried, condemned without proof, suffered thirteen years' imprisonment in the Tower, and was at length executed out of complaisance to the Spaniards. The execution of this distinguished man is one of the most unjustifiable acts of James's reign. It is certainly possible, as Hume has asserted, that Raleigh may have made the pretended gold mine in Guiana a cloak for his real design of plundering the Spanish settlements; but if the fact admitted of as easy proof as has been alleged, Raleigh ought to have been punished on that account, and on no other. It has been conceded, however, that an English jury would not have returned a verdict of guilty against him; and if so, the sacrifice of the bravest living commander, at the instigation of a foreign power, was equally detestable in itself and derogatory to the dignity and independence of the country.

Allusion having been already made to the Gunpowder treason, discovered in 1605, the origin and circumstances of that desperate plot shall now be detailed. On the accession of James, great expectations had been formed by the Catholics that he would prove favourable to them; and it is even pretended that he had entered into a positive engagement to grant them toleration as soon as he should mount the throne of England. But their hopes were built on an insecure foundation. James on all occasions expressed his intention of executing strictly the laws enacted against them, and of persevering in the rigorous measures of Queen Elizabeth. A scheme of revenge was first thought of by one Catesby, a man of good parts and ancient family, who communicated his design to Percy, a descendant of the house of Northumberland. The latter proposed to assassinate the king. But Catesby deemed this quite inadequate to the purpose, inasmuch as the king would be succeeded by his children, who would also inherit his maxims of government; and even if the whole royal family were destroyed, the parliament, nobility, and gentry, who were all infected with the same heresy, would raise another Protestant prince to the throne. "To recreations as contributed to their health as well as amuse- serve any good purpose," said he, " we must destroy, at

Reign of one blow, the king, the royal family, the lords and com- may expect the event in safety. For though there be no Reign of James I. mons, and bury all our enemies in one common ruin. Happily they are all assembled on the first meeting of parliament, and afford us the opportunity of glorious and useful vengeance. Great preparations will not be requisite. A few of us may run a mine below the hall in which they meet; and choosing the very moment when the king harangues both the houses, consign over to destruction the determined foes to all piety and religion."

This comprehensive scheme being approved of, it was resolved to communicate it to a few more. Thomas Winter was sent over to Flanders in quest of Fawkes, an officer in the Spanish service, of approved zeal and courage. All the conspirators were bound by the most solemn oaths, accompanied with the sacrament; and to such a degree had superstition hardened their minds, that not one of them entertained the smallest compunction for the cruel destruction they were preparing to commit. Some indeed were startled at the thoughts of destroying a number of Catholics who must necessarily be present as spectators, or attendants on the king, or as having seats in the House of Peers; but Desmond a Jesuit, and Garnet, superior of that order in England, removed these scruples, by showing that the interest of religion required in this case the sacrifice of the innocent with the guilty.

This happened in the spring and summer of 1604, about which time the conspirators hired a house in Percy's name, adjoining that in which the parliament was to meet. Towards the end of the year they began to pierce through the wall of the house, in order to get in below that where the parliament was to assemble. The wall being about three yards thick, occasioned a great deal of labour; but its density yielded to perseverance, and they at length approached the other side, when they were startled by a noise for which they could not well account. Upon inquiry, they found that it proceeded from a vault below the House of Lords; that a magazine of coals had been kept there; and that the coals were then selling off, after this the vault was immediately hired by Percy, and thirtysix barrels of gunpowder lodged in it; the whole being covered up with faggots and billets, the doors of the cellars boldly flung open, and every body admitted as if it contained nothing dangerous.

Considering themselves as now certain of success, the conspirators began to arrange the remaining part of their enterprise. The king, the queen, and Prince Henry, were expected to be present at the opening of the parliament. But as the duke, by reason of his tender age, would be absent, it was resolved that Percy should seize or murder him. The Princess Elizabeth, likewise a child, being kept at Lord Harrington's house in Warwickshire, some others of the conspirators engaged to assemble their friends on pretence of a hunting match, to seize the person of that princess, and immediately proclaim her queen. The day so long wished for at last approached. The dreadday so long wished for at last approached. ful secret, though communicated to more than twenty persons, had been religiously kept for near a year and a half; and nothing could be foreseen calculated to prevent the success of their design. Ten days before the meeting of parliament, however, Lord Monteagle, a Catholic, son of Lord Morley, received the following letter, which had been delivered to his servant by an unknown hand.

"My Lord, out of the love I bear to some of your friends, I have a care for your preservation. Therefore I would advise you, as you tender your life, to devise some excuse to shift off your attendance on this parliament.

appearance of any stir; yet, I say, they shall receive a James I. terrible blow this parliament, and yet they shall not see who hurts them. This counsel is not to be contemned, because it may do you good, and can do you no harm; for the danger is over as soon as you have burned this letter. And I hope God will give you the grace to make good use of it, to whose holy protection I commend you."

Though Lord Monteagle imagined this letter to be only a ridiculous artifice to frighten him, he carried it to Lord Salisbury, secretary of state; and the latter laid it before the king on his arrival in town a few days after. His majesty looked upon it in a much more serious light than the young nobleman to whom it had been addressed. From the peculiar manner in which it was expressed, he concluded that some design had been formed to blow up the Parliament House with gunpowder; and it was thought advisable to search the vaults underneath.

The lord chamberlain, to whom this charge belonged, purposely delayed the search till the day before the meeting of parliament. He remarked the great piles of wood and faggots which lay in the vault under the House of Lords; and casting his eye upon Fawkes, who stood in a corner and passed himself for Percy's servant, he could not help noticing the daring and determined courage conspicuous in his face, and which so much distinguished this man even amongst the other conspirators. As Percy lived little in town, so large a quantity of fuel appeared somewhat extraordinary; suspicions were thus excited; and, upon comparing all circumstances, it was resolved to make a further search. About midnight, Sir Thomas Knevet, a justice of peace, was sent with proper attendants; and meeting Fawkes, who had just finished all his preparations, before the door of the vault, Sir Thomas immediately seized him, and, turning over the faggots, discovered the gunpowder. The matches and every thing proper for setting fire to the train were found in the pocket of Fawkes, who seeing now no refuge except in boldness which the vault would be let to the highest bidder. Upon and despair, expressed the utmost regret that he had missed the opportunity of firing the powder at once, and of sweetening his own death by that of his enemies. For several days he displayed the same obstinate intrepidity; but on being shut up in the Tower, and the rack exhibited to him his resolution at last failed, and he made a full discovery

Catesby, Percy, and the other conspirators, on learning that Fawkes was arrested, hurried to Warwickshire, where Sir Edward Digby, imagining that his confederates had succeeded, was already in arms to seize the Princess Elizabeth. But she had escaped into Coventry; and they were obliged to put themselves in a posture of defence against the country people, who were raised in all quarters and armed by the sheriffs. The conspirators, with their attendants, never exceeded eighty in number, and being surrounded on every side, could no longer hope either to prevail or escape. Having therefore confessed themselves, and received absolution, they boldly prepared for death, and resolved to sell their lives as dear as possible. But even this miserable consolation was denied them. Some of their powder catching fire, exploded, and disabled them from defending themselves. The people then rushed in upon them. Percy and Catesby were killed by one shot. Digby, Rookwood, Winter, and others, being made prisoners, were tried, confessed their guilt, and died, as well as Garnet, by the hands of the common executioner. The Lords Stourton and Mordaunt, two Catholics, were fined by the Star Chamber, the former in L.4000, the latter in L.10,000, because their absence from par-For God and man have determined to punish the wicked- liament had occasioned a suspicion of their acquaintance ness of this time. And think not slightly of this adver- with the conspiracy. The Earl of Northumberland was tisement; but retire yourself into the country, where you fined in L.30,000, and detained several years a prisoner in

Reign of the Tower, by reason of his having admitted Percy into whose opposition he foresaw, accepted the offer, and Reign of James I. the number of gentlemen-pensioners without taking the

requisite oaths. 1605.

James's attempts to civilize the barbarous inhabitants of Ireland, and to render their subjection durable and useful to the crown of England, were more honourable in the design than successful in the execution. He began by abolishing the ancient Irish customs which supplied the place of laws, and were exceedingly barbarous and absurd. By the Brehon law, every crime, however enormous, was punished only by fine. Murder itself was compensated in this way. Every one had a value affixed to him, called his eric; and he who was able to pay this, might kill whomsoever he pleased. As for such slight offences as oppression, extortion, or other things of that nature, no penalty was affixed to them, nor could any redress be obtained for them. The custom of gavelhind, by which, upon the death of any person, his land was divided amongst all the males of the sept or family, both bastard and legitimate, also operated as a powerful preventive to improvement, and commenced that incessant subdivision of the soil, the bitter consequences of which we have lived to witness. Having abolished these customs, James substituted English law in their stead, and taking the natives under his protection, he declared them free citizens, and proceeded to govern them by a regular administration, military as well as civil. But other measures of a more doubtful character followed. As the Irish had been engaged in rebellion against Elizabeth, a renunciation of all rights formerly granted them to separate jurisdictions was rigorously exacted; a resignation of private estates was even required; and when these were restored, the proprietors received them back under such conditions as seemed calculated to prevent all future oppression of the common people. Meanwhile a company was established in London for planting new colonies in the province of Ulster, which had fallen to the crown by the attainder of rebels. The property was divided into moderate shares, the largest not exceeding 2000 acres; tenants were brought over from England and Scotland; the Irish were removed from the hills and fastnesses, and settled in the open country; husbandry and the arts were taught them; most civilized.

On the 6th of November this year Henry prince of Wales died suddenly, not without strong suspicions of poison. On opening his body, however, no symptoms of the kind appeared; but his death diffused a universal grief throughout the nation, as he was reckoned a prince of extraordinary accomplishments and high promise. But the marriage of the Princess Elizabeth with Frederic, elector palatine, which was celebrated in February 1613, served to dissipate the grief caused by Prince Henry's death. This marriage, however, proved unfortunate both with respect to the king and to his son-in-law; for the elector, trusting to so great an alliance, engaged in enterprises beyoud his means; and James, unable, and perhaps also unwilling, to assist him in his distress, lost his last hold on the affections of his people.

These bad consequences did not begin to appear till the year 1619. At that time the states of Bohemia, having taken arms in defence of the Protestant religion, and persevered in the contest notwithstanding the preparations of the emperor to crush them, made an offer of their crown to the elector palatine, induced doubtless by his connection with the king of England, and his relationship to Prince Maurice, whose authority in the United Provinces was nearly absolute. Stimulated by ambition, the young palatine, without consulting either James or Maurice,

marched into Bohemia in support of his new subjects. James I. But the affairs of the new king soon came to a crisis. Frederic, defeated in the decisive battle of Prague, fled with his family into Holland; whilst Spinola the Spanish general invaded the palatinate, where, meeting with little resistance, except from one body of 2400 Englishmen commanded by Sir Horace Vere, he quickly reduced the whole principality. The ban of the empire was published against the unfortunate elector in 1621; the upper palatinate was in a little time conquered by the elector of Bavaria, to whom the execution of the decree of the diet had been committed; Frederic was obliged to live with his numerous family in poverty and distress, either in Holland or at Sedan; and the new conquests of the Catholics throughout Germany were attended with persecutions

against the Protestants.

By this intelligence the religious zeal of the English was inflamed to the highest pitch. The sufferings of their Protestant brethren in Germany excited universal sympathy, whilst the neutrality and inactivity of James were loudly exclaimed against. But although the king might have defended his pacific measures by plausible arguments, some of his motives were the most ridiculous that can be conceived. In a spirit of pedantic self-conceit, he fancied himself capable of disarming hostile nations by dint of argument; and believed that the power of Austria, though not awed by that of England, would submit to his arbitration merely out of respect to his virtue and mode-Wedded to his notions concerning the prerogaration. tive of kings, he also imagined, that wherever a contention arose between any sovereign and his subjects, the latter must necessarily be in the wrong; and for this reason he from the first denied his son-in-law the title of king of Bohemia, and forbade him to be prayed for in the churches under that appellation. Besides, James was on other accounts extremely averse to a rupture with Spain. He had entertained an opinion peculiar to himself, that any alliance below that of a king was unworthy a prince of Wales; and he never would allow any princess except a daughter of France or of Spain to be mentioned as a match for his son. This pitiful folly gave Spain an opand Ulster, from being the most wild and disorderly pro-vince in Ireland, became in time the best cultivated and important concerns. With a view of engaging him to observe neutrality in regard to the succession of Cleves, the elder daughter of the king of Spain had been indirectly offered during the life of Prince Henry. The bait, however, did not then take; and James, in consequence of his alliance with the Dutch, sent 4000 men to the assistance of the Protestants, by which means the succession was secured to the Protestant line. In 1618, Gondomar offered the king of Spain's second daughter to Prince Charles; and, to render the temptation irresistible to so necessitous a prince as James, he gave hopes of an immense dowry with the Infanta. On this match James built great hopes, not only of relieving his own necessities, but of recovering the palatinate for his son-in-law; at least the public were taught to believe that the recovery of the palatinate was one of the king's chief motives for entertaining the project of such a marriage.

But the Commons viewed the matter in a very different light; and this, joined to other parts of the king's conduct, blew into a flame the contention which had long subsisted between them. On the 14th of November 1621, the Commons framed a remonstrance, which they intended to carry to the king, representing that the enormous growth of the Austrian power threatened the liberties of Europe; that the progress of the Catholic religion in England bred the most melancholy apprehensions; that the indulgence of his majesty towards the professors of that religion had

1621.

James I.

Reign of encouraged their insolence and temerity; that the un- he would prohibit in future the execution of the penal Reign of lics; and particularly that the proposed Spanish match had led them to hope for the entire toleration, if not final re-establishment, of their religion. They therefore entreated his majesty to undertake the defence of the palatinate, and maintain it by force of arms; to turn his sword against Spain, whose armies and treasures were the chief support of the Catholic interest in Europe; to enter into no negociation for the marriage of his son except with a Protestant princess; to cause the children of Popish recusants to be taken from their parents and committed to the care of Protestant teachers and schoolmasters; and to exact with the utmost severity the fines and confiscations to which the Catholics by law were liable. Protestants had not yet learnt toleration in the school of adversity. The king was then at Newmarket; but hearing of the intended remonstrance, he wrote a letter to the Speaker, sharply rebuking the House for debating on matters far above their reach and capacity, and strictly forbidding them to meddle with any thing that regarded his government, or deep matters of state, and especially not to touch on his son's marriage with the Spanish princess. Upon this the Commons framed a new remonstrance, in which they asserted their right of debating on all matters of government, and claimed entire freedom of speech in their debates. The king replied, that their remonstrance was more like a denunciation of war than an address of dutiful subjects; that their pretension to inquire into all state affairs without exception, was such a plenipotence as none of their ancestors, even during the reign of the weakest princes, had ever pretended to; that they could not better show their wisdom, as well as duty, than by keeping within their proper sphere; and that in any affair which depended on his prerogative, they had no title to interpose with their advice, unless when he pleased to ask it. The Commons in return framed the protestation already mentioned, which the king tore out of their journals, and soon after dissolved the parliament. Of the leading members of the house, Sir Edward Coke and Sir Robert Phillips were committed to the Tower, and Selden, Pym, and Mallory, to other prisons; while, as a lighter punishment, some others were sent into Ireland to execute the king's commands in that country. A more judicious course was followed with Sir John Saville, who was made comptroller of the household, a privy counsellor, and soon after a baron.

This open breach between the king and the parliament soon rendered politics a general subject of discourse; every man began to indulge himself in reasonings and inquiries concerning matters of state; and the parties which arose in parliament were speedily propagated throughout the nation. In vain did James, by reiterated proclamations, forbid discourses of this kind. These, if they had any effect at all, served rather to inflame than allay the curiosity of the public. In every company or society the transactions just mentioned became the subject of argument and debate; some taking the side of monarchy, and others that of liberty. And this was the real origin of the two parties since known by the names of Whigs and Tories.

During five years James continued the dupe of the court of Spain. Firmly resolved to contract no alliance with a heretic, the king of Spain continued to procrastinate and invent one excuse after another; pretending all along a willingness to conclude the match, though no step had as yet been taken for obtaining a dispensation from the pope. To pave the way for bringing the matter to a close, James issued public orders for discharging all popish recusants

controlled conquests made by the Austrian family in Ger-many raised mighty expectations in the English Catho-ceeded from genuine principles of toleration, he was obliged to justify on the hollow pretence that it was done in order to procure from foreign princes a corresponding indulgence for the Protestants; the severity of the English laws against Catholics having, it was alleged, been urged as a reason against showing any favour to Protestants residing in Catholic kingdoms.

Armed with these concessions, which were but ill relished at home, Digby, earl of Bristol, was sent as ambassador to the court of Spain; and one Gage was secretly dispatched as an agent to Rome. After amusing him so long with false hopes, the court of Spain seemed at last sincere in the projected marriage. Lord Bristol himself, although he had formerly opposed the Spanish match, now came to be of this opinion, and considered the proposed marriage as an infallible prognostic of the palatine's restoration; nor, indeed, was it easy to conjecture why Philip should be ready to bestow the Infanta with a dowry of L.600,000 sterling on a prince whose demands he meant to refuse at the hazard of a war, unless we suppose that he reckoned on the cowardice and imbecility

of the English monarch's character.

But whilst the king exulted in his pacific counsels, and boasted of his superior sagacity and penetration, all his prospects were blasted by the temerity of the worthless favourite who governed both court and nation with almost unlimited sway. This was Villiers, duke of Buckingham, who had succeeded Somerset in the capricious affections of James, and had risen from the rank of cupbearer to a dukedom and the highest honours of the state. Though possessed of some accomplishments as a courtier, he was utterly devoid of the talent necessary to a minister; and at once partook of the insolence which attends a fortune newly acquired, and the impetuosity which belongs to persons born in high stations, and unacquainted with opposition. Amongst those who had experienced the arrogance of this overgrown favourite, was the Prince of Wales himself; and a coldness, if not enmity, had in consequence arisen between them. Desirous of putting an end to this misunderstanding, and at the same time envious of the great reputation of the Earl of Bristol, Buckingham persuaded the prince to undertake a journey to Madrid. This, he said, considered as an unexpected piece of gallantry, would equal all the fictions of Spanish romance; and, suiting the chivalrous and enterprising character of that nation, would immediately introduce him to the princess under the agreeable character of a devoted and adventurous suitor. Little persuasion was necessary to prevail with Charles to undertake the journey; and the impetuosity of the favourite having extorted a consent from James, the prince and Buckingham (or "Baby Charles" and "Steenie," as the king ridiculously called his son and his minion) set out as knight-errant and squire. They travelled through France in disguise, under the assumed names of Jack and Tom Smith. At a ball in Paris, the prince first saw the Princess Henrietta, whom he afterwards married. She was then in the bloom of youth and beauty, and the novelists of the time say that the prince fell in love with her on this occasion.

On their arrival at Madrid, every body was surprised by a step so little usual among great princes. The Spanish monarch made Charles a visit, expressed the utmost gratitude for the confidence reposed in him, and made warm protestations of a corresponding confidence and friendship. He gave Charles a golden key which opened all his apartments, that the prince might, without any formality, have access to him at all hours; and heaped upon him other who were imprisoned; and it was daily apprehended that marks of distinction and favour if possible still more flat.

James I. lover in public; the Spanish ideas of propriety being too strict to allow any further intercourse till the arrival of the dispensation. Meanwhile no attempt was made by the Spaniards to profit by the circumstance of having the prince of Wales in their power, in order to impose any harder conditions of treaty. Their Catholic zeal, indeed, prompted them on one occasion to seek more concessions in the religious articles; but, on the opposition of Bristol, they immediately desisted. The pope, however, hearing of Charles's arrival in Madrid, tacked some new clauses to the dispensation; and it became necessary to transmit the articles to London for the king's ratification. This treaty, which was made public, consisted of several articles, chiefly regarding the exercise of the Catholic religion by the Infanta; and of these, the only one that could reasonably be found fault with, was that in which the king consented that the children of the marriage should be educated by the princess till they were ten years of age. But besides this public treaty, there were some private articles, which stipulated for a suspension of the penal laws against the English Catholics in the first instance, together with a toleration for the exercise of the Roman Catholic religion in private houses, and, next, a repeal of these laws by parliament. Meanwhile Gregory XV. who had granted the dispensation, died; and Urban VIII. was chosen as his successor. Upon this the nuncio refused to deliver the dispensation till the pleasure of the new pope should be known concerning it. But the crafty pontiff delayed his confirmation, in hopes that, during the prince's residence in Spain, some expedient might be fallen upon to effect his conversion. The king of England, as well as his son, became impatient; but, on the first hint, Charles obtained leave to return, and Philip graced his departure with the same marks of civility and respect which had signalised his arrival.

> The modest, reserved, and highly dignified behaviour of Charles, together with the confidence he had reposed in the Spanish nation, and the romantic gallantry he had practised in regard to their princess, endeared him to the whole court of Madrid. But in the same proportion that Charles was beloved and esteemed, Buckingham was despised and hated. His sallies of passion, his indecent freedoms with the prince, his dissolute pleasures, and his arrogant, impetuous temper, which he either could not or would not restrain, rendered him an object of undisguised aversion to the Spaniards. Buckingham, on the other hand, sensible how odious he had become to the Spaniards, and dreading the influence which that nation would naturally acquire after the arrival of the Infanta, employed all his influence to prevent the marriage. What arguments he used to prevail with the prince to offer so gross an insult to the Spanish nation, from whom he had received the most generous treatment, or what colours he employed to disguise the ingratitude and imprudence of such a measure, are totally unknown. Certain it is, however, that when the prince left Madrid, he was firmly determined, in opposition to his most solemn promises, to break off the treaty with Spain. Accordingly, on their arrival at London, the prince and Buckingham assumed the entire direction of the negociation; and it was not difficult to find pretences under which to mask the breach of treaty which had been secretly resolved on. After employing many fruitless artifices to delay or prevent the espousals, Bristol received positive instructions not to deliver the proxy which had been left in his hands, nor to conclude the marriage until security was given for the full restitution of the palatinate. Philip understood this language; but, determined to throw the whole blame of the rupture on the English, he delivered into Bristol's hand a written calculated to insure admiration or regard. He possessed

Reign of tering. The Infanta, however, was only shown to her promise, by which he bound himself to procure the resto- Reign of ration of the palatinate either by persuasion or by every James I. other possible means. When he found that this concession gave no satisfaction, he ordered the Infanta to lay aside the title of Princess of Wales, which she had borne after the arrival of the dispensation from Rome, and to drop the study of the English language; and as he foresaw that the rash counsels which now governed the court of England would not stop short at the breach of the marriage-treaty, he immediately ordered preparations for war to be made throughout all his dominions.

A match for Prince Charles was soon afterwards negociated with Henrietta, daughter of Henry IV., and this met with much better success than that with the Infanta. But the king had not the same inducements to prosecute this match as the former one, the portion promised being much smaller; yet willing that his son should not be altogether disappointed of a bride, and the king of France demanding only the same terms which had been offered to the court of Spain, James thought proper to comply. In an article of this treaty of marriage, it was stipulated that the education of the children till the age of thirteen should belong to the mother; and this probably gave that turn towards popery which afterwards proved the ruin of the unfortunate house of Stuart.

Being now deprived of every other hope of relieving his son-in-law, except by force of arms, James declared war against Spain and the emperor, for the recovery of the palatinate; and six thousand men were sent over into Holland to assist Prince Maurice in his schemes against those powers. The people were everywhere elated at the course which events had taken; and so popular was the idea of a Spanish war, and so great the joy at the rupture of the projected Catholic alliance, that Buckingham became for the time a favourite of the people, and was hailed even by Sir Edward Coke as the saviour of the nation. The reinforcement sent to Prince Maurice was followed by another consisting of twelve thousand men, commanded by Count Mansfeldt; and the court of France promised its assistance. But the English were disappointed in all their views. The troops embarked at Dover found, on arriving at Calais, that no orders had arrived for their admission into that place, much less for affording them a passage through France, as had been promised; and after waiting some time, they were obliged to sail towards Zealand, where proper measures had not as yet been taken for their disembarkation. Meanwhile a pestilential disorder crept in amongst them; half their number died while on board, and the other half, weakened by sickness, was insufficient to march into the palatinate; and thus ended this ill-concerted and fruitless expedition. Whether its unfortunate result had any effect on the king's health is uncertain; but he was soon after seized with a tertian ague, which put an end to his life on the 27th of March 1625, after having lived fifty-nine years, and reigned over England twenty-two, and over Scotland almost as long as he had lived.

James, the son of Queen Mary and of Lord Darnley, the handsomest couple of their age, was lumpish, not to say deformed, in his person, vulgar in his air, and ungainly in his manners. He had an awkward figure, a rolling eye, a ricketty sidelong walk, nervous tremblings, a slobbering mouth, and a boyishness of manner which formed a ludicrous contrast with the airs of dignity and regal state which he was constantly labouring to assume. These imperfections, it is true, might have been found in the best and greatest man; and it is seldom indeed that nature is equally lavish in physical and mental endowments. But, in this king, the ungainliness of his outward man was not redeemed by intellectual or moral qualities

1625.

Reign of some learning, indeed, and, within a narrow circle, exhi-Charles I. bited considerable ingenuity of speculation on subjects connected with government and morals. But his understanding was deficient alike in depth and in soundness; his principles were loose, vague, and undefined; his prejudices ridiculously gross; his credulity boundless; and his conceit only to be matched by his pedantry and imbecility. As a king he was perhaps the most extraordinary phenomenon that history has ever presented to the wonder of mankind. What policy would have induced wise tyrants to conceal, James was continually obtruding on all who had the patience to listen to him. His despotic theories of government, and his pretensions to arbitrary power, were continually in his mouth; and whilst he had not a regiment of guards to enforce his doctrines, he talked with more confidence than Hadrian would have judged it wise to assume when at the head of eighty legions and the master of the Roman world. In practice, however, no monarch ever held his prerogatives with less tenacity. "He neither gave way gracefully to the advancing spirit of liberty, nor took vigorous measures to stop it, but retreated before it with ludicrous haste, blustering and insulting as he retreated." Whatever might have been the frailties, vices, or crimes of former kings of England, they had all possessed great force of character, and, whether loved or hated, they had always been feared. James, on the contrary, was only despised; and even his spoiled minion Buckingham made no scruple to laugh outright in the face of his "dear dad and gossip." Nor did the follies and vices of the man tend in any degree to lessen the contempt produced by the feeble and wavering policy of the sovereign. The indecent gallantries of the court, and the habits of gross intoxication which even the females indulged, were viewed with loathing and disgust by a people whose manners were beginning to be tinctured by a more than stoical severity. But there were shades still darker and deeper than these. "Crimes of the most frightful kind had been discovered; others were suspected. The strange story of the Gowries was not forgotten. The ignominious fondness of the king for his minions, the perjuries, the sorceries, the poisonings, which his chief favourites had planned within the walls of his palace,the pardon which, in direct violation of his duty and of his word, he had granted to the mysterious threat of a murderer,-made him an object of loathing to many of his subjects." In a word, nature and education seem to have done their best to make James a finished specimen of all that a king ought not to be.

### CHAP. III.

#### REIGN OF CHARLES I.

Accession of Charles I.—His character as contrasted with that of his father.-First Parliament.-Their niggard supply.-Dissolved .- New Parliament .- Impeachment of Buckingham .-Arbitrary proceedings of the King.—Disputes.—Dissolution.—Ship-money.—Forced loan resisted.—Remarkable trial.—War with France.—Buckingham's Expedition.—Third Parliament.

-Petition of Right .- Duplicity of Charles .- Royal assent at Reign of length given to the Bill.—Assassination of Buckingham.—Ton- Charles I. nage and poundage.—Parliament dissolved.—Peace concluded with France and Spain.—Archbishop Laud.—Religious Innova-tions.—New Ministry.—Strafford.—Arbitrary measures of the King.—John Hampden prosecuted for the payment of ship-money.—Particulars of this memorable case.—Hampden, Cromwell, and other Puritans prevented from emigrating to North well, and other Puritans prevented from emigrating to North America.—Attempt to introduce Episcopacy into Scotland.—The Covenant.—King tries to soothe the Covenanters.—Assembly at Glasgow.—Episcopacy abolished.—War.—Peace.—War again declared.—A Parliament called and dissolved.—Pecuniary distresses of the King.—Royalists defeated at Newburn.—Treaty of Rippon.—Meeting of Parliament.—Impeachment, trial, and execution of Strafford.—Injustice of this proceeding.—Parliament rendered perpetual.—Imprisonment of Laud.—Delinguency.—Charles's visit to Scotland.—His concessions and Delinquency.—Charles's visit to Scotland.—His concessions and promotions.—The Incident.—Rebellion and Massacre of the Protestants in Ireland.—Reasons for attaching suspicion to the King.—Proceedings of the English Parliament.—Acrimonious remonstrance of the Commons.—Their violent proceedings.— Roundheads and Cavaliers.—The Bishops retire from the House of Lords.—Impeachment, by the King's order, of six members of Parliament.—He goes in person to seize them.—Consequences of this rash act.—Proffered concessions unavailing.—Commons demand the surrender of the executive power of the state. -Refused by the King.-War between the King and Parlia-

Charles I. succeeded to the same favourite, the same ministers, and the same council, which his father had possessed, to say nothing of the same pecuniary distress; and, unhappily, he also inherited the same principles of government. But in other respects he bore no resemblance to his sire. "He was neither a driveller nor a pedant, a buffoon nor a coward. Even in the judgment of his enemies he was a scholar and a gentleman, a man of exquisite taste in the fine arts, and of strict morals in private life. His talents for business were respectable, and his demeanour was grave, dignified, and kingly. But he was false, imperious, obstinate, narrow-minded, ignorant of the temper of his people, and unobservant of the signs of the times. The main principle of his government was resistance to public opinion; and hence his concessions were delayed till it mattered not whether he resisted or yielded, till the nation, which had long ceased to love or to trust him, had at last ceased also to fear him." (Edinb. Rev. vol. liv. p. 515.) At the same time his accession to the throne was greeted with favour, and even hailed as auspicious by the nation, which had been wearied and sickened by the pedantic and presumptuous incapacity of his father. Nothing is more easy than for princes to gain golden opinions; nothing more difficult than to rule with wisdom and moderation in those great crises when the national mind becomes agitated by a new spirit, and when the old frame of government must either accommodate itself to the advancing state of society, or be dashed in pieces by a rude collision with a new and resistless force. Pleased with his temporary popularity, obtained partly by the rupture with Spain, and also in want of money for carrying on his government, Charles resolved to call together the great council of the nation; and, accordingly,

¹ Edinburgh Review, vol. liv. p. 512. "The sovereign whom James most resembled," says the very able writer of the article here ferred to, "was, we think, Claudius Cæsar. Both had the same feeble and vacillating temper, the same childishness, the same referred to, "was, we think, Claudius Casal." Both had the same telepte and vachating temper, the same children coarseness, the same poltroonery. Both were men of learning; both wrote and spoke—not, indeed, well, but still in a manner in which it seems almost incredible that men so foolish should have written or spoken. The follies and indecencies of James are well described in the words which Suetonius uses respecting Claudius:—'Multa talia, etiam privatis deformia, needum principi, neque infacundo, neque indocto, immo etiam pertinaciter liberalibus, studiis dedito.' The description given by Suetonius, of the manner in which the Roman prince transacted business, exactly suits the Briton. 'In cognoscendo ac decernendo mira varietate animi fuit, modo circumspectus et sagax, modo inconsultus ac praceeps, nonnunquam frivolus amentique similis.' Claudius was ruled successively by two bad women; James successively by two bad women; James successively by two bad women is principle of the person of Claudius which we find in the animate of the person of the person of Claudius which we find in the animate of the person of the p cient memoirs might in many points serve for that of James. 'Ceterum et ingredientem destituebant poplites minus firmi, et remisse quid vel serio agentem multa dehonestabant, risus indecens, via turpior, spumante rictu, præterea linguæ tibubantia?"

Charles I 7th of May 1625. But the arrival of the Princess Henrietta, whom he had espoused by proxy, obliged him to delay, by repeated prorogations, their meeting till the 18th of June, when they assembled at Westminster for the dis-

patch of business.

The king's discourse to the parliament was full of apparent simplicity and cordiality. He mentioned cursorily the occasion he had for supply, but, it is said, employed no means to influence the suffrages of the members. The officers of the crown, who had seats in the house, were not even allowed to specify the particular sum which he had occasion for; he trusted entirely to the wisdom and affection of his parliament. But the parliament, composed chiefly of Puritans, was not in a humour to be generous, or even just, in appreciating the king's necessities. They knew that all the money formerly granted had been expended on military and naval preparations; that great anticipations were made on the revenues of the crown; that the king was loaded with a debt contracted by his father, who had borrowed money both from foreign princes and from his own subjects; that the public revenues could with difficulty maintain the dignity of the crown, even under the ordinary charges of government; that the present into a law was reserved until the end of the session; a war had been, in a great measure, the result of their own importunate applications and entreaties; and that the nation was solemnly pledged to support their sovereign in carrying it on. They could not be ignorant of the difficulty of military enterprises directed against the whole house of Austria; against the king of Spain, possessed of the greatest riches and most extensive dominions of any prince in Europe; against the Emperor Ferdinand, hitherto the most fortunate monarch of the age, who had astonished Germany by the rapidity of his victories. Yet, with all this knowledge, and to answer all these important ends, the commons thought proper to vote a supply of only L.112,000. The excuses which have been made for this insulting parsimony are, the hatred of Buckingham, and the discovery that the war had been produced by his artifices and intrigues. But the validity of this apology may reasonably be disputed. If the war was judged impolitic or unnecessary, it became the duty of the Commons to address the king, praying him to abandon it. If it was neither the one nor the other, they ought not to have avenged themselves for a trifling grievance by insulting the king and degrading the country.

The parliament was adjourned for a few weeks in summer by reason of the plague, which had suddenly broken out; but on their re-assembling at Oxford, the king represented, in the most explicit manner, the necessity there was for a large supply, urging that this request was the first he had ever made them; that he was young, and in the commencement of his reign; and that if he now met with kind and dutiful usage, it would endear to him the use of parliaments, and for ever preserve an entire harmony between him and his people. But the Commons remained inexorable, refusing even the addition of two fifteenths to the former supply. They renewed their complaints against the growth of popery; they demanded a strict execution of the penal laws against the Catholics; they remonstrated against some late pardons granted to priests; and they attacked Montague, one of the king's chaplains, on account of a book he had lately composed, in which it was maintained that virtuous Catholics as well as other Christians would be saved from eternal torments. Charles gave them a complaisant answer, but at the same time firmly resolved to abate somewhat of the rigorous ful, would have proved decisive, and reduced the king to laws against that unfortunate party, which his engagements with France absolutely required. No measure of preparing a remonstrance against the levying of tonnage his whole reign, however, proved more obnoxious to his and poundage without consent of the legislature. This

Reign of he issued writs, for summoning a new parliament for the intolerant subjects, or in its consequences more fatal to Reign of himself, than this resolution. The Puritans, who had con- Charles I tinued to gain ground during the whole reign of James, now formed the majority of the House of Commons. Petitions were consequently presented to the king for replacing such clergymen as had been silenced for want of conformity to the ceremonies; and laws were enacted for the strict observance of Sunday, which was sanctified with the most rigid and melancholy gloom. The inevitable result of all this was the dismissal of the refractory parliament, which was dissolved on the 12th of August.

During this interval Charles had been obliged to borrow from his subjects on privy-seals and other expedients, by which means he was enabled, though with great difficulty, to equip a fleet destined to act against Spain. But the force thus painfully fitted out performed nothing worthy of notice, and the ill success of the enterprise only served

to increase the clamours against the court.

Charles's second parliament, which was speedily convoked, adopted substantially the same views as the first, though without pushing their parsimony to such meanness. They voted a supply of three subsidies, amounting to L.168,000 and three fifteenths; but the passing of this vote proceeding which was tantamount to a threat of withholding it unless their demands were satisfied. Charles was greatly incensed at this conduct; but he found it prudent to submit, and to wait the event with patience. In the mean time the Commons attacked the Duke of Buckingham, who had become generally obnoxious; and he was also impeached by the Earl of Bristol in the Lords, on account of his conduct in the Spanish negociation. But the earl's impeachment was entirely overlooked, and the Commons taxed Buckingham with offences, such as administering physic to the late king without consent of his physicians, from which he found little difficulty to exculpate himself. While under this impeachment, Buckingham was elected chancellor of the university of Cambridge, and the king publicly thanked the university for their wise and proper choice. This was keenly resented by the Commons; but when they loudly complained of the affront, the lord-keeper commanded them, in the king's name, not to meddle with his minister and servant, but to finish in a few days the bill they had begun for the subsidies, otherwise they must expect to sit no longer. And to strip this imprudent menace of all disguise, Sir Dudley Carlton emphatically explained it by allusion to those monarchs in Christendom who, owing to the turbulence of their subjects, had been obliged to overthrow parliaments altogether. Nor was this the whole, or even the worst. Adding injury to indignity, the king next ordered two members of the House of Commons, Sir John Eliot and Sir Dudley Digges, the chief managers of the impeachment against the duke, to be thrown into prison, alleging as the reason of this proceeding certain seditious expressions said to have dropped from these members. Upon inquiry, however, it appeared that no such expressions had been uttered; and as the Commons refused to proceed with any business until they received satisfaction in their privileges, the members were accordingly released, though with a very bad grace. Soon after, the House of Lords; moved by the example of the Commons, claimed liberty for the Earl of Arundel, who had been lately confined in the Tower; and after many fruitless evasions the king was obliged, though somewhat ungraciously, to comply with their demand.

The next attack meditated by the Commons, if successan absolute dependence on his parliament. They were

1626.

Reign of impost, together with six new ones laid on merchandise right by the law. No particular cause was assigned for Reign of tion of the Commons, if they succeeded in carrying this by dissolving parliament, on the 15th of June 1626. The House of Lords in vain interceded. The king was determined on his course; and when the Peers prayed that the parliament might be allowed to continue its sittings, he replied in anger, " Not a moment longer." The king and the Commons at their separation published each an appeal to the nation.

Charles having thus made a breach with his parliament which there were no hopes of repairing, was obliged to have recourse to the naked exercise of his prerogative in order to supply himself with money. A commission was openly granted to compound with the Catholics, and dispense with the penal laws enacted against them; an expedient by which the king filled his coffers, but gave universal disgust to his subjects. From the nobility he desired assistance; from the city of London he required a loan of L.100,000. The former contributed but slowly; the latter, sheltering themselves under many pretences and excuses, gave at last a flat denial. To equip a fleet, an apportionment was made by order of the council amongst all assistance of the adjacent counties, to furnish a certain number of vessels or amount of shipping. The city of London was rated at twenty ships. And this was the first appearance, in the present reign, of ship-money; a taxation which had once been imposed by Elizabeth on a great emergency, but which, revived and carried some steps farther by Charles, produced the most violent discontents. These summary methods of supply, however, were employed with some moderation, until the tidings arrived of the king of Denmark's defeat by Tilly, the imperial general. Money then became more than ever necessary; and as the ways and means hitherto employed had not answered expectation, it was suggested in council, as the most speedy, equal, and effective means of obtaining a supply, to exact a general loan from the subject, rating every man according as he was assessed in the rolls of the last subsidy. The precise sum required was what each would have paid was at the same time ostentatiously declared that the sums thus exacted were not to be considered as subsidies, but as loans.

This paltry and equivocating subterfuge imposed upon no one. It was plain that by the course which the court was now pursuing, the liberty of the subject would be entirely destroyed, and parliaments in future rendered wholly superfluous. It was to no purpose, therefore, that the followers of the court, and their preachers in the pulpit, enjoined submission to this loan as part of the duty of passive obedience and non-resistance. A spirit of opposition arose among the people; many refused these loans; and some were even active in encouraging their neighbours to insist upon their common rights and privileges. By a warrant of the council these were thrown into prison, and most of them patiently submitted to confinement, although such as applied to the king by petition were commonly released. Five gentlemen alone, Sir Thomas Darnel, Sir John Corbet, Sir Walter Earl, Sir John Heweningham, and Sir Edmond Hampden, demanded release, not as a favour from the court, but as their

Charles I by King James, constituted nearly one-half of the crown their commitment; the special command of the king and Charles I. revenues; and it was therefore of vital importance to the council was alone pleaded. But it was alleged, that, by king, situated as he was, to preserve it entire, although law, this was not sufficient reason for refusing bail or rethere can be no doubt whatever that, in its own nature, it leasement to the prisoners. The question was brought to was an odious and oppressive tax. It was also the inten- a solemn trial before the Court of King's Bench, and the whole kingdom was attentive to the issue of the cause. point, to petition the king to remove Buckingham from his By the debates on this subject, it appeared that personal presence and councils. But the king, alarmed at the blow liberty had been secured by no less than six different stawhich was preparing for him, anticipated the Commons tutes, and by an article in Magna Charta itself. In times of turbulence and sedition, indeed, the princes had infringed upon these laws; and of this several examples were produced. The difficulty then lay to determine when such violent measures were necessary, and of that the court pretended to be supreme and only judge. As it was found to be legal, however, that the five gentlemen should plead the statute, by which they might demand bail, so it was deemed expedient by the court to remand them to prison, without determining on the necessity of taking bail for the present. This was a cruel evasion of justice; and, as might be expected, satisfied neither party. The court insisted that no bail could be taken; the country exclaimed

that the prisoners ought to be set free.

While the king was thus embroiled with his parliament at home, and with powerful nations abroad, he rashly engaged in a war with France, a kingdom with which he had but lately formed an alliance; a temerity bordering on madness. All historians agree that the French, like the Spanish war, was of Buckingham's creating; and the motives which led to it would appear incredible, if the viothe maritime towns, each of which was required, with the lence, profligacy, and folly of that man's character were not known. At the time when Charles married, by proxy, Henrietta of France, Buckingham had appeared at Paris to grace the festivity, and, by his showy superficial accomplishments, had attracted the admiration of the Queen of France herself. Having conducted Henrietta safely to England, he was preparing, doubtless in the spirit of ambitious gallantry, to return upon a new embassy; when Richelieu, the minister, himself a disappointed lover of the queen, caused a message to be sent him from France, declining the honour of his intended visit. Buckingham's rage at this knew no bounds, and, in a transport of passion, he swore that he would see the queen in spite of all the power of France. He also determined, if possible, to embroil the two kingdoms in war; and with this view he prevailed with Charles to dismiss the queen's French domestics, and encouraged the English ships to seize on those of France. But great as these provocations were, they failed had the vote of four subsidies passed into a law; but it in their object, which was to drive the French to a declaration of war. Upon this Buckingham persuaded the king openly to espouse the cause of the Huguenots, whose leader, the Duke de Soubise, was then in London. And the vain, shallow, impetuous favourite himself set sail with a hundred ships and seven thousand men to assist the Huguenots of Rochelle. Uninformed of his designs, however, the latter shut their gates against him. Instead of attacking the rich and defenceless isle of Oleron, Buckingham then bent his course to that of Rhé; and, after allowing the garrison of St Martyn to be well provisioned, he resolved to reduce it by famine. But his impatience soon led him to abandon this design; and attempting to storm the place without having made a breach in the defences, he was repulsed with the loss of two thirds of his force, and returned to England covered with disgrace. Destitute alike of capacity for war, of common sense and common vigilance, his conduct, throughout the whole of this expedition, was alternately that of an idiot and a madman. He did every thing that he ought not to have done; neglected every thing which it was his duty to do; attempted what was impossible or impracticable; sacrificed

Charles 1. brought disgrace on the national arms; and prodigiously aggravated all the difficulties and embarrassments with which his master was then surrounded. Of all the popinjays ever hatched and feathered in a court, Buckingham was beyond all doubt one of the most mischievous as

well as most unprincipled.

Well then might the king and his favourite tremble at the prospect of meeting a third parliament, after having squandered the money illegally extorted from a nation, now on the point of insurrection, on a war begun in the madness of profligacy, and productive only of disaster and shame. But, in the actual state of men's minds, it would have been hazardous to renew the experiment of raising money by the exercise of the prerogative alone. A third parliament was therefore summoned, and met on the 17th of March 1628. At the beginning of the session Charles plainly told them, that "if they should not do their duties, in contributing to the necessities of the state, he must, in discharge of his conscience, use those other means which God had put into his hands, in order to save that which the follies of some particular men might otherwise put in danger." Foreseeing that they might expect to be dismissed on the first disagreement with the king, the Commons proceeded with caution, yet relaxed nothing in vigour. The nation was now really suffering from the late arbitrary proceedings. They, therefore, began by remonstrating against arbitrary imprisonments and forced loans; after which, five subsidies, or L.280,000, were voted to the king, a sum with which Charles declared himself well satisfied. The Commons, however, resolved not to pass this vote into a law, until they had obtained from the king a sufficient security that their liberties should no longer be violated as they had formerly been. With this view they framed a law which was called a Petition of Right, because it was only a confirmation of the ancient constitution, in which they collected all the arbitrary exertions of the prerogative which had taken place since the king's accession, and in particular complained of the grievances of forced loans, benevolences, taxes without consent of parliament, arbitrary imprisonments, billeting soldiers, and martial law. They made no pretensions to any unusual power or privileges; nor did they intend to infringe on the royal prerogative in any respect. They aimed only at securing those rights and privileges derived from their ancestors.

But the king, on his part, began plainly to show that he aimed at nothing less than absolute power. This most reasonable petition he did his utmost to evade, by repeated messages to the house, in which he offered his royal word that there should be no more infringements on the liberty of the subject. But these messages had no effect on the Commons. They knew how brittle such promises were without further security, and accordingly passed the bill. In the Lords an attempt was made to stultify the measure, by adding to a general declaration of the rights of property and person a clause to the effect that, in case the sovereign be, from absolute necessity, obliged to imprison a subject, "he shall be petitioned to declare that, within a convenient time, he shall and will express the cause of imprisonment, and will, upon cause so expressed, leave the prisoner to be tried by the common law of the land." But in a conference the Commons refused to annihilate their petition by such a compromise; the Lords then passed the bill, and nothing was wanting but the royal assent to give it the force of a law. Charles accordingly came to the House of Peers, sent for the Commons, and being seated in the chair of state, instead of giving the usual concise assent, said, "the king willeth that right be done according to the laws and customs of

Reign of the lives of brave men at the shrine of his insane folly; the realm, and that the statutes be put into execution; Reign of that his subjects may have no cause to complain of any Charles L wrong or oppression contrary to their just rights and liberties, to the preservation whereof he holds himself in conscience as much obliged as of his own prerogative."

This equivocal answer was highly resented. The Commons returned in very ill humour; and their indignation would undoubtedly have fallen on the unfortunate Catholics, had not the petition against that persecuted class of religionists already received a satisfactory answer. To give vent to their displeasure, therefore, they fell on Dr Mainwaring, who had preached, and, at the special command of the king, printed, a sermon, which was found to contain doctrines subversive of civil liberty. For these doctrines Mainwaring was sentenced to be imprisoned during the pleasure of the house, to be fined in L.1000, to make submission and acknowledgment for his offence, to be suspended for three years, and declared incapable of holding any ecclesiastical dignity or secular office; and his book was ordered to be called in and burnt. But the session was no sooner ended than Mainwaring received a pardon, and was promoted to a living of considerable value; and some years afterwards he was raised to the see of St Asaph. Having dealt thus with Mainwaring, the Commons proceeded to censure Buckingham; and the storm of public indignation seemed ready to burst on his head, when it was diverted by the king's yielding to the importunities of parliament. He went to the House of Peers,

it be law as is desired," the house resounded with acclamations, which were re-echoed over all the country, and the bill for five subsidies immediately passed. But the Commons were not yet done with the redress of grievances. They called for the abolition of a commission which had been recently granted to thirty-three officers of the crown for levying money by impositions or otherwise, "in which form or circumstance were to be dispensed with rather than the substance be lost or hazarded." They adverted to a scheme for introducing into England a thousand German horse, probably to aid in levying contributions; they again attacked Buckingham, against whom

and when he pronounced the usual form of words, " Let

they were justly implacable; and they also asserted that the levying of tonnage and poundage without consent of parliament was a palpable violation of the ancient liberties of the people, and an open infringement of the peti-tion of right so lately granted. To prevent a formal remonstrance on these subjects, the king suddenly prorogued

the parliament on the 26th of June 1628.

The hand of an assassin soon rid the Commons of their enemy Buckingham. He was murdered on the 23d of August this same year, by one Felton, who had formerly served under him as a lieutenant. The king did not appear much concerned at his death, but retained an affection for his family throughout his whole lifetime. He desired also that Felton might be tortured, in order to extort from him a discovery of his accomplices; but the judges declared, that though that practice had been for-

merly very common, it was altogether illegal.

In 1629 the usual contentions between the king and his parliament were renewed. The great article on which the Commons broke with their sovereign, and which finally created in him a disgust at all parliaments, was their demands with regard to tonnage and poundage. The question at issue was, whether this tax could be levied without consent of parliament or not. Charles, supported by multitudes of precedents, maintained that it might; and the parliament, in consequence of their petition of right, asserted that it could not. But the Commons were resolved to support their rights.

They began with summoning before them the officers of

Reign of the custom-house, to give an account of the authority by fifth century, when the Christian church was sunk in su- Reign of Charles I. which they had seized the goods of those merchants who had refused to pay the duties of tonnage and poundage. The Barons of Exchequer were questioned with regard to their decrees on that head. The sheriff of London was committed to the Tower for his activity in supporting the officers of the custom-house. The goods of Rolles, a merchant, and member of the house, being seized on account of his refusal to pay the duties, complaints were made of this violence, as a breach of privilege. Charles, on the other hand, supported his officers in all these measures; and the breach between him and the Commons became every day wider. Sir John Eliot framed a remonstrance against tonnage and poundage, which he offered to the clerk to read; but the latter refused, and Sir John then read it himself. When the question was called for, the Speaker, Sir John Finch, said, that he had it in command from the king to adjourn, and to put no question; upon which he rose and left the chair. The whole house was in an uproar; the Speaker was pushed back, and forcibly held in the chair by Hollis and Valentine, till a short remonstrance was framed, and passed by acclamation. Papists and Arminians were now declared capital enemies to the commonwealth; those who levied tonnage and poundage were branded with the same epithet; and even the merchants who voluntarily paid these duties were declared betrayers of English liberty, and public enemies. The doors being locked, the gentleman-usher of the House of Lords, who was sent by the king, could get no admittance till this remonstrance was finished. By the king's order he took the mace from the table, which put an end to their proceedings; and, on the 10th of March, the parliament was dissolved. Some of the members were imprisoned and fined; but this severity served only to increase the general discontent, and point out the sufferers as proper leaders for the popular party.

Disgusted with parliaments, Charles now resolved to call no more; but finding himself destitute of resources, he was obliged to conclude a war which was begun without necessity, and conducted without glory. A treaty was signed with France on the 14th of April, and another with Spain on the 5th of November 1630, by which Charles bound himself to observe a neutrality with regard to the affairs of the Continent. In these treaties the Huguenots and the palatinate were equally abandoned. Charles, however, united with France in mediating between Sweden and Poland, in hopes of gaining the former to the cause of his brother-in-law. But although Gustavus espoused the cause of the German Protestants, and accepted of aid from Charles under the Marquis of Hamilton, he refused, when he had overrun Germany, to restore the palatinate, except on condition of its dependence upon himself. In short, the peace was as ignominious as

the war had been disgraceful.

The king's conduct to his subjects cannot now therefore appear blameless, nor the general discontent without foundation. As if resolved to ruin himself utterly, and to forfeit any small degree of regard which his subjects still retained for him, Charles now set about making innovations in religion. Archbishop Laud had obtained a prodigious ascendancy over the king, and, by a superstitious attachment to fantastical ceremonies, led him into a conduct that proved fatal to himself and ruinous to the kingdom. The humour of the nation at that time inclined them to enthusiasm rather than superstition; and the ancient ceremonies which had been sanctified by the permission and practice of the first reformers, were barely tolerated in divine service. Yet Laud chose this time, in every respect the most unseasonable that could have been hit upon, for renewing the ceremonies of the fourth and in every aspect of his character, became the associate and

perstition, and religion had been smothered under a cum- Charles I. brous mass of unmeaning forms; and so openly were his projects avowed, that not only did the Puritans believe the church of England to be fast relapsing into the ancient faith, but even the court of Rome itself entertained hopes of regaining its former authority in this island, and, in order to quicken the zeal of Laud, twice offered him, in private, a cardinal's hat. He had just sense enough to decline a tender which, if accepted, would have instantly wrought his overthrow. But it must nevertheless be confessed, that if he hesitated openly to declare himself a Catholic, the genius of his religion was essentially identical with that of Rome. The same profound respect was exacted to the sacerdotal character; the same submission to the creeds and decrees of synods and councils; the same pomp and ceremony in worship; the same superstitious regard to days, postures, meats, and vestments. The communion table was removed from the middle of the area where it had hitherto stood in all churches except cathedrals, and placed at the east end, railed in, and denominated an altar, whilst the clergyman who officiated received the appellation of priest. All kinds of ornaments, especially pictures, were introduced; some of them copied from the mass-book. And the crucifix too, that perpetual consolation of all pious Catholics, and terror of all sound Protestants, was not forgotten on this occasion.

In return for the king's indulgence towards the church. Laud and his followers took care to magnify on every on casion the regal authority, and to treat with the utmost disdain all puritanical pretensions to a free and independent constitution. From this subjection, however, they took care to exclude themselves, insisting upon a divine and apostolical charter in preference to a legal and parliamentary one. The sacerdotal character was magnified as sacred and indefeasible; and all right to spiritual authority, or even to private judgment in spiritual subjects, was refused to profane laymen. Ecclesiastical courts were holden by bishops in their own name, without any notice being taken of the king's authority; and Charles, though extremely jealous of every claim set up by popular assemblies, seemed rather to encourage than repress the en-

croachments of his clergy.

Meanwhile the king had changed his counsellors without changing his councils. In order to weaken the popular party, by creating suspicion and distrust of its chiefs, Charles, resorting to an expedient often adopted by princes, had chosen his ministers from the ranks of the patriots, in the hope of converting them into strenuous supporters of the prerogative which he was content to share with them. Nor was he mistaken in calculating the more immediate effects of this political apostacy. Sir Thomas Wentworth, now created Earl of Strafford, was appointed president of the council of York, deputy of Ireland, and chief counsellor of the king. Sir Dudley Digges became master of the rolls; Noy, attorney-general; and Littleton, solicitor-general. But the arch-apostate was Wentworth, a man distinguished by great force of character, dauntless courage, brilliant and commanding eloquence, extraordinary intellectual resources, unconquerable moral energy, and a fierce tumultuous ambition, which led him to trample without scruple or remorse upon every principle accounted most sacred and most binding on public men. In him the popular party lost one of its most powerful supporters, whilst despotism gained a formidable instrument, ready to revenge his own apostacy on the men he had deserted and betrayed, and to employ all his powers for the purpose of crushing those liberties of which he had been the most distinguished champion. This bold, bad man, remarkable alike

Reign of colleague of Laud, who still retained the chief direction of that the law was clearly in favour of Hampden, and that Reign of Charles Lecclesiastical affairs, and who has not unaptly been described as a lower kind of Saint Dominic, "differing from the fierce and gloomy enthusiast who founded the Inquisition, as we might imagine the familiar imp of a spiteful witch to differ from the archangel of darkness."

burgh Review, vol. liv. p. 521.) Whilst Charles ruled without parliaments he ruled by the naked exercise of prerogative alone. He wanted money for the support of government; and he levied it, either by the revival of obsolete laws, or by violations of the rights and privileges of the nation. In the Star-chamber and High Commission unheard of severities were practised in order to support the present mode of administration, and suppress the rising spirit of liberty throughout the kingdom. Sir David Foulis was fined L.5000 for dissuading a friend from compounding for knighthood. Prynne, a barrister, was condemned to be pilloried in two places, to lose his ears, to pay a fine of L.5000, and to be imprisoned during life, for reviling stage plays, huntings, and festivals, and animadverting on the superstitions of Laud. Allison was ordained to pay L.1000 to the king, to be publicly flogged, and to stand four times in the pillory, for reporting that the Archbishop of York had fallen into disgrace by asking toleration for the Catholics. Nor were these the only cases of the kind. Personal liberty was annihilated. Meanwhile tonnage and poundage continued to be levied by royal authority alone. The former arbitrary impositions were still exacted, and even new ones laid upon the different kinds of merchandise. custom-house officers received orders from the council to enter into any house, warehouse, or cellar; to search any trunk or chest, and to break any bulk whatsoever, in default of the payment of customs. To exercise the militia, each county was assessed by edict of the council, in a certain sum for maintaining a muster-master appointed to that service. Compositions were openly made with recusants, and the toleration of the Catholic religion being sold, religion became a regular part of the revenue. A commission was also granted for compounding with such as possessed crown-lands on defective titles; and upon this iniquitous pretence large sums were exacted from the people, who chose rather to submit to this fraudulent imposition, than to have the precise nature of their titles and

These arbitrary proceedings led to an occurrence which will be ever memorable in the history of English liberty. John Hampden had been rated at twenty shillings of shipmoney for an estate he possessed in Buckinghamshire, which was assessed at a ship of four hundred and fifty tons, or four thousand five hundred pounds. The share of the tax which fell to Hampden was very small; so small, indeed, that the sheriff was blamed for setting so wealthy a man at so low a rate; but although the sum demanded was a trifle, the principle of the demand was essentially despotical. The judges, it is true, had declared that, in case of necessity, the king might impose the tax of ship-money, and that his majesty was the sole judge of that necessity. But after consulting the most eminent constitutional lawyers of the time, Hampden, undismayed by this judicial deliverance, refused to pay the few shillings at which he was assessed, and determined, rather than submit to the imposition, to incur the certain expense and eventual danger of bringing to a solemn hearing this great controversy between the crown and the people. The leading council against the writ was the celebrated Oliver St John, whilst the attorney-general and solicitor-general appeared for the crown. The case was argued during twelve days in the Exchequer Chamber, and the judges took a considerable time for deliberation. No one has ever doubted

the state of their private affairs exposed to the world.

the arguments of his counsel remained unanswered. The Charles L bench was, however, divided in opinion. Four of the twelve judges pronounced decidedly in his favour; a fifth took a middle course; and the remaining seven gave their voices in favour of the writ. The majority against him was, therefore, the narrowest possible; and when it is recollected that the judges held their situations only during the royal pleasure, and consequently were entirely dependent on the court, this decision may be regarded as in reality a victory. In this light it was considered at the time; and it certainly had the effect of awakening the public indignation against the arbitrary designs of the court, and the abominable prostitution of judicial authority by which these had been sanctioned and abetted. "The judgment," says Clarendon, "proved of more advantage and credit to the gentleman condemned, than to the king's service."

The decision of the Exchequer Chamber, however, had placed at the disposal of the crown the property of every man in England; whilst the abominable proceedings of the Star-chamber, which caused obnoxious individuals to be mutilated and sent to rot in dungeons, showed that the persons as well as the estates of all who ventured to oppose the crown were entirely at its mercy. What that mercy was will immediately be seen. Hampden, with some of his friends and connections, determined to quit England for ever, and to betake themselves across the Atlantic, to a settlement which a few persecuted Puritans had formed in the wilderness of Connecticut. Lords Saye and Brooke were the original projectors of this scheme of emigration; and Hampden, who had been early consulted respecting it, now resolved to withdraw himself beyond the reach of further persecution, having reason to dread the vengeance of the court for the resistance he had offered to its tyranny. He was accompanied by his kinsman Oliver Cromwell; and the cousins took their passage in a vessel which lay in the Thames, bound for North America. They were actually on board, when an order of council appeared, by which the ship was prohibited from sailing; and seven other ships, filled with emigrants, were also stopped by the same authority. "Hampden and Cromwell remained," says the writer from whom we have borrowed so much, "and with them remained the evil genius of the house of Stuart." (Edinburgh Review, vol. liv. p.

While the discontent produced by these arbitrary proceedings was at its height in England, and the people ready to break out in open rebellion, Charles thought proper to attempt setting up Episcopacy in Scotland. The canons for establishing a new ecclesiastical jurisdiction were promulgated in 1635, and were received without any external appearance of opposition, yet with great inward apprehension and discontent. But when the reading of the liturgy was first attempted in the cathedral church of St Giles in Edinburgh in 1637, it produced such a violent tumult that it was not thought safe to repeat the experiment. A universal combination against the religious innovations began: immediately to take place; but Charles, as if obstinately bent on his own destruction, continued inflexible in his purpose, though he had nothing to oppose to the united force of the kingdom but a proclamation, in which he pardoned all past offences, and exhorted the people to be more obedient for the future, and to submit peaceably to the use of the liturgy. This proclamation accelerated the insurrection which had before been but slowly advancing. Four Tables, as they were called, were formed in Edinburgh; one consisting of nobility, another of gentry, a third of ministers, and the fourth of burgesses. The table of gentry was divided into many subordinate



Reign of ones, according to the different counties. In the hands of The bishops sent a protest, declining the authority of the Reign of Charles I the Four Tables the authority of the whole kingdom was assembly; the commissioner too protested against that Charles L placed. Orders were issued by them, and everywhere obey-This famous instrument consisted of a renunciation of popery, formerly signed by James in his youth, and filled with many virulent invectives against that party. A bond of union or league followed, by which the subscribers obliged themselves to resist all religious innovations, and to defend each other against all opposition whatsoever. The Covenant was subscribed by people of all ranks and conditions. Few disapproved of it in their hearts, and still fewer dared openly to condemn it. The king's ministers and counsellors themselves were mostly of the same way of thinking; and none but persons accounted rebels to God, and traitors to their country, could withdraw themselves from so salutary and pious a combination.

The king now began to be seriously alarmed. He sent the Marquis of Hamilton, as commissioner, with authority to treat with the Covenanters; he required the Covenant to be renounced and recalled; and, as sufficient concessions on his part, he offered to suspend the canons and liturgy till they could be received in a fair and legal way, and so to model the High Commission that it should no longer give offence to his subjects. In answer to this demand, however, the Covenanters declared that they would sooner renounce their baptism than the Covenant; and they invited the commissioner himself to sign it. Hamilton returned to London; made another fruitless journey with new concessions to Edinburgh; returned again to London, and was immediately sent back with still more satisfactory concessions. The king was now willing to abolish entirely the canons, the liturgy, and the High Commission Court; he even resolved to limit greatly the power of the bishops, and seemed content if on any terms he could retain that order in the Church of Scotland. Further, he gave Hamilton authority to summon first an assembly, and then a parliament, where every national grievance should be redressed. But these tardy and reluctant concessions only showed the weakness of the king, and encouraged the malcontents to rise in their demands. The offer, however, of an assembly and a parliament, in which they expected to be entirely masters, was very willingly embraced by the Covenanters.

Perceiving the advantage which his enemies had reaped from their Covenant, Charles resolved to have one on his side also; and he ordered a bond to be drawn up for that purpose. It consisted of the same strenuous renunciation of popery with the other; and although the king did not approve of this, he thought proper to adopt it, in order to remove all the suspicions entertained against him. As the Covenanters, in their bond of mutual defence against all opposition, had been careful not to except the king, Charles also formed a bond, which was annexed to this renunciation, and expressed the subscribers' loyalty and duty to his majesty. But the Covenanters perceiving that this new. Covenant was only meant to weaken and divide them, received it with the utmost scorn and detestation; and proceeded without delay to model the assembly from which such great achievements were expected.

This assembly met at Glasgow in 1638. A firm determination had been entered into of utterly abolishing Episcopacy; and, as preparatory thereto, there was laid before the presbytery of Edinburgh, and solemnly read in all the churches of the kingdom, an accusation against the bishops, as guilty, all of them, of heresy, simony, bribery, perjury, cheating, incest, adultery, fornication, common swearing, drunkenness, gaming, breach of the sabbath, and

court, as illegally constituted and elected, and in his maed with the utmost regularity; and amongst the first acts jesty's name dissolved it. This measure was foreseen, of their government was the production of the Covenant. and little regarded. The court still continued to sit and do business. All the acts of assembly since the accession of James to the crown of England were, upon very reasonable grounds, declared null and invalid. The acts of parliament which affected ecclesiastical affairs were on that very account supposed to have no authority. And thus the whole fabric which James and Charles, in a long course of years, had been rearing with much care and policy, fell at once to the ground. The Covenant likewise was ordered to be signed by every one, under pain of excommunication.

In 1639 the Covenanters prepared in earnest for war. The Earl of Argyll, though he long seemed to temporize, at last embraced the Covenant, and became the chief leader of that party. The Earls of Rothes, Cassillis, Montrose, Lothian, the Lords Lindesay, Loudoun, Yester, and Balmerino, also distinguished themselves. Many Scottish officers had acquired reputation in the German wars, particularly under Gustavus; and these were invited over to assist their country in its present necessity. The command was intrusted to Leslie, a soldier of experience and ability. Forces were regularly enlisted and disciplined: arms were commissioned and imported from foreign countries; a few castles which belonged to the king, being unprovided with provisions, ammunition, and garrisons, were soon seized; and the whole country, except a small part under the Marquis of Huntly, who still adhered to the king, fell into the Covenanters' hands, and was soon put in a tolerable state of defence.

Charles, on the other hand, was not deficient in endeavours to oppose this formidable combination. By regular economy he had not only paid all the debts contracted in the French and Spanish wars, but had amassed a sum of L.200,000, which he had reserved for any sudden exigency. The queen, who had great interest with the Catholics, both from sympathy of religion, and from the favours and indulgences which she had been able to procure them, now employed her credit in persuading them that it was reasonable to give large contributions, as a mark of their duty to the king, during this urgent necessity; and thus, to the great scandal of the Puritans, a considerable supply was raised. The king's fleet also was formidable and well supplied. Having put five thousand land forces on board, he intrusted the command to the Marquis of Hamilton, who had orders to sail for the Frith of Forth, and cause a diversion by occupying the forces of the malcontents. An army of near twenty thousand foot and three thousand horse was meanwhile levied, and put under the command of the Earl of Arundel, a nobleman of great family, but distinguished for neither military nor political abilities. The Earl of Essex, a man of strict honour, and extremely popular, especially among the soldiery, was appointed lieutenant-general; and the Earl of Holland was made general of the horse. The king himself joined the army, and summoned all the Peers of England to attend him. The whole had the appearance of a splendid court rather than a military armament, and in this state the army arrived at Berwick.

The Scottish force was equally numerous with that of the king, but inferior in cavalry. The officers had more experience; and the soldiers, though ill disciplined and armed, were animated, as well by the national aversion to England, and the dread of becoming a province of their old rival, as by that religious enthusiasm which was the. occasion of the war. Yet so prudent were their leaders, every other; crime which had occurred to the accusers; that they immediately sent very submissive messages to the;

Charles I. as usual, took the worst possible course. He concluded the Tower. Coat and conduct money for the soldiery was Charles I. a sudden pacification, in which it was stipulated, that he also levied on the counties; all the pepper was bought up should withdraw his fleet and army; that within fortyeight hours the Scots should dismiss their forces; that the king's forts should be restored to him, his authority acknowledged, and a general assembly and parliament immediately summoned, in order to compose all differences. But this peace was not of long duration. Charles could not prevail on himself to abandon the cause of Episcopacy, and secretly intended to seize every favourable opportunity to recover the ground he had lost. The assembly, on the other hand, proceeded with the utmost vigour and determination. They voted Episcopacy to be unlawful in the church of Scotland; they stigmatized the canons and liturgy as popish; and they denominated the High Commission tyranny. The parliament, which sat after the assembly, advanced pretensions which tended to diminish the civil power of the monarch; and they were proceeding to ratify the acts of assembly, when, by the king's instructions, Traquair, the commissioner, prorogued them. By reason of these claims, which might have easily been foreseen, the war recommenced the same year.

No sooner had Charles concluded the peace, however, than he found himself obliged to disband his army from want of money; and as the soldiers had been held together merely by mercenary views, it was not possible, without great trouble, expense, and loss of time, to re-assemble them. The Covenanters, on the contrary, in dismissing their troops, had been careful to preserve nothing but the appearance of a pacification. The officers had orders to be ready on the first summons; the soldiers were warned not to think the nation secure from an English invasion; and the religious zeal which animated all ranks of men made them immediately fly to their standards as soon as the trumpet of war was sounded by their spiritual and tem-

poral leaders.

In 1640, however, the king managed to draw an army together; but finding himself unable to support them, he was obliged to call a parliament after an intermission of about eleven years. As the sole object of the king in calling this parliament was to obtain a supply, and the only reason they had for attending was to procure a redress of grievances, much harmony could scarcely be expected. The king accordingly insisted for money, and the parliament expatiated on their grievances, till a dissolution ensued; and, as if to render this measure still more unpopular, the king permitted the Convocation to sit after the dissolution;—a practice of which there had been very few examples since the reformation, and which was now deemed exceedingly irregular. Besides granting a supply to the king from the spiritualities, the Convocation, jealous of innovations similar to those which had taken place in Scotland, imposed an oath on the clergy and the graduates in the Universities, binding them to maintain the government of the church, by archbishops, bishops, deans, chapters, and otherwise, as by law established. These steps were deemed illegal, because not ratified by consent of parliament; and the oath became a subject of general ridicule.

Disappointed of parliamentary subsidies, the king was obliged to have recourse to other expedients. The ecclesiastical subsidies offered a considerable resource; and it seemed but just that the clergy should contribute to the expense of a war which they had been mainly instrumental in raising. Charles borrowed money from his ministers and courtiers; and so urgent were his wants, that above L.300,000 were subscribed in a few days. Attempts were made to levy a forced loan from the citizens; but these were repelled by the spirit of liberty, which had now be-

Reign of king, and craved leave to be admitted to a treaty. Charles, extorted from the Spanish merchants who had bullion in Reign of from the East India Company upon trust, and sold at a great discount for ready money; and an infamous scheme was proposed for coining two or three hundred thousand pounds of base money. Such were the extremities to which Charles was now reduced. The fresh difficulties which were every day raised with regard to the payment of shipmoney, obliged him to exert continual acts of authority, and augmented extremely the discontents of the people, while his indigence and necessities continued undiminished.

1640.

These expedients, however, enabled the king, though with great difficulty, to set in motion an army, consisting of 19,000 foot and 2000 horse. The Earl of Northumberland was appointed general; the Earl of Strafford, who had been recalled from Ireland, lieutenant-general; and Lord Conway general of the horse. A small fleet was thought sufficient to serve the purposes of this expedition. Scottish forces, though somewhat superior, were sooner ready than the king's army, and marched to the borders of England. But notwithstanding their warlike preparations, the Covenanters still held the most submissive language to the king; having entered England, they said, with no other design than to obtain access to the king's presence, and lay their humble petition at his royal feet. At Newburn-upon-Tyne they were opposed by a detachment of four thousand five hundred men under Conway, who seemed resolved to dispute the passage of the river. The Scots first entreated them civilly not to interrupt them in their march to their gracious sovereign; and then attacking the detachment with great bravery, killed several, and chased the remainder from the ground. A panic now seized the whole English army; the forces at Newcastle fled immediately to Durham; and not thinking themselves safe there, they abandoned the town, and retreated into Yorkshire.

The Scots continuing to advance, dispatched messengers to the king, who had by this time arrived at York. They took care to redouble their expressions of loyalty, duty, and submission to his person; and they even made apologies for their late victory. Charles was in a very distressed condition; and, in order to prevent the further advance of the Scots, he agreed to a treaty, and named sixteen English noblemen to meet with eleven Scottish commissioners at Rippon. Strafford, upon whom, by reason of Northumberland's sickness, the command of the army had devolved, advised Charles rather to put all to the hazard than to submit to the terms which he foresaw would be prescribed. He urged him to push forward, to attack the Scots, and to bring the affair to a quick decision. If he were ever so unsuccessful, nothing worse could befal him than what he would certainly be exposed to from his inactivity; and, to show how easily this project might be executed, he ordered an assault to be made on some quarters of the Scots, and gained some advantage over them. This energetic advice Charles had not resolution to adopt. He resolved to summon a council of the peers; and as he foresaw that they would advise him to call a parliament, he told them in his first speech that he had already taken that resolution. Meanwhile, in order to subsist both armies (for the king was obliged to pay his enemies, in order to save the northern counties), Charles wrote to the city, desiring a loan of L.200,000; and the peers assembled at York joined in the same request.

The parliament met in November 1640. The House of Commons had never been observed to be so numerous; and, in order to strike a blow at once against the court, they began with the impeachment of the Earl of Strafford. That nobleman, who was considered as prime minister, come unconquerable. A loan of L.40,000 was, however, both on account of the credit he possessed with his mas-

Reign of ter, and his own uncommon vigour and capacity, had in- nor his hand immediately engaged in it, he was free from Reign of Charles I curred the hatred of the three kingdoms. The Scots looked upon him as the capital enemy of their country. He had engaged the parliament of Ireland to advance large subsidies to be employed in a war against them; he had levied an army of nine thousand men, with which he had menaced their western coast; he had obliged those who lived under his government to renounce the solemn league and covenant; and he had governed Ireland, first as deputy, and then as lord-lieutenant, during eight years, with great vigilance, activity, and energy, but with very little popularity, owing to the severities he had exercised. In a nation so averse to the English government and religion, these qualities were sufficient to draw upon him the public hatred. His manners, besides, were at bottom haughty, rigid, and severe; and no sooner did adversity begin to seize him, than this concealed hatred blazed up at once, and the Irish parliament used every expedient to aggravate the charge against him. Nor was this all. The universal discontent which prevailed throughout England was all pointed against the Earl of Strafford; and for this reason, that he was the minister of state whom the king most favoured and trusted. His extraction was honourable, his paternal fortune considerable; yet envy attended his sudden and great elevation, and his former associates in popular counsels, finding that he owed his advancement to the desertion of their cause, denounced him as the archapostate of the commonwealth, whom it behoved them to sacrifice as a victim to public justice.

From such causes nothing else could be expected than what really happened. Articles of impeachment were exhibited against Strafford, and this proceeding was followed by a bill of attainder. The king had induced Strafford to leave the army by a promise of protection, and an assurance that not a hair of his head should be hurt; but he soon learnt to his cost, that in neglecting the scriptural admonition, "Put not your faith in princes," he had rushed into the jaws of destruction. It was not without extreme difficulty, however, that the king could be brought to consent to the sacrifice of his favourite minister. He came to the House of Lords, where he expressed his resolution never to employ Strafford again in any public business; but with regard to the treason of which that minister was convicted, he professed himself totally dissatisfied. The Commons, however, voted it a breach of privilege for the king to take notice of any bill depending before the House. Charles did not seem to perceive that his attachment to Strafford was the chief motive for the bill; and that the greater the proof he gave of this attachment to his minister, the more inevitable did he render his destruction. The House of Lords were intimidated, by popular violence, into passing the bill of attainder against the unfortunate earl; and the same battery was next employed to force the king's assent. The populace flocked about Whitehall, and accompanied their demand of justice with loud clamours and open menaces. A thousand reports of conspiracies, insurrections, and invasions, were spread abroad. On whatever side the king cast his eyes he saw no resource nor security. All his servants, consulting their own safety rather than their master's honour, declined interposing with their advice between him and his parliament; the queen, terrified at the appearance of so great a danger, pressed Charles, with tears, to satisfy his people in this demand, which it was hoped would finally content them; Archbishop Juxon alone had the courage to advise him, if he did not approve of the bill, by no means to consent to it. At last, after the most violent anxiety and doubt, Charles granted a commission to four noblemen, in his name, to give the royal assent to the bill; flattering himself, that as neither his will was consenting to the deed,

the guilt which attended this base and ungrateful act.

That Strafford, on general grounds, perhaps, merited his fate, may be more easily conceded than the legality or justice of the proceedings which issued in his condemnation and death. The articles of impeachment exhibited against him respected his conduct as president of the Council of the North, as deputy of Ireland, and as commanderin-chief in England; and four months were employed by the managers in framing the accusation, so as, if possible, to entangle him in the meshes of treason. But he baffled, with wonderful ability, all the arguments of his accusers, whom he met and overthrew on every point; nor was the evidence produced against him at all sufficient to establish the charge of absolute treason, or to warrant the bill of attainder which was subsequently introduced. He was convicted of that constructive or accumulative species of treason, which, once admitted into the criminal jurisprudence of any country, must, in seasons of agitation and excitement, place the life of every man in it at the disposal of the ruling powers. He was sentenced to death in virtue of an ex post facto law, and fell the victim of popular odium, if not of party vengeance. It has indeed been said, that the proceedings against Strafford were justified by that which alone justifies capital punishment, or warrants the ravages committed in war, namely, by the public danger. But, even on this ground, it was incumbent on his accusers to show, first, that there was such a pressing and urgent danger as to justify an act of attainder; and, secondly, that the sacrifice demanded was the only mode in which such danger could be obviated or removed. Neither of these points, however, was established, or attempted to be established. The high tribunal before which Strafford was tried, convicted, and condemned, never seems to have thought of setting forth its own fears for the public weal, whether well or ill founded, as the sole and only measure of the justice of its procedure; they went upon grounds totally different, and sought to give a legal sanction to a judgment, for which no better defence can now be devised than the plea of necessity. And had they followed a different course, their conduct would have been at once absurd and inconsistent; for where there is an urgent or admitted necessity, that, from the nature of things, supersedes all ordinary principles of law, all questions of evidence, all considerations of guilt or of innocence; and where, as in this case, a formal investigation and trial have been gone into, it converts them into an absolute and intolerable mockery. The execution of Strafford, therefore, may be more easily palliated than defended. As a revolutionary measure, it may have been expedient; considered as a judicial act, it seems to have been a flagrant violation of the most sacred principles of law and justice.

These commissioners were empowered to give the royal assent to a bill yet more fatal to the king, which provided that the present parliament should not be dissolved, prorogued, or adjourned, without their own consent. By this last bill Charles perpetuated the power which had already become uncontrollable. The reason of this extraordinary step was, that the Commons, from policy rather than necessity, had resorted to the expedient of paying the two armres by borrowing money from the city; and these loans they were to be afterwards repaid by taxes levied on the people. But at last the citizens began to start difficulties with regard to a further loan which was demanded. "We make no scruple of trusting the parliament," said they, " were we certain that the parliament was to continue till our repayment. But, in the present precarious situation of affairs, what security can be given us for our money?" In order to obviate this objection, the above-mentioned bill was sud-

Reign of denly brought in, and having passed both houses with great Charles I. rapidity, was at last brought to the king, who, being oppressed with grief on account of the unhappy fate of Straf-

> Soon after the impeachment of Strafford, Laud was accused of high treason, and committed to custody; and to avoid a similar fate Lord Keeper Finch and Secretary Windebank fled, the one into Holland, the other into The house then instituted a new species of crime, which was termed delinquency; and persons who had acted under the king or by his authority during the late military operations were now called delinquents. however, reaped great advantage from their invention;law and liberty, and spread the terror of their own authority. All the sheriffs who had formerly exacted ship-money, though by the king's express command, were now de-ruling party. Several of the Covenanters were also sworn toms who had been employed during so many years in levying tonnage, poundage, and other imposts laid on without the authority of parliament, were likewise denominated delinquents, and were afterwards glad to compound for a pardon by paying L.150,000. Every sentence of the Star Chamber and High Commission Courts, which from their very nature were arbitrary and oppressive, underwent a severe scrutiny; and all who had concurred in such sentences were voted liable to the penalties of law. No minister of the king, no member of the council, was safe. The judges who had formerly given judgment against Hampden for refusing to pay ship-money were accused before the Peers, and obliged to find security for their appearance when required. Berkeley, a judge of the King's Bench, was seized by order of the house, even when sitting in his court. The sanction of the Lords and Commons, as well as that of the king, was declared necessary for the confirmation of ecclesiastical canons.

In a word, the constitution was new-modelled, in as far as that may be said to have been done by reforming abuses and striking terror into all those who had profited by them, or had in any manner of way been accessory to the arbitrary proceedings of the court. And during the first period of the transactions of this parliament, their merits so greatly overbalanced their defects and errors, as to entitle them to the admiration of all lovers of liberty. Not only provision was also made, by excellent laws, against a recurrence of the like evils. And if the means by which them. they accomplished such great ends savoured often of artifice, sometimes of violence, it is to be considered that revolutions in government cannot always be effected by mere force of argument and reasoning; and that, factions being once excited, men can neither so certainly regulate the tempers of others, nor control their own, as to guard against all excesses.

The king having promised to pay a visit this summer to his subjects in Scotland, in order to settle their government, the English parliament was very importunate with him to lay aside that journey; but they could not prevail with him so much as to delay it. Failing in this, they appointed a small committee of both houses to attend him; in order, as was pretended, to see the articles of pacification executed, but in reality to watch the motions of the king, and to extend still further the ideas of parliamentary authority. This committee consisted of the Earl of Bedford, Lord Howard, Sir Philip Stapleton, Sir

Charles arrived in Scotland on the 14th of August 1641, Reign of intending, it is said, to give full satisfaction if possible to Charles I. the people of that country. And some useful changes were ford, did not perceive the effect of it until it was too late. in reality made. The bench of bishops and the lords of articles were abolished; it was provided that no man should be created a Scottish peer who possessed not ten thousand merks, above L.500 sterling, of annual rent in the kingdom; a law for triennial parliaments was likewise passed; it was resolved that the last act of every parliament should be to appoint the time and place for holding the parliament next ensuing; and the king was also deprived of the power he had formerly exercised of issuing pro-Many of the nobility and gentry of the nation, while ex- clamations which enjoined obedience under the penalty erting what they considered as the legal powers of magi- of treason. But the hardest blow given to the royal austracy, thus found themselves unexpectedly involved in thority was an article which provided that no member this new and sufficiently vague offence. The Commons, of the privy council, no officer of state, none of the judges, should be appointed without the advice and approbation they disarmed the crown, established the maxims of rigid of parliament. Charles even agreed to deprive of their seats four judges who had adhered to his interests; and their place was supplied by others more agreeable to the clared delinquents. The farmers and officers of the cus- of the privy council; and all the ministers of state, counsellors, and judges, were by law to hold their offices during life or good behaviour. While in Scotland, the king conformed himself to the established church; he bestowed pensions and preferments on Henderson, Gillespie, and other popular preachers; and he practised every artifice to soften, if not to gain, his greatest enemies. The Earl of Argyll was created a Marquis, Lord Loudon an Earl, and Leslie was raised to the peerage by the title of Lord Leven. But though Charles thus heaped favours on his enemies with a prodigal hand, they were not satisfied, believing that all he did proceeded from artifice and necessity; whilst some of his friends were disgusted, and thought themselves ill rewarded for their past services. The king was manifestly playing a part, and he played it ill, because he overacted his assumed character.

Argyll and Hamilton, being seized with an apprehension, real or pretended, that the Earls of Crawford and Cochrane meant to assassinate them, left the parliament suddenly, and retired into the country; but, upon receiving assurances of safety, they returned in a few days. This event, which had no visible result in Scotland, was commonly denominated the Incident; but it was attended with very serious consequences in England. The English parliament immediately took the alarm. They insinuated that the Malignants, as they called the king's party, had laid a plot to murder the godly in both kingdoms; and were former abuses remedied, and grievances redressed; having applied to Essex, whom the king had left general of the south of England, he ordered a guard to attend

> In the mean time a rebellion broke out in Ireland, with circumstances of unparalleled atrocity, bloodshed, and devastation. By the judicious conduct of James the old Irish had been subdued, and proper means taken for securing their subjection in time coming; but their ancient animosity still remained, and only wanted an occasion, or rather pretext, to burst forth. And this, according to the received account, was furnished by the circumstances of the times and the weakness of the government.

Roger More, a gentleman descended from an ancient Irish family, but of narrow fortune, first formed the project of expelling the English, and asserting the independence of his native country. He went secretly from chieftain to chieftain, and roused up every latent principle of discontent. He maintained a close correspondence with Lord Macguire and Sir Phelim O'Neale, the most powerful of the old Irish chiefs; and, by his persuasions, soon engaged not only them, but the most considerable William Armyne, Nathaniel Fiennes, and John Hampden persons of the nation, in a conspiracy. It was also hoped

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Reign of that the English of the Pale, as they were called, or the old rance of the natives, were consumed with fire, or laid level Reign of ancient splendour and authority. The design was, that Sir Phelim O'Neale and the other conspirators should begin an insurrection on a given day throughout the provinces, and attack all the English settlements; and that, on the very same day, Lord Macguire and Roger More should surprise the castle of Dublin. They fixed on the beginning of winter for the commencement of the insurrection, that there might be more difficulty in transporting forces from England. Succours of men and supplies of arms were expected from France, in consequence of a promise to that effect made them by Richelieu; and many Irish officers who had served in the Spanish army expressed their readiness to lend their aid as soon as they saw an insurrection commenced by their Catholic brethren. The news which every day arrived from England of the fury expressed by the Commons against Catholics struck terror into the Irish nation, and stimulated the conspirators to execute their fatal purpose, by assuring them of the concurrence of their countrymen.

From the propensity discovered by the Irish to revolt, it was deemed unnecessary as well as dangerous to trust the secret to many; and, though the day appointed drew near, no discovery, it is said, had yet been made by government. The king, indeed, had received information from his ambassadors, that something was in agitation among the Irish in foreign parts; but though he gave warning to the administration in Ireland, his intelligence was entirely neglected. They were awakened from their security only the day before the commencement of hostilities. The castle of Dublin, by which the capital was commanded, contained arms for ten thousand men, with thirty-five pieces of cannon and a proportional quantity of ammunition; yet this important place was guarded by no greater force than fifty men, and even they did their duty negligently. Macguire and More were already in town with a numerous the night; and next morning they were to enter on what bability exaggerated. seemed an easy enterprise, the surprisal of the castle. But justices the project of a general insurrection.

But though O'Connolly's discovery saved the castle from the intended insurrection. O'Neale and his confederates had already taken arms in Ulster. The houses, cattle, heard of the commotions in their neighbourhood, instead of deserting their habitations, and assembling together for mutual protection, remained at home in hopes of defending their property, and thus fell separately into the hands of their enemies. A universal massacre now commenced, accompanied with circumstances of unequalled barbarity. No age, no sex, no condition, was spared. In the frenzy death dealt by the hand from which protection was implored and expected. All the tortures which wanton the anguish of mind, all the agonies of despair, could not satiate revenge excited without injury, and cruelty derived from no cause. Enormities, indeed, were committed, which, though attested by undoubted evidence, appear almost incredible. The stately buildings or commodious habita-

Charles I English planters, who were all Catholics, would afterwards with the ground; whilst the miserable owners, shut up in Charles I. join the party which proposed to restore their religion to its their houses, and preparing for defence, perished in the flames, together with their wives and children; thus affording a double triumph to their insulting foes. If anywhere a number assembled together, and resolved to oppose the assassins, they were disarmed by capitulations and promises of safety, confirmed by the most solemn oaths; but no sooner had they surrendered, than the rebels, with perfidy equal to their cruelty, made them share the fate of their unhappy countrymen. Others tempted their prisoners, by the love of life, to embrue their hands in the blood of friends, brothers, or parents; and having thus rendered them accomplices in their own guilt, gave them that death which they sought to shun by deserving it.

The barbarities by which Sir Phelim O'Neale and the Irish in Ulster signalized their rebellion may be imagined from this faint description. More, shocked at the recital of such enormities, flew to O'Neale's camp; but he found that his authority, though sufficient to excite the Irish to a rebellion, was too feeble to restrain their inhumanity. Soon afterwards he abandoned the cause, and retired to Flanders. From Ulster the flames of rebellion diffused themselves in an instant over the other three provinces of Ireland. In all places death and slaughter were common, though the Irish in some provinces pretended to act with moderation and humanity. But barbarous indeed was their humanity. Not content with expelling the English from their houses, they stripped them of their very clothes, and turned them out naked and defenceless to all the severities of the season; and the heavens, as if conspiring with the wrath of man against that unhappy people, were armed with cold and tempest unusual to the climate, and destroyed what the sword had spared. By some computations, the number of those who perished by all these cruelties is estimated at a hundred and fifty thousand; by the most moderate, forty thousand are calculated to band of retainers; others were expected in the course of have lost their lives; but even this estimate is in all pro-

The English of the Pale, who were not probably at first O'Connolly, an Irishman and a Protestant, discovered the in the secret, pretended to condemn the insurrection, and conspiracy. The justices and council immediately fled to detest the barbarity with which it was accompanied; to the castle, and reinforced the guards. The city was and by their earnest protestations they engaged the justices alarmed, and the Protestants prepared for defence. More to supply them with arms, which they promised to employ escaped, but Macguire was taken; and Mahon, one of the in defence of government. But the interests of religion conspirators, being likewise seized, first discovered to the were found to have more influence over them than a regard to duty and the peace of their country. They chose Lord Gormonstone as their leader; and, joining the old Irish, a surprise, Mahon's confession came too late to prevent rivalled them in acts of cruelty towards the English Protestants. Besides many smaller bodies dispersed over the kingdom, the main army of the rebels amounted to twenty and goods of the English were first seized. Those who thousand men, and threatened Dublin with an immediate siege. Both the English and Irish rebels pretended authority from the king and queen, but especially the latter, for their insurrection; and they affirmed that the cause of their taking arms was to vindicate the royal prerogative, now invaded by the puritanical parliament. Sir Phelim O'Neale having, it is said, found a royal patent in the house of Lord Caulfield, whom he had murdered, tore off of this bloody tragedy, every ordinary tie was broken, and the seal, and affixed it to a commission which he had previously forged for himself.

The king received intelligence of this insurrection while cruelty could devise, all the lingering pains of body, all in Scotland, and immediately communicated the disastrous tidings to the Scottish parliament; expressing a hope that, as there had all along been an outcry against popery, the nation would now, when that religion was appearing in its blackest colours, support him vigorously in the suppression of it. But if he was sincere in this request, which tions of the planters, as if upbraiding the sloth and igno- may not uncharitably be doubted, the Scots were not dis

Charles I. Considering themselves now as secured in the enjoyment of their rights, and conceiving hopes from the present distresses of Ireland, they resolved to ascertain precisely the ground on which succours were demanded, before consenting to grant them. Except dispatching a small body of forces to support the Scottish colonies in Ulster, the utmost length they would go, therefore, was to agree to send commissioners to London, in order to treat with the parliament. The king accordingly found himself obliged to have recourse to the English parliament, and to depend on their assistance for a supply. He told them that the insurrection was not, in his opinion, the result of any rash enterprise, but of a preconcerted conspiracy against the crown of England. To their care and wisdom, therefore, he said, he committed the conduct and prosecution of the war, which, in a cause so important to national and religious interests, must of necessity be immediately begun him, to show these marks of respect. But all the pleaand vigorously pursued. These words are fair-seeming, and it would be cruel to load the memory of an unfortunate prince with unjust reproach, or even ill-founded suspicion. But the impartiality of history compels us reluctantly to admit that there are grounds for charging the king with a guilty foreknowledge of what was designed and perpetrated in Ireland. The suddenness of his visit to Scotland, and the time chosen for undertaking it; his whole conduct in that country, particularly in at once making concessions at utter variance with the principles of his government and the integrity of his prerogative, which he had risked a civil war to preserve entire, and in heaping favours on his bitterest enemies; his new-born zeal against popery, which he had been so long covertly labouring to introduce; the criminal intrigues of the queen and those about her person, of which he could scarcely be altogether ignorant; the known deceit and duplicity of his own character; the strange inaction of the public functionaries in Ireland, even after they were apprized of the danger, to say nothing of the deaf ear they had turned to many previous hints that danger was brewing, and some sudden explosion contemplated; the absence of all proof of the fraud alleged to have been committed by O'Neale in regard to the royal patent said to have been found in the house of Lord Caulfield;—these, and many other circumstances that might be mentioned, seem to establish, first, that Charles had some very particular and urgent reasons for visiting Scotland at this time; secondly, that while there he acted a part which is only explicable on the supposition that he had a secret design to cover by it; thirdly, that such an impression seems to have been general at the time; and, lastly, that there are cirpresent the matter to his majesty." Every method of have never been explained in such a manner as to vindiguilty knowledge.

The English parliament, now re-assembled, discovered in each vote the same dispositions in which they had separated. By the difficulties and distresses of the crown, the Commons, who alone possessed the power of supply, had aggrandized themselves; and some were not sorry that the Irish rebellion had succeeded, at such a critical juncture, to the pacification in Scotland. An expression of the king's, by which he committed to them the care of Ireland, was immediately laid hold of, and interpreted in the most unlimited sense. On other occasions the Commons had been gradually encroaching on the executive power of the crown; but in regard to Ireland they now at tence of the Irish expedition, but reserved it for other

Reign of posed to give so serious a pledge without due deliberation. reserved them for more immediate use. Yet though no Reign of forces were for a considerable time sent over to Ireland, Charles L and very little money remitted during the extreme distress of that kingdom, so strong was the attachment of the people to the Commons, that the fault was never imputed to persons whose votes breathed nothing but destruction and death to the Irish rebels.

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In the meanwhile it was resolved to frame a general remonstrance on the state of the kingdom; and the committee, which at the meeting of the parliament had been chosen for that purpose, were commanded to finish their undertaking. The king returned from Scotland on the 25th of November 1641, and was received in London with shouts and acclamations by the people. Sir Richard Gournay, the lord-mayor, had promoted these favourable dispositions, and persuaded the populace, who had so lately insulted the king, and who so soon after made war upon sure which Charles had reaped from this reception was soon damped by the remonstrance of the Commons, which was presented to him, accompanied with a petition of similar import. The bad counsels which he had followed were there complained of; his concurrence in the Irish rebellion was plainly insinuated; the scheme laid for the introduction of popery and superstition was inveighed against; and, as a remedy for all these evils, the king was desired to intrust every office and command to persons in whom his parliament should see cause to confide. To this bitter remonstrance Charles found it necessary to make a civil reply. He knew that the public confidence was at that time denied to his ministers, more especially to such of them as had deserted the public cause; and that whilst men detested the servile insolence of Williams, the reckless levity of Digby, and the unblushing infamy of Saville, their faith and hope were strong in the inflexible virtues of Hampden, the mild integrity of Kimbolton, the ardent patriotism of Hollis, and the cool sagacity of Pym.

From this period the proceedings of the Commons became bolder, and more determined and violent. Finding themselves likely to be opposed by the nobility, who saw that their own degradation would speedily follow that of the crown, they openly told the Upper House that " they themselves were the representatives of the whole body of the kingdom, and that the Peers were nothing but individuals, who held their seats in a particular capacity; and therefore, if their Lordships would not consent to acts necessary for the preservation of the people, the Commons, together with such of the Lords as were cumstances connected with this atrocious rebellion which alarming the country was now put in practice. Affecting continual fears of destruction to themselves and to cate the king's memory from the suspicion of at least the whole nation, they excited the people by never-ceasing inquiries concerning conspiracies, by reports of insurrections, by alleged rumours of invasion from abroad, and by discoveries of dangerous combinations at home. When Charles dismissed the guard which had been ordered them during his absence, they complained; and, on his promising them a new guard under the command of the Earl of Lindesay, they declined the offer. They ordered halberts to be brought into the hall where they assembled, and thus armed themselves against those conspiracies with which they pretended they were hourly threatened. During this time several reduced officers and young gentlemen of the inns of court offered their service to the king; and between them and the populace once assumed it as if it had been delivered over to them by a regular assignment. They levied money under pre- out bloodshed. By way of reproach, these gentlemen gave the rabble the name of Roundheads, on account of their purposes; they took arms from the king's magazines, but short cropped hair; whilst the latter distinguished their

Reign of opponents by the name of Cavaliers; and thus the nation the accused were present; but they had escaped a few Reign of Charles I. was furnished with party names, under which the factions might rendezvous and signalize their mutual hatred.

These tumults continued to increase about Westminster and Whitehall. The cry against the bishops continually resounded; and being easily distinguishable by their habit, as well as objects of violent hatred to all the sectaries, they were exposed to the most outrageous insults. In these circumstances, the Archbishop of York, having been abused by the populace, hastily called a meeting of his brethren; and by his advice a protestation was drawn up and addressed to the king and the House of Lords, setting forth, that though they had an undoubted right to sit and vote in parliament, yet in coming thither they had been menaced and assaulted by the multitude, and could no longer with safety attend their duty in the House; for which reason they protested against all laws, votes, and resolutions, as null and invalid, which should pass during the time of their forced absence. This ill-timed protestation was signed by twelve bishops, and communicated to the king. As soon as it was presented to the Lords, that house desired a conference with the Commons, whom they informed of this unexpected protestation. An impeachment of high treason was immediately sent up against the bishops, as endeavouring to subvert the fundamental laws, and to invalidate the authority of the legislature; and on the first demand they were sequestered from parliament, and committed to custody. No man in either house ventured to speak a word in their vindication. One individual alone remarked, that he did not believe them guilty of high treason; he only thought they were stark mad, and therefore desired that they might be sent to Bedlam.

This was a fatal blow to the royal interest, and it was aggravated by the imprudence of the king himself. Charles had long suppressed his resentment, and only strove to gratify the Commons by the greatness of his concessions; but finding all his compliances unavailing, he now gave orders to Herbert, the attorney-general, to enter an accusation of high treason, in the House of Peers, against Lord Kimbolton and five commoners, Sir Arthur Hazlerig, Hollis, Hampden, Pym, and Strode. The articles charged them with traitorously endeavouring to subvert the fun-damental laws and government of the kingdom, to deprive the king of his regal power, and to impose on his subjects an arbitrary and tyrannical authority; with inviting a foreign army to invade the kingdom; with aiming at subverting the very right and being of parliaments; and with actually raising and countenancing tumults against the king. Men had scarce leisure to wonder at the precipitation and imprudence of this impeachment, when they were astonished by another measure still more rash and unwarrantable. A serjeant at arms, in the king's name, demanded of the house the five members, and was sent back without any positive answer. This was followed by conduct still more extraordinary. Next day the king himself entered the House of Commons alone, and advanced through the hall, while all the members stood up to receive him. The Speaker withdrew from the chair, and the king took possession of it. Having seated himself, and looked round for some time, he told the house that he was sorry for the occasion that forced him thither, but that he was come in person to seize the members whom he had accused of high treason, seeing they would not deliver them up to his serjeant at arms. Then addressing himself to the Speaker, he desired to know whether any of the members were in the house. But the Speaker, falling on his knees, replied that he had neither eyes to see nor tongue to speak, in that place, but as the house was pleased to direct him; and he asked pardon for not being able to give any other answer. The king sat for some time to see if

minutes before his entry, and taken shelter in the city. Charles I. Disappointed, perplexed, and not knowing on whom to rely, he next proceeded, amidst the invectives of the populace, who continued to cry out, "Privilege, privilege!" to the common council of the city at Guildhall, where he justified his proceedings respecting the fugitives, and expressed a hope that they would not find shelter or protection in the city. The common council answered his complaints by a disdainful silence; and, on his return, one of the populace, more courageous or insolent than the rest, cried out, "To your tents, O Israel!"

When the Commons assembled the next day, they affected or felt the greatest terror, and passed a unanimous vote that the king had violated their privileges, and that they could not assemble again in the same place, till they had obtained satisfaction, and a guard for their security. Meanwhile the king retired to Windsor, whence he wrote to his parliament, promising every satisfaction in his power. But they were resolved to accept of nothing unless he would discover his advisers in that illegal measure; a condition which they knew that, without rendering himself for ever vile and contemptible, he could not

possibly submit to.

The Commons had already stripped the king of most of his privileges; the bishops were fled, the judges were intimidated; and it now only remained, after securing the church and the law, that they should also get possession of the sword. The power of appointing governors and generals, and of levying armies, still continued a prerogative of the crown. Having first magnified their terrors of popery, which perhaps they actually dreaded, the Commons proceeded to petition that the Tower might be put into their hands, and that Hull, Portsmouth, and the fleet, should be intrusted to persons of their choosing. Compliance with these requests was calculated to subvert what remained of the monarchy; but such was the necessity of the times, that they were first contested, and then granted. The Commons then desired to have a militia, raised and governed by such officers and commanders as they should nominate. But Charles hesitated. Being at that time in Dover attending the queen and the Princess of Orange, who was about to leave the kingdom, he replied that he had not now leisure to consider a matter of such great importance; and therefore would defer an answer till his return. The Commons, however, were well aware that they had gone too far to recede; and hence they were desirous of leaving him no authority whatever, conscious that they themselves would be the first victims of its free exercise. They alleged that the dangers and distempers of the nation were such as could endure no longer delay; and unless the king speedily complied with their demands, they would be obliged, both for his safety and that of the kingdom, to embody and direct a militia by the authority of both houses. In their remonstrance they also desired to be permitted to command the army for an appointed time; a request which so exasperated him, that he exclaimed with indignation, "No, not for an hour!" This peremptory refusal broke off all further treaty, and both sides now resolved to have recourse to arms.

## CHAP. IV.

#### REIGN OF CHARLES I.: CIVIL WAR.

Charles, with his family, retires to York.-Fruitless negociations.—State of the belligerent parties.—Inactivity of the parliamentary army.—Skirmish at Worcester.—Battle of Edgehill.—Association in favour of the King.—Fairfax defeated in the north.—Battle of Stratton.—Bristol taken by the royalists.

1642.

Reign of Charles I. 1642.

-Siege of Gloucester.-Raised.-Battle of Newbury.-Advantages gained by Fairfax and Cromwell-Lord Fairfax defeated at Atherton.—The Scots agree to assist the Parliament.—Solemn League and Covenant.—Dexterity of Vane.—King's Irish auxiliaries.—Dispersed at Lantwich.—Siege of York.

—Royalists totally defeated at Marston-Moor.—Demands of the Parliament.-Execution of Laud.-Exploits of Montrose in Scotland.—Defeat of the Covenanters under Burley at Aberdeen .- Subsequent movements .- Devastation of Argyll's country.—Battle of Inverlochy.—Sack of Dundee.—Battles of Alderne and Alford.—Parliamentary army new-modelled by Cromwell.—Royalists defeated at Naseby.—Bristol taken.—Retreat of the King to Oxford.—Battle of Kilsyth.—Montrose defeated at Philiphaugh.—Charles throws himself on the Scottish army at Newark.—Negociations and proceedings in consequence.—Sur-render of the King's person to the English.—The army usurp the sovereignty.—Seizure of the King by Cromwell.—Designs of the army resisted, but ineffectually.—Presbyterian members forced to leave the House.-Both parties treat with the King.-His resolution to quit the kingdom.—Seized and confined in the Isle of Wight.—Levellers.—Danger of Cromwell from this sect.—Put down.—The Scottish army under Hamilton defeat-State of parties.—Cromwell enters Edinburgh in triumph, and settles the government of Scotland.—Negociations between the King and Parliament.—Pride's Purge.—Charges against the King.—His trial.—His sentence.—His execution.—Behaviour in his last moments.—Feelings of the nation on the King's

Charles, taking the Prince of Wales and the Duke of York along with him, retired, by slow journeys, to the city of York, where the people were more loyal, and less infected with the prevailing spirit of the times, than elsewhere. Here he found his cause backed by a more numerous party among the people than he had expected. The nobility and gentry from all quarters, either personally or by messages and letters, expressed their duty towards him; and the queen, who was then in Holland, had succeeded in levying men and procuring ammunition by selling the crown jewels. But before war was openly declared, the semblance of a negociation was kept up, rather with a view to please the people, than with any hope of reconciliation. Nay, that the king might despair of all composition, the parliament sent him the conditions on which they were willing to come to an agreement. Their demands were contained in nineteen propositions or articles, and in effect amounted to a total abolition of monarchical authority. It was required that no man should remain in the council who was not agreeable to parliament; that no deed of the king's should be held valid unless it passed the council, and was attested under their hand; that all the officers of state should be chosen with consent of parliament; that none of the royal family should marry without the consent of parliament or of council; that the laws should be executed against Catholics; that nobles and gentry, than from the baser disposition of the the votes of Catholic lords should be excluded; that the reformation of the liturgy and church government should proceed according to the advice of parliament; that the ordinance with regard to the militia should be acquiesced in; that parliament should judge all delinquents; that a general pardon should be granted, with such exceptions as might be advised by parliament; that the forts and castles should be disposed of by consent of parliament; and that no peers should be created but with consent of king and all his counsellors preferable to a peace on such ignominious terms. " If I should submit to these terms," said he, "I may have my hand kissed, and may retain the title of majesty, but I should remain but the outside, the picture, the sign of a king." Charles accordingly resolved to support his authority by force of arms. His towns, he said, were taken from him; his ships, his army, and his money. But there still remained to him a good cause, and the hearts of his loyal subjects, which, with God's

blessing, he doubted not would recover all the rest. There- Reign of fore, collecting some forces, he advanced southwards, and Charles I. erected his royal standard at Nottingham. 1642.

The struggle now about to commence seemed, in many respects, exceedingly unequal. The king, indeed, was supported by a splendid nobility, and a large portion of the more considerable gentry, who, dreading a total confusion of ranks, enlisted themselves under the banner of their monarch, from whom they received, and to whom they communicated, lustre. The cordial concurrence of the bishops and church of England also increased the number of his adherents. But it may safely be affirmed, that the high monarchical doctrines so much inculcated by the clergy had been eminently prejudicial to his cause; while the bulk of the nobility and gentry who now attended the king in his distress breathed the spirit of liberty as well as of loyalty; and it was only in the hopes of his submitting to a limited and legal government that they were willing to sacrifice their lives and fortunes in his cause. On the other hand, the city of London, and most of the great corporations, took part with the parliament. In the capital, no less than four thousand men enlisted in one day; and the demand for a loan, by the parliament, was answered with so much alacrity, that the treasure flowed in faster than it could be received. All the sea-ports, except Newcastle, were also in the hands of the parliament; and the seamen naturally followed the party espoused by the ports to which they belonged. Add to this, that the example of the Dutch commonwealth, where liberty had so happily supported industry, made the commercial part of the nation desire to see a similar form of government established in England; whilst many families, who had enriched themselves by commerce, finding that, notwithstanding their opulence, they could not raise themselves to a level with the ancient gentry, adhered to a power by the success of which they hoped to acquire both rank and consideration.

At first every advantage seemed to lie against the royal cause. The king was totally destitute of money, while, from the causes already mentioned, the parliament were secure of a considerable revenue. They had begun by seizing all the magazines of arms and ammunition, and their fleet intercepted the greater part of the succours sent by the queen from Holland; so that the king, in order to arm his followers, was obliged to borrow the weapons of the trained bands, under promise of restoring them on the return of peace. The nature and qualities of his adherents alone gave the king some compensation for all the advantages possessed by his adversaries. More bravery and activity were hoped for from the generous spirit of the multitude; and as the landed gentlemen had levied and armed their tenants at their own expense, greater force and courage were to be expected from these rustic troops than from the vicious and enervated population of cities.

But the parliamentary forces were ill officered or ill directed, otherwise, with a disposable force of six thousand men, which lay within a few days' march of the royalists, they might have easily dissipated the small number of troops which the king had been able to collect, amountboth houses. War on any terms was esteemed by the ing to no more than eight hundred horse and three hundred foot. In a short time the parliamentary army marched to Northampton, where the Earl of Essex, who had joined them, found a force amounting to fifteen thousand men. The king's army too was soon reinforced from all quarters; but having no force capable of coping with the parliamentary army, he thought it prudent to retire to Derby, and thence to Shrewsbury, in order to cover the levies which his friends were making in those parts. At Wellington, a day's march from Shrewsbury, he assem-

Reign of bled his forces, amounting to near ten thousand men, an assembly of divines. But considerable abatement would Reign of whole army that he would maintain the Protestant religion according to the church of England; that he would govern according to the known statutes and customs of the kingdom; and that he would observe inviolate the laws to which he had given his consent during the present and preceding parliaments.

While Charles lay at Shrewsbury, he received the news of an action, the first that occurred in this unhappy contest, in which his party were victorious. On the appearance of civil commotion in England, the Princes Rupert and Maurice, sons of the elector palatine, had offered their services to the king; and the former at that time commanded a body of horse which had been sent to Worcester to watch the motions of Essex, who was then marching towards that city. The prince, however, had scarcely arrived, when he saw some of the enemy's cavalry approaching the gates. Without a moment's delay he attacked them as they were defiling from a lane and in the act of forming, killed their commander, Colonel Sandys, routed the whole party, and pursued them above a mile.

At this period military science and skill were at the lowest possible ebb in England; so much so, indeed, that, however much the contending parties might differ in spirit or in means, they were on a footing of perfect equality in ignorance of the principles and conduct of war. hostile armies moved simultaneously, the king's from Shrewsbury, and the parliamentary from Worcester; but so totally destitute were both of intelligence, that they wandered about for ten days in absolute ignorance of each other's motions. At length, on the 23d of October 1642, they met at Keinton, or Edgehill, in the county of Warwick. The royalists were commanded in chief by the Earl of Lindesay, who had seen some service in the Low Countries, and now had under him Prince Rupert, master of the horse, Sir Jacob Astley in charge of the foot, Sir Arthur Aston commanding the dragoons, and Sir John Heydon the artillery. The general-in-chief of the parliamentary forces was the Earl of Essex, assisted by a number of subordinate officers as yet unknown to fame. In the encounter which immediately ensued, the royalists were at first victorious. Both wings of the parliamentary army were broken and put to flight by the onset of Prince Rupert's cavalry, supported by the troops under Aston and Wilmot; and if the royalist reserve had remained steady, the day would have been won. But thinking the victory already decided, they broke up from their position to join in the pursuit, and, whilst in the confusion produced by this disorderly movement, they were attacked by Sir William Balfour, who had anxiously watched their motions, with the parliamentary reserve, and defeated in their turn. Both armies then rallied, and faced each other for some time, neither party venturing to renew the attack: they lay all night under arms, and next day withdrew, Essex towards Warwick, and the king to his former quarters. Five thousand men, it is said, were left dead on the field in this bootless encounter. Soon afterwards, the king took Banbury and Reading, and defeated two regiments of his enemies at Brentford, taking five hundred prisoners. Thus ended the campaign of 1642, in which, though the king upon the whole had the advantage, yet the parliamentary army amounted to twenty-four thousand men, and was much superior to his. Nevertheless, his enemies had so far been humbled as to offer terms of peace. This led to the negociations at Oxford. The terms required by the parliament as the condition of the king's recal, were the disposal of the militia, the abolition of Episcopacy, and the settlement of ecclesiastical controversies by

Charles I. and caused to be read at the head of every regiment his probably have been made in these demands if Charles had Charles L military orders, in which he protested solemnly before his not been extravagant in his; and the failure of the negociation is ascribed to the king's fidelity to an unhappy promise he had made to the queen to accede to no terms without her intervention and consent.

While the treaty was in dependence no cessation of hostilities took place. On the 27th of April 1643 Reading surrendered to the parliamentary forces under the Earl of Essex, who commanded a body of eighteen thousand men. In the north, the Earl of Northumberland united the counties of Northumberland, Cumberland, and Westmoreland, in a league for the king, and some time after engaged other counties in the same association. The same nobleman also took possession of York, and the Earl of Newcastle dislodged the forces of the parliament under Fairfax at Tadcaster; but his victory was not decisive. Other advantages were also gained by the royalists, the most important of which was at Stratton, where Waller, who commanded the parliamentary army, was entirely defeated, and forced to fly with only a few horse to Bristol. This happened on the 13th of July, and was followed by the siege of Bristol, which surrendered to Prince Rupert on the 25th of the same month.

Although the taking of Bristol cost the royalists dear, five hundred having fallen in the attempt to carry it by storm, yet their general success had greatly dispirited the opposite party; and the confusion which now prevailed at London was so great that some proposed to the king tomarch directly to the metropolis, which it was hoped might be reduced by an insurrection of the citizens, by victory, or by treaty, and thus put an end at once to the civil disorders. But this judicious advice was rejected; and it was resolved first of all to reduce Gloucester, that the king might have the whole course of the Severn under his command. By this means it was hoped that the rich but disaffected counties of the west, losing the protection of their friends, might be forced to pay large contributions as an atonement for their disaffection; that a communication might be maintained between Wales and these new conquests; and that half the kingdom, freed from the enemy, and united into one firm body, might be employed in re-establishing the king's authority throughout the remainder. The siege accordingly commenced on the 10th of August; but the town being defended by Massey, a resolute governor, and well garrisoned, made a vigorous defence. The consternation in London, however, was as great as if the enemy had already been at their gates; and in the midst of the general confusion a design was formed by Waller of forcing the parliament to accept of some reasonable conditions of peace. He imparted his design to some others; but a discovery being made of their proceedings, he and two others were condemned to death. Waller, however, escaped with a fine of L.10,000. In the meanwhile Gloucester was reduced to the utmost extremity. A general assault had been repelled by the desperate enthusiasm of the garrison and city; but the means of prolonging the defence were now nearly exhausted. As a last resource, the parliament dispatched Essex with an army of fourteen thousand men to raise the siege. This he effected without much difficulty; and on entering the place he found only one barrel of gunpowder left, and the provisions nearly exhausted.

But on his return to London he was intercepted by the king's army, and a desperate battle ensued at Newbury, which lasted till night. Essex's horse were several times broken by the king's, but his infantry preserved its formation; and the front ranks presenting a formidable array of pikes, whilst those in the rear poured in a destructive fire, Prince Rupert and the gentry composing the royal caval-

1643.

Reign of ry were unable, notwithstanding the furious impetuosity of besides mutually engaging to defend each other against Reign of Charles I. their attacks, to make any impression on its compact order. Night put an end to the contest, but left the victory undecided. On the side of the king fell the brave, accomplished, and virtuous Lord Falkland, one of the few personages to be met with in history whose life and death were equally honourable and glorious. Next morning Essex proceeded on his march to London; and although he had rather escaped a defeat than gained a victory, he obtained the approbation of parliament. The king followed in the same direction, and, having taken possession of Reading, he established a garrison there, and by that means straitened London and the quarters of the enemy.

In the north, during the summer, the Earl, now created Marquis, of Newcastle, had raised a considerable force for the king; and great hopes of success were entertained from that quarter. But there appeared, in opposition to him, two men, on whom the event of the war finally depended, and who about this time began to be remarked for their valour and military conduct. These were Sir Thomas Fairfax, son to the lord of that name, and Oliver Cromwell. The former gained a considerable advantage over the royalists at Wakefield, and took General Goring prisoner; the latter obtained a victory at Gainsborough over a party commanded by General Cavendish, who perished in the action. But both these defeats were more than compensated by the total rout of Lord Fairfax at Atherton Moor, and the dispersion of his army, which happened on the 31st of July. After this victory, the Marquis of Newcastle sal down before Hull with an army of fifteen thousand men; but, being beaten off by a sally of the garrison, he suffered so much that he thought it proper to raise the siege. About the same time Manchester advanced from the eastern associated counties, and having joined Cromwell and young Fairfax, defeated the royalists at Horne Castle, where the conduct and gallantry of these two rising officers were eminently conspicuous. But though fortune had thus balanced her favours, the king's party still remained much superior in the north; and had it not been for the garrison of Hull, which kept Yorkshire in awe, a junction of the northern forces with the army of the south might have enabled the king, instead of undertaking the imprudent enterprise against Gloucester, to march directly to Lon-Newbury terminated the campaign of 1643, by both parties retiring into winter quarters.

The issue of the war being still doubtful, both the king and parliament began to look for assistance from other nations. The former looked to Ireland, the latter to Scotland. The parliament of England, at the commencement of the civil dissensions, had invited the Scots to interpose their mediation, which, however, the king had declined. Early in the spring of 1643 this offer was renewed, but with empowered to urge on the king to a compliance with the the commissioners, finding themselves unable to prevail in any one of their demands, returned highly dissatisfied. Disappointed in all these views, the English parliament now sent commissioners to Edinburgh, to treat of a more close confederacy with the Scottish nation. The person in whom they principally confided on this occasion was Sir Harry Vane, who, in eloquence, address, and capacity, as well as in art and dissimulation, was not surpassed by any one in that age, so famous for men of active talents. By his

all opponents, bound themselves to endeavour, without re- Charles L. spect of persons, the extirpation of popery, prelacy, superstition, heresy, and profaneness; to maintain the rights and privileges of parliaments, together with the king's authority; and to discover and bring to justice all incendiaries and malignants. They vowed also to preserve the reformed religion as established in the church of Scotland. but, by the artifice of Vane, no declaration more explicit was made with regard to England and Ireland, than that those kingdoms should be reformed according to the word of God and the example of the purest churches. This equivocal abjuration of prelacy completely blinded the Scottish Presbyterians, who, assuming their own to be the purest church, never doubted that it was intended to serve as a model for England. But, as a leader of the sect of Independents, Vane had other views, and artfully reserved a loophole of retreat whenever it should be convenient to dispense with the assistance of the Scots. Meanwhile the Solemn League and Covenant was received in the Scottish convention, and in the assembly of the kirk, with tears of enthusiastic joy, and transmitted to the English parliament and assembly of divines at Westminster, where, for different reasons, it was received with equal applause, and ordained to be universally subscribed in both kingdoms. By a treaty with the convention, twenty-one thousand Scottish troops were to be retained in arms at the expense of England, to be led by their own generals, and to re-

1644.

The king likewise, in order to secure himself, had concluded a cessation of arms with the Irish rebels, and recalled a considerable part of his army from Ireland. Some Irish Catholics came over with these troops, and joined the royal army, where they continued the same cruelties and disorders to which they had been accustomed; and the parliament voted that no quarter should ever be given them in any action. But Prince Rupert having made some reprisals, this inhumanity was repressed on both sides.

ceive orders from a committee of both kingdoms.

The campaign of 1644 proved very unfortunate to the royal cause. The forces brought from Ireland were landed at Mostyne in North Wales, and placed under the command of Lord Biron. They then besieged and took the castles of Hawarden, Beeston, Acton, and Deddingtondon and put an end to the war. The indecisive battle of house. No place in Cheshire or the neighbourhood now adhered to the parliament except Lantwich, and to it Biron laid siege in the depth of winter. Alarmed at this progress, Sir Thomas Fairfax assembled an army of four thousand men in Yorkshire, and having joined Sir William Brereton, approached the camp of the royalists. Biron and his soldiers, elated with success, entertained a most profound contempt for their enemies, and, as usual in such cases, paid dear for their absurd vanity. Fairfax suddenly attacked their camp, while the swelling of the river by a thaw dino better success than before. Commissioners were also vided one part of the army from the other. Those immediately opposed to Fairfax were quickly driven from their presbyterian worship and discipline; but this he absolutely post, and having retired into the church of Acton, were refused, as well as to call a parliament in Scotland; and surrounded and taken prisoners; the other part retreated precipitately without fighting; and thus was dissipated or rendered useless the body of auxiliaries from Ireland. This happened on the 25th of January. On the 11th of April ensuing Colonel Bellasis was totally defeated at Selby in Yorkshire by Sir Thomas Fairfax, who had returned from Cheshire with his victorious forces. Being afterwards joined by Lord Leven with the Scottish army, Fairfax, in conjunction with his ally, sat down before the city of York, but being unable to invest the city completepersuasions was framed at Edinburgh the Solemn League ly, they were obliged to content themselves with incomand Covenant, which effaced all former protestations and moding it by a loose blockade. Hopetoun, having assemvows taken in both kingdoms, and long maintained its bled a body of fourteen thousand men, endeavoured to break credit and authority. In this covenant, the subscribers, into Sussex, Kent, and the southern association, which seem-

Reign of ed well disposed to receive him; but he was defeated by of Essex's forces, which happened on the 1st of Septem- Reign of Charles L Waller at Cherington. At Newark, however, Prince Ru- ber. On the 27th of October another battle was fought Charles I. pert totally routed the parliamentary army which besieged that place, and thus preserved the communication open

between the king's northern and southern quarters.

The great advantages which the parliament had gained in the north seemed now to second their enterprises, and finally to promise them success. Manchester having taken Lincoln, had united his army to that of Leven and Fairfax; and York was now closely besieged by their numerous forces. That town, though vigorously defended by the Marquis of Newcastle, was reduced to the last extremity, when Prince Rupert, having joined Sir Charles Lucas, who commanded Newcastle's horse, hastened to its

relief with an army of twenty thousand men. The Scottish and parliamentary generals raised the siege, and, drawing up on Marston-moor, prepared to give battle to the royalists. By a dexterous movement, or rather by masking his movements, Rupert, interposing the Ouse between him and the enemy, threw military stores and provisions into York, and joined his forces with those under Newcastle. The marquis then endeavoured to persuade him, that, having successfully effected his purpose, he ought to be contented with the present advantage; remain on the defensive at least till an expected reinforcement arrived; and leave the enemy, diminished by losses, and discouraged by ill success, to dissolve by the mutual dissensions which had begun to take place among them. The prince, however, hurried on by his natural impetuosity, gave immediate orders for fighting. His forces occupied Marston-moor; those of his opponents were posted in the adjacent fields; and both sides were nearly equal in numbers. Fifty thousand British subjects were now drawn up in order of battle, and ready to begin the work of mutual destruction. After an ineffectual cannonade across a bank and ditch which separated the two armies, the signal for close combat was given nearly at the same instant each party expecting that the other would begin the attack. But evening approached, and no time was to be lost. At the head of the left wing of the parliamentary army Cromwell and David Leslie crowned the bank, drove back Rupert's right wing, dispersed his cavalry, and over-powered part of his centre. A different fortune awaited the right wing of the parliamentary army, where young Fairfax commanded. Charged with irresistible impetuosity by General Hurry, it was beaten back in disorder; and a reserve of the Scottish infantry, which moved to its support, was also cut up with astonishing celerity. The royalists then pushed for the enemy's baggage, and began to plunder. But while they were thus occupied, Cromwell and Leslie wheeled round and restored the battle. The parliamentary right wing now rallied on the left, and the whole army having changed its front, drew up in a position at right angles to that which it had occupied at the commencement of the battle. The royalists did the same, and the combat was renewed with great fury on both sides. But fortune soon declared in favour of the parliamentarians. The shock, though bloody, was brief, and the victory decided by Leslie's three Scottish regiments and Cromwell's brigade of ironsides. The royal army was driven off the field, and its whole artillery taken.

Immediately after this unfortunate action the Marquis of Newcastle left the kingdom, while Prince Rupert retired into Lancashire. The city of York surrendered in a few days, and Newcastle was soon afterwards taken by storm. This was a fatal blow to the royal cause, and far from being counterbalanced by an advantage gained at Cropredybridge by the king over Waller, or even by the surrender

at Newbury, in which the royalists were worsted; but soon after they retrieved their honour at Dennington Castle, which finished the campaign in 1644.

In 1645 negociations were renewed, and the commissioners, sixteen from Charles, twelve from the parliament, and four from the Scots, assembled at Uxbridge on the 30th of January; but it was soon found impossible to come to any agreement. The demands of the parliament were exorbitant, and, what was worse, their commissioners alleged that these were nothing but preliminaries. The king was required to attaint, and except from a general pardon, forty of the most considerable of his English, and nineteen of his Scottish subjects, together with all the popish recusants who had borne arms for him. It was insisted that forty-eight more, with all the members of either house who had sat in the parliament called by the king at Oxford, all lawyers and divines who had embraced the king's party, should be rendered incapable of any office, be forbidden the exercise of their profession, be prohibited from coming within the verge of the court, and should forfeit the third of their estates to the parliament. It was required, that whoever had borne arms for the king should forfeit the tenth of their estates, or, if that did not suffice, the sixth, for the payment of public debts. And, as if such terms would not have sufficiently annihilated the royal authority, it was further demanded that the court of wards should be abolished; that all the considerable officers of the crown, and particularly the judges, should be appointed by parliament; and that the right of peace and war should not be exercised without consent of parliament. Considerable abatement was, however, made in these rigorous demands; and as the rising power of the Independents made it the interest of the Presbyterians to conclude peace, if it could be done with any degree of safety, the treaty was now limited to the three subjects of by both sides. A moment of silent suspense followed, religion, the militia, and Ireland. On the first, the king's enemies required the abolition of prelacy, the confirmation of the acts of the assembly of divines at Westminster, and the ratification of the Solemn League and Covenant, with an injunction to all to take it, beginning with the king himself; on the second, the management of the militia till seven years after the peace, and an act of mutual oblivion; on the third, or Ireland, a cessation of arms, and the surrender to parliament of the direction of the war, and of the power of concluding peace without their consent. But, after a great deal of fruitless negociation, Charles ultimately refused to concede any of these points, and the treaty was in consequence broken off. The news of Montrose's victories in Scotland, and the hope of ten thousand men under the Duke of Lorraine, which the queen had stipulated for, are alleged to have been the chief causes of the failure of the treaty. A little before the commencement of this negociation, the parliament, to show their determined resolution to proceed as they had begun, brought to the block Archbishop Laud, who had for a considerable time been a prisoner in the Tower, and was no longer capable of giving offence, or rendering him-self dangerous to any one. The sacrifice of this weak, wicked, and unfortunate man, was therefore, politically considered, an act of bootless severity, and as such ought to be condemned.

But while the king's affairs were daily becoming worse in England, they seemed to revive a little in Scotland, through the conduct and valour of the Earl of Montrose. On his return from his travels, Montrose had been introduced to the king; but not meeting with an agreeable reception, he went over to the Covenanters, and had been active in forwarding all their schemes. Being commis-

Charles I. while the army lay at Berwick, he was gained over by the civilities and caresses of that monarch, and thenceforth devoted himself entirely, though secretly, to his service. Having attempted to form an association in favour of the royal cause, Montrose was thrown into prison; and on his release, which he managed to obtain, he found the king ready to give ear to his counsels, which were of the boldest and most daring kind. The whole nation of Scotland was occupied by the Covenanters; considerable armies were kept on foot by them, and every place was guarded by a vigilant administration; yet, by his own credit, and that of a few friends who remained to the king, this bold renegade undertook to raise such commotions as should soon oblige the malcontents to recal the forces which had so sensibly turned the balance in favour of the English parliament. The defeat at Marston-moor had left him no hopes of any succours from England; he was therefore obliged to stipulate with the Earl of Antrim for a supply of men from Ireland. And having used various disguises, as well as passed through many dangers, he arrived in Scotland, where he lay for some time concealed on the borders of the Highlands.

Although the Irish did not exceed eleven hundred foot, very ill armed, Montrose immediately put himself at their head; and, being joined by thirteen hundred Highlanders, he attacked Lord Elcho, who lay at Tibbermore, near Perth, with six thousand men, and utterly defeated him, killing two thousand of the Covenanters. He next marched northwards in order to rouse the Marquis of Huntly and the Gordons, who had before taken arms, but had been overpowered by the Covenanters. At Aberdeen he attacked and entirely defeated Lord Burley, who commanded two thousand five hundred men. But by this victory Montrose did not obtain the end he proposed; for the Marquis of Huntly showed no inclination to join an army where he was sure to be eclipsed by a powerful and

daring genius acting from its own impulses.

Montrose was now in a very dangerous situation. Argyll, reinforced by the Earl of Lothian, was behind him with a great army; while the militia of the northern counties of Moray, Ross, and Caithness, to the number of five thousand, opposed him in front, and guarded the banks of the Spey, a deep and rapid river. In order to save his troops, he turned aside into the hills; but, after some marches and counter-marches, Argyll came up with him at Faivy Castle. Here, after some skirmishes, in which he was victorious, Montrose got clear of a superior army, and, by a quick march through almost inaccessible mountains, placed himself absolutely beyond their reach.

But it was the misfortune of this general, that good or ill fortune proved equally destructive to his army. After every victory his Scottish adherents went home with the spoil they had collected; and had his army been composed of these only, he must soon have been altogether abandoned. But the Irish under his command, having no place to which they could retire, adhered to him in every fortune. With these, therefore, and some reinforcements of Atholemen and Macdonalds, Montrose fell suddenly upon Argyll's country, letting loose upon it all the horrors of war in their most savage form. Having collected three thousand men, Argyll marched in quest of the enemy, who had retired with their plunder, and took up a position at Innerlochy, supposing himself to be still at a considerable distance from his antagonist. While this force had thus eslevied troops, pressed the royalists on the other side, and threatened them with total destruction. The situation of

Reign of sioned, however, by the tables to wait upon the king and fortune relieved him, and brought back victory to his Reign of standard. By a rapid and unexpected march he hasten- Charles L ed to Innerlochy, and presented himself in order of battle before the Covenanters at the head of about eighteen hundred men. Argyll, seized with a panic, deserted his army, and, at a secure distance, having pushed off from the shore of the loch in a boat, witnessed the conflict which he had not the courage to share. The Campbells, however, made a stout resistance, but were at last defeated and pursued with great slaughter. After this victory, Montrose was joined by great numbers of Highlanders; Seaforth's army dispersed of itself; and the Lord Gordon, eldest son of the Marquis of Huntly, having escaped from his uncle Argyll, who had hitherto detained him, now joined Montrose with a considerable number of his followers, accom-

panied by the Earl of Aboyne. Alarmed at these victories, the council at Edinburgh sent for Baillie, an officer of reputation, from England, and, joining him in command with Urrey, dispatched them with a considerable army against the royalists. Montrose, with a detachment of eight hundred men, had attacked Dundee, a town remarkable for its zeal in favour of the covenant, carried it by assault, and given it up to be plundered by his soldiers, when Baillie and Urrey with their whole force suddenly came upon him. He instantly called off his soldiers from the plunder, put them in order, covered his retreat by a series of skilful manœuvres, and, having marched sixty miles in the face of a superior enemy without stopping or allowing his soldiers the least time for sleep or refreshment, he at last secured himself in the mountains. His antagonists now divided their forces, in order to carry on the war against an enemy who surprised them as much by the rapidity of his marches as by the boldness of his enterprises. Urrey met him with four thousand men at Auldearn, near Inverness, and, trusting to his superiority in number, Montrose having only two thousand men, attacked him in the post which he had chosen. Montrose posted his right wing on some strong ground, and drew the best of his forces to the other, leaving no main body between them; a defect which he artfully concealed by showing a few men through the trees and bushes with which the ground was covered. And, that Urrey might have no leisure to discover the stratagem, he instantly led his left wing to the charge, and made a furious onset on the Covenanters, whom he drove from the field in complete disorder. Baillie now advanced to revenge Urrey's defeat, and re-establish, if possible, the credit of the popular arms. But he himself met with a similar fate at Alford. Montrose, weak in cavalry, intermixed his troops of horse with platcons of infantry, and, having put his enemy's horse to rout, fell with united force upon their foot, which were entirely cut in pieces, though with the loss of the gallant Lord Gordon on the part of the royalists. Victorious in so many battles, which his vigour had rendered as decisive as they were successful, Montrose now prepared to march into the southern counties, in order to put down the power of the Covenanters, and disperse the parliament, which had been ordered to assemble at St Johnstone or Perth.

While Montrose was thus signalizing his valour in the north, Fairfax, or rather Oliver Cromwell under his name and sanction, employed himself in new-modelling the parliamentary army, and throwing the whole into a different and much more effective form. And never perhaps was there a more singular army established than that which blished itself in front, the Earl of Seaforth, at the head of was now re-organized by the parliament. To the greater the garrison of Inverness and a body of five thousand new number of the regiments chaplains were not appointed: the officers assumed the spiritual duty, which they united with their military functions. During the intervals of ac-Montrose was critical in the extreme; but a stroke of genius tion they occupied themselves in sermons, prayers, and

Reign of exhortations. Rapturous ecstasies supplied the place of recalled all the prince's commissions, and sent him a pass Reign of Charles L study and reflection; and whilst the zealous devotees poured out their thoughts in unpremeditated harangues,

they mistook the natural eloquence which flowed from an excited and enthusiastic temperament, for illuminations and illapses of the Holy Spirit. Wherever they were quartered, they excluded the minister from his pulpit, and, usurping his place, conveyed their sentiments to the audience with all the authority that belonged to their power, their valour, and their military exploits, united with zeal and fervour. The private soldiers were infected with the same spirit; and such an enthusiasm seized the whole army as perhaps has scarce ever been equalled in the history of the world. The royalists ridiculed the fanaticism of the parliamentary armies, without being sensible how much reason they had to dread its effects. They were at this time equal, if not superior, in numbers to their enemies, but so licentious in their conduct, that they had become more formidable to their friends than to their enemies. The commanders were most of them men of dissolute characters; in the west especially, where Goring commanded, universal spoil and havoc were committed; the whole country was laid waste by the excesses of the royalist army; and even the most devoted friends of church and state longed for success to the parliamentary forces in these parts, as the only mode in which a stop could be put to these frightful disorders.

The natural consequence of this enthusiasm in the parliamentary army, and this licentiousness in that of the king, was, that equal numbers of the latter were no longer able to maintain their ground against the former. This appeared conspicuously in the decisive battle of Naseby, which was fought between forces nearly equal. Prince Rupert, by his furious onset, broke the wing of the enemy opposed to him, but, as usual, pursued too far. Cromwell also bore down the wing of the royalists opposite that which he commanded; but instead of imitating the example of the impetuous prince, he sent a detachment in pursuit, and executing what is technically called a quart de conversion, attacked the exposed flank of the centre, where the royalist infantry were pressing hard on Fairfax. The result of this movement was decisive. When Rupert returned from pursuit the battle was irretrievably lost. The king called out to make but one charge more and the day would be their own; but his artillery and baggage being already taken, his infantry destroyed, and the prince's cavalry wholly exhausted by their exertions, it was now too late to attempt any such effort. After an obstinate struggle, Charles was entirely defeated, with the loss of five hundred officers and four thousand private men prisoners, and all his artillery and ammunition, while his infantry were totally dispersed.

After this fatal battle, the king retired first to Hereford, then to Abergavenny, and remained some time in Wales, in the vain hope of raising a body of infantry in these quarters, already harassed and exhausted. His affairs now went to ruin in all quarters. Fairfax retook Leicester on the 17th of June; and on the 10th of July he raised the siege of Taunton, while the royalists retired to Lamport, an open town in the county of Somerset. Here they were attacked by Fairfax, and driven from their position, with the loss of three hundred killed and fourteen hundred taken prisoners. This was followed by the loss of Bridgewater, which Fairfax took three days after, making the garrison, to the amount of two thousand six hundred men, prisoners of war. He then reduced Bath and Sharburn; and on the 11th of September Bristol was surrendered by Rupert, though a few days before he had boasted, in a letter to Charles, that he would defend the place for four

to go beyond sea.

Charles L 1646.

In the mean time the Scots, having made themselves masters of Carlisle after an obstinate siege, marched southwards and invested Hereford, but were obliged to raise the siege on the king's approach. This was the last glimpse of success that attended his arms. Having marched to the relief of Chester, which was anew besieged by the parliamentary forces under Colonel Jones, his rear was attacked by Poyntz, and an engagement immediately ensued. The fight was maintained with great obstinacy, and victory seemed to incline to the royalists, when Jones fell upon them from the other side, and defeated them with the loss of six hundred killed and a thousand taken prisoners. The king, with the remains of his army, fled to Newark, and thence escaped to Oxford, where he shut himself up during the winter season. After the surrender of Bristol, Fairfax and Cromwell, having divided their forces, marched, the former westwards in order to complete the conquest of Devonshire and Cornwall, and the latter to attack the king's garrisons to the eastward of Bristol. Nothing was able to stand before these victorious generals; every town was obliged to submit, and every body of troops which ventured to resist them were utterly defeated.

At last news arrived that Montrose himself, after some more successes, had been defeated; and thus the only hope of the royal party was destroyed. When he had descended into the southern counties, the Covenanters, assembling their whole force, met him with a numerous army, and gave him battle at Kilsyth. But here he obtained a memorable victory. Of the Covenanters above four thousand were killed on the spot, and no remains of an army left them in Scotland. Many noblemen, who had secretly favoured the royal cause, now declared openly for it, when they saw a force able to support them. The Marquis of Douglas, the Earls of Annandale and Hartfield, the Lords Fleming, Seton, Maderty, Carnegy, and many others, flocked to the royal standard. Edinburgh opened its gates and gave liberty to all the prisoners detained there by the Covenanters, and amongst the rest to Lord Ogilvy, son to the Earl of Airly, whose family had contributed essentially to the victory gained at Kilsyth. David Leslie was now detached from the army in England, and marched to the relief of his distressed party in Scotland. Allured by vain hopes of rousing to arms the Earls of Hume, Traquaire, and Roxburgh, who had promised to join him, and of obtaining from England some supply of cavalry, in which he was still very deficient, Montrose advanced still further to the south. But by the negligence of his piquet, or more probably from security engendered by success, Leslie surprised his army at Philiphaugh in the Forest, then much diminished in numbers from the desertion of the Highlanders, who, according to custom, had retired to the hills to secure their plunder. After a sharp conflict, in which Montrose displayed great valour, his forces were routed by Leslie's cavalry, and he was himself forced to fly to the mountains.

In the situation to which the king was now reduced, he resolved to grant the parliament their own terms, and sent them repeated messages to this effect; but a considerable time elapsed before they deigned to make him any reply. At last, after reproaching him with the blood spilt during the war, they informed him that they were preparing some bills, to which, if he would consent, they should then be able to judge of his pacific inclinations. In the mean time Fairfax was advancing with a victorious army in order to lay siege to Oxford; and Charles, rather than submit to be taken captive and led in triumph by his insolent subjects, resolved to give himself up to the Scots, who months. This so enraged the king, that he immediately had never testified such implacable animosity against him,

Reign of and to trust to their loyalty for the rest. After passing might have arisen in England, such a stipulation to sup- Reign of Charles I in disguise through many bye-ways and cross-roads, he arrived, in company with only two persons, Dr Hudson and Mr Ashburnham, at the Scottish camp before Newark, and immediately discovered himself to their general Lord

Leven. This resolution, though adopted in the midst of disaster, seems to have been formed by the king in hopes of dividing his enemies, and profiting by their dissensions, of which, indeed, any prince in his situation would not have hesitated to avail himself. Nor were there wanting circumstances to justify a measure which, because it proved unfortunate, has generally been considered as rash and illadvised. The Presbyterian form of church government had indeed been adopted in England, under the sanction of the divines assembled at Westminster; but the parliament steadily refused to render the church supreme, and to disjoin it from all connection with the state. The Independents, also, had combined with the Erastians in parliament to procure a charitable indulgence of conscience, or, in other words, unlimited though tacit toleration of all sects and opinions; a proceeding which the English as well as Scottish Presbyterians resisted as at once incompatible with the covenant, and favourable to boundless latitudinarianism. Nor were there wanting other causes of deep offence to exasperate the Scots. Their pay was in arrear; their supplies were neglected; their cautionary garrisons in the north were demanded back; their free quarters were refused. Ever since the battle of Naseby the Presbyterian, and with it the Scottish, influence had declined, whilst that of the Independents became every day stronger and stronger. Symptoms of an approaching schism, if not collision, were apparent. Is it to be wondered that, in these circumstances, Charles, who had already maintained a secret correspondence with the two factions of his enemies, should have now calculated on widening, by his presence with one of them, the breach that had so evidently taken place? His previous views, as expressed in a confidential letter to Lord Digby, were " to draw either the Presbyterians or the Independents to side with him," and to render whichever of the two he succeeded in gaining instrumental in extirpating the other; "so that," as he says, "I shall really be king again." Nor is there any reason to doubt that, in betaking himself to the Scottish camp, the real design of the king was to endeavour to effect the object here so distinctly

On the authority of an intercepted letter of the king, it has been asserted that he threw himself on the Scottish army in consequence of an assurance that they would assist him in recovering his lost prerogative, unite with the forces under Montrose, and compel the English parliament to accept a peace. In a declaration still extant, however, the Scottish leaders disclaim, in the strongest terms, any public or private agreement whatsoever with the king; and as this disclamation, which was publicly made, received no contradiction at the time, the reasonable conclusion is, that it could not be disputed. It is no doubt true that an agreement had been concerted, through Montreville the French ambassador, by which the Scots, with the knowledge and approbation of the English Presbyterians, were to escort the king to their camp. But the treaty was broken off by the refusal of the Scots to co-operate with Montrose, and by the king's hesitation to sanction and confirm the Presbyterian form of church establishment. The Scots seem, therefore, to have been perfectly sincere in their declaration to the English parliament. Charles came amongst them of his own proper motion, and not in consequence of any stipulation on their part to unite with him against their English allies; and whatever discontents

declared.

port the king, without first exacting from him an unequi. Charles I. vocal pledge to grant all the objects for which they had taken up arms, would have been the height of folly, and a sacrifice of great national interests to a romantic sentiment. Accordingly, they remained faithful to their original engagements; and although they withdrew to Newcastle to prevent the English intercepting their return home, they obtained the king's order for the surrender of Newark, guarded his person with respectful vigilance, and openly professed their resolution to avail themselves of the advantage they had thus acquired, in order to obtain the desired conformity in religion, and the establishment

of peace on a durable basis.

Next came the negociations between the Scots and English for the payment of arrears due to the former, and for the surrender of the king's person into the hands of the latter. The arrears, after many deductions, were finally settled at L.400,000; and this adjustment has been perpetually identified by historians with the agreement to deliver up the king's person, and represented as the equivalent given, or the price paid, for an act of unparalleled baseness. The confusion of facts, however, is as gross as the stigma attached to the Scottish nation is undeserved. The amount of the arrears was fixed in August. In November the question as to the disposal of the royal person remained still unsettled. At this time the Scottish parliament, indignant at a vote passed by the English parliament in September (a month after the settlement of the arrears) claiming the sole disposal of the king's person, resolved to maintain the freedom of the king, and assert his right to the English throne; but the vote was afterwards rescinded, on the just ground that it amounted to an abandonment of the solemn league and covenant, adopted in concert with the English Presbyterians, unless their joint demands were granted by the king. They offered, however, to reinstate him on the throne, and to obtain for him a just settlement with his English subjects, provided he would consent to take the covenant; and commissioners were appointed by the estates in Scotland to signify to his majesty these conditions, upon which alone he could expect to be received in Scotland, or assisted by the Scottish nation. But the king remained inflexible. In vain did the Duke of Hamilton, one of his principal friends in Scotland, unite with the ministers in representing that this alone could save him; in vain was it urged that if he conceded the Presbyterian church to both kingdoms, the demands respecting the militia would be relaxed, that all Scotland would declare in his favour, and that, while the Presbyterians remained numerous and powerful, few in England would venture to oppose the reconstitution of the monarchy with limited power. Nothing could move him to accede to that which alone could save him. On the eve of his departure, the commissioners renewed with great earnestness their offers to conduct him to Berwick, and to procure more equitable terms, provided he would take the covenant; and so anxious were they to save him, that a bare promise to comply with their religious demands would have been deemed sufficient. But all that could be wrung from this unhappy prince was a doubtful consent to tolerate Presbytery for three years; and even in making this concession, he justified it to his own curious conscience, by declaring before two of his bishops his unalterable resolution to restore and uphold Episcopacy. In the case of a sovereign cursed with such blind and obstinate infatuation, what else could be done but leave him to his fate?

It has been mentioned as a circumstance reflecting disgrace on the Scots, that the English parliament still withheld their arrears, and that the surrender of the king's

tharles I. be obtained. If the case had really stood so that the refusal of the Scots to deliver up Charles would have been punished only by defrauding them of the money which was justly due to them, and by no other consequence whatever, then the charge of selling the king for prompt payment might well have been alleged against them. But it must be obvious that the loss of the arrears, upon which so much stress has always been laid, was a mere trifle in comparison with the misery and bloodshed which must have ensued from drawing the sword in defence of the king, without first securing the grand objects of the covenant. Conduct such as this, on the part of the Scottish leaders, would have amounted to a violation of their solemn oaths, and a betrayal of the great national interests intrusted to their guardianship. They offered all that men, circumstanced as they were, could offer; they were willing, at any hazard, to adhere to the king, if the king would have been true to the country; and his refusal to accede to the terms proposed to him shows, that, if the Covenanters had conquered all England in his cause, they would only have rivetted more firmly the chains of Episcopacy and tyranny on themselves.1

> After the flight of Charles, Oxford surrendered to Fairfax, and the civil war terminated exactly four years after the king's standard was first erected at Nottingham. In consequence of the transactions at Newark, and the total failure of all attempts at an accommodation with the Presbyterians, the king was delivered over to the English commissioners, and conducted under a guard to Holdenby, in Northamptonshire, where he was very rigorously confined, and debarred from visits of his friends, as well as all com-

munication with his family.

The civil war being thus ended, the king absolved his followers from their allegiance, and the parliament had now no enemy to fear but the troops which had fought for them. But it was not long before they found themselves in the same unfortunate predicament to which they had reduced the king. The majority of the house were Presbyterians, but the majority of the army were Independents. Soon after the retreat of the Scots, the former seeing every thing reduced to obedience, proposed to disband a considerable part of the army, and send the rest over to Ireland. But this was by no means relished by the Independents, and Cromwell took care to heighten the disaffection. Instead of preparing to disband, therefore, the soldiers resolved to petition, and began by demanding an indemnity, ratified by the king, for any illegal actions they might have committed during the war. But the Commons voted that this petition tended to introduce mutiny, and threatened to proceed against the promoters

Reign of person was the only condition upon which payment could of it as enemies to the state and disturbers of the public Reign of The army accordingly began to set up for them- Charles L peace. selves, and a military parliament was organized, in opposition to the parliament at Westminster. The principal officers formed a council to represent the body of Peers; the soldiers elected two men out of each company, called the agitators of the army, to represent the Commons; and of this assembly Cromwell took care to be a member. The new parliament soon found many grievances to be redressed, and specified some of the most considerable. The Commons were obliged to yield to every request, and the demands of the agitators rose in proportion to the concessions they extorted. The Commons accused the army of mutiny and sedition; but the army retorted the charge, and alleged that the king had been deposed only to make way for their usurpations. In the mean time Cromwell, who secretly conducted all the measures of the army, while he exclaimed against their violence, resolved to seize the king's person. Accordingly a party of five hundred horse appeared at Holmby Castle, under the command of one Joyce, originally a tailor, now a cornet; and by this man was the king conducted to the army, who were hastening to their rendezvous at Triplow Heath, near Cambridge. Next day Cromwell arrived, and being received with acclamations of joy, was immediately invested with the supreme command. The Commons now discovered the designs of the army; but it was too late. All resistance had become hopeless. Cromwell advanced with precipitation, and was in a few days at St Alban's. Even submission was now to no purpose. The army still rose in their demands, in proportion as these were gratified, and at last proclaimed their intention of modelling the whole government, as well as settling the nation.

Cromwell began with accusing eleven members of the house, leaders of the Presbyterian party, as guilty of high treason, and enemies to the army. The Commons were willing to protect them; but the army insisting on their dismission, they voluntarily left the house. At last the citizens of London, finding the constitution totally overturned, and a military despotism about to be established on the ruins of the kingly tyranny which they formerly dreaded, began to think seriously of repressing the insolence of the troops. The common council assembled the militia of the city; the works were manned; and a manifesto was published, aggravating the hostile intentions of the army. Finding that the Commons, in compliance with the request of the army, had voted that the city militia should be disbanded, the multitude rose, besieged the door of the house, and obliged them to reverse the vote which they had so lately passed. The assembly was in consequence divided into two parties; the greater part siding

¹ The comments which Mr Hume has thought it proper to make on this unfortunate transaction are sufficiently met and answered by the statements contained in the text. The following defence of the Scots against the accusations which have been so freely preferred in consequence of the transactions at Newark, will, however, be read with interest, as proceeding from a writer who will not be suspected of any undue partiality to the Covenanters, namely, Sir George Mackenzie of Rosehaugh, Lord Advocate of Scotland in the reigns of Charles II. and James VII. "The parliament of Scotland (1661)," says he, "taking to their consideration how much and how unjustly this kingdom was injured by an aspersion cast upon it for the transactions at Newcastle in anno 1647, at which time the king was delivered to the parliament of England; which was called in some histories a selling of the king; did by an express act condemn and reprobate all that treaty, and declare that the same was no national act, but was only carried on by some rebels who had falsely assumed the name of a parliament. Nor wanted there many, even in that parliament, who protested against all that procedure, and who had the courage and honesty to cause registrate that protestation. And I must here crave leave to expostulate with our neighbours of England, for inveighing so severely against our nation for delivering their king, seeing he was only delivered up to the then parliament, who first imprisoned and thereafter murdered him: whereas how soon even our rebels discovered their design, they carried into England a splendid mighty army for his defence; and when his murder came to their ears, they proclaimed his son their king, and sent commissioners to treat with him and bring him to Scotland; and when he was arrived they did contribute their lives and fortunes for his safety. And albeit some bigot Presbyterians did use him unkindly out of too much kindness to their own principles, yet even these did very generously oppose Cromwell, and such as had murdered the king; as is clear by the attack made by Major-general Montgomery at Musselburgh, and by the remonstrators at Linlithgow. They fought also two battles for this at Dunbar and Worcester, and suffered the greatest imaginable hardships." (Memoirs of the Affairs of Scotland, from the Restoration of King Charles II. A. D. 1660. By Sir George Mackenzie of Rosehaugh. Printed at Edinburgh in 1821, and edited by Thomas Thomason, Eaq. Depute Clerk Registrar of Scotland.)

Reign of with the citizens, but the minority, with the two speakers favourite chaplain, and had acquired a good reputation in Reign of Charles I. at their head, being for encouraging the army. Accord- the army, it was thought proper to have recourse to him Charles I. the protection of the army, which was then at Hounslow Heath. They were received with shouts and acclamations; their integrity was extolled: and the whole force of the

soldiery, to the number of twenty thousand men, now moved forward to reinstate them in their places.

resolved to resist the encroachments of the army. They chose new speakers, gave orders for enlisting troops, and ordered the train-bands to man the lines; while the whole city boldly resolved to resist the invasion. But this resolution only held while the enemy was at a distance. When Cromwell appeared, all was obedience and submission; and the gates were opened to the general, who attended the two speakers and the rest of the members peaceably to their habitations. The eleven impeached members having been accused as the cause of the tumult, were expelled, and most of them retired to the Continent. The mayor, the sheriff, and three aldermen, were sent to the Tower; several citizens and officers of the militia were committed to prison; the lines about the city were levelled with the ground; and the command of the Tower was given to Fairfax.

It now only remained to dispose of the king, who continued a prisoner at Hampton Court. The Independent army, at the head of which was Cromwell, on the one hand, and the Presbyterians, in name of both houses, on the other, treated with him separately in private. He had sometimes even hopes, that in these struggles for power, he might be chosen mediator in the dispute; and he expected that the kingdom, at last sensible of the miseries of anarchy, would of its own accord relapse into tranquillity. At this time he was treated with flattering marks of distinction, and allowed to converse with his own servants; whilst his chaplains were permitted to attend him, and celebrate divine service in their own way. But the most exquisite pleasure he enjoyed was in the company of his children, with whom he had several interviews. The meeting on these occasions was so touching, that Cromwell himself, who happened once to be present, could not help being moved, and was heard to declare that he never before beheld such an affecting scene. But these instances of respect were not of long continuance. As soon as the army had gained a complete victory over the House of Commons, the king was treated not only with the greatest disrespect, but even kept in continual alarm for his personal safety. The consequence was, that Charles at last resolved to withdraw himself from the kingdom.

Accordingly, on the 11th of November 1647, the king, attended only by Sir John Berkeley, Ashburnham, and Leg, privately left Hampton Court; and his escape was not discovered till nearly an hour afterwards, when those who entered his chamber found on the table some letters directed to the parliament, to the general, and to the officer who had attended him. He travelled all night through the forest, and arrived next day at Titchfield, a seat of the Earl of Southampton, occupied by the countess dowsafely intrust his person. Before he arrived at this place, he went to the sea-coast, and expressed great anxiety that a ship, which he seemed to look for, had not arrived. As he could not hope to remain long concealed at Titchfield, the question was, what measure should next be embraced? In the neighbourhood lay the Isle of Wight, of which Hammond was governor. This man was a dependent of Cromwell's, which was an unfavourable circum-

ingly the two speakers, with sixty-two of the members, in the present emergency, when no other rational expesecretly retired from the house, and threw themselves on dient could be thought of. Ashburnham and Berkeley were accordingly dispatched to the island. They had orders not to inform Hammond of the place where the king lay concealed, till they had first obtained from him a promise not to deliver up his majesty, even though the parliament and army should require him, but restore him to In the meanwhile the part of the house which was left his liberty, if he could not protect him. The promise would have been but a slender security; yet, even without exacting it, Ashburnham imprudently, if not treacherously, brought Hammond to Titchfield; and the king was obliged to put himself into his hands, and to attend him to Carisbrooke Castle in the Isle of Wight, where, though he was received with great demonstrations of respect and kindness, he was in reality a prisoner.

While the king continued in this forlorn situation, Cromwell found himself upon the point of losing all the fruits of his schemes, by having his own artifices turned against himself. Among the Independents, who in general were hostile to all ecclesiastical systems, a set of men grew up called Levellers, who disallowed all subordination whatsoever, and declared that they would have no other chaplain, king, nor general, save Jesus Christ. All this would have gone down very well with Cromwell as long as it was only directed against his enemies, but he did not relish it quite so well when applied to himself. Accordingly, having intimation that the Levellers were to meet at a certain place, he unexpectedly appeared before them at the head of his red regiment, which had hitherto been deemed invincible, and demanding, in the name of God, what these meetings and murmurings meant, he expostulated with them upon the dangerous consequence of their precipitate schemes, and desired them immediately to depart. Instead of obeying, however, they returned an insolent answer; upon which he ordered his guards to disperse them, caused several of them to be hanged upon the spot, sent others to London, and thus dissipated a faction which was no otherwise criminal than in having followed his own example. Cromwell's authority was greatly increased by the reduction of this sect; and it became irresistable in consequence of a new and unexpected addition to his successes.

Meanwhile the relative situations of parties had materially changed, and the power of the Independents been increased as that of the Presbyterians declined. The former, too, began to disclose ulterior views and intentions which had never hitherto been suspected by their allies the Scots, whom they now took all occasions to mortify. The latter also found, that in the matter of Presbytery, no less than in the conduct of the war and the policy pursued towards the king, they had been overreached and deceived. The discovery in question brought on an accommodation between Charles and his Scottish subjects, who, in consideration of his majesty agreeing to confirm the covenant in parliament, and establish the Presbyterian church till it should be revised by the assembly of divines, engaged to assert and restore his authority by force of arms. This treaty was afterwards called The Engageager, a woman of honour, to whom the king knew he might ment; but although discontents had multiplied between the two kingdoms, it was found no easy matter to induce the nation to enter into the views of those by whom the engagement had been concluded. The Scottish royalists, under Traquair and Callender, were impatient for action; the moderate Presbyterians, under the Duke of Hamilton, wished to restore the king and the power of the English Presbyterians; the wild party, headed by Argyll, and seconded by the kirk, denounced the engagement as a deadstance; yet as he was nephew to Dr Hammond, the king's ly breach of the covenant, and deprecated hostilities with

Reign of England. Amidst this division of party and opinion, new a hundred and sixty members were excluded; and none Reign of Charles I levies were raised for the invasion of England, and the chief command given to Hamilton, as David Leslie and the other officers could not act without the sanction of

Langdale headed a separate body of royalists who had not taken the covenant, and both invaded the north of England. But though these two armies amounted to above twenty thousand men. Cromwell, at the head of eight thousand hardy veterans, feared not to give battle to the divided and undisciplined mass, conducted by an incapable leader. Attacking these bodies in succession, he routed and dispersed them, took Hamilton prisoner, and, following up the blow, soon entered Scotland. Of the whole Scottish force only a small body under Callender, who disdained to surrender, made their way back to Scotland. This overthrow was the signal for the High Presbyterian party to bestir themselves. New levies were indeed raised by the Earl of Lanark, Hamilton's brother; but these proved of no The Earls of Argyll, Cassillis, and Eglintoun, at the head of the Presbyterians of the west country and the Highlands, marched to Edinburgh, and inviting Cromwell to the metropolis, conducted him thither in triumph, suppressed the engagement, and renewed the solemn league and covenant with England. This expedition of the Covenanters to Edinburgh, commonly called the Whigamores' Inroad, gave the finishing blow to the royal cause in Scotland at this time.

During these contentions the king, who was kept a prisoner at Carisbrooke Castle, continued to negociate with the parliament for putting an end to the unspeakable calamities of the kingdom. And the parliament, on the other hand, saw no method of restraining the military, except to counterbalance it by the kingly power. Frequent proposals for an accommodation accordingly passed between the captive king and the Commons; but the great obstacle which had all along stood in the way still remained unshaken. This was the king's refusal to abolish Episcopacy, though he consented to alter the liturgy. However, the treaty was still carried on with vigour, and the parliament for the first time seemed in earnest to conclude their negociations. But all was now too late. The victorious army, headed by Cromwell, advanced to Windsor, and with furious remonstrances began to demand vengeance on the king. The unhappy monarch had been lately sent in custody to that place; and from thence he was now conveyed to Hurst Castle in Hampshire, opposite to the Isle of Wight. The parliament in the meanwhile began to issue ordinances for a more effectual opposition to these military encroachments, when they were astonished by a message from Cromwell, intimating his intention of paying them a visit next day with his whole army, and at the same time ordering them to raise him L.40,000 on the city of London.

The Commons, though destitute of all hopes of prevailing, had still the courage to resist, and to attempt in the face of the whole army to finish the treaty they had begun with the king. They had taken into consideration the whole of his concessions; and although they had formerly voted them unsatisfactory, they now renewed the consultation with great vigour. After a violent debate, which lasted three days, it was carried in the king's favour, by a majority of 129 against 83, that his concessions were a foundation for the houses to proceed upon in settling the affairs of the nation. This was the last at-tempt in his favour; for the next day Colonel Pride, at the head of two regiments, blockaded the house, and seizing in the passage forty-one members of the Presbyterian party, sent them to a low room belonging to the house, that passed by the denomination of Hell. Above having been engaged in treaty with his two houses of

were allowed to enter but the most furious and deter. Charles I. mined of the Independents, in all not exceeding sixty. This atrocious invasion of parliamentary rights commonly passed by the name of Pride's Purge, and the remaining members were called the Rump. The latter soon voted that the transactions of the house a few days before were entirely illegal, and that their general's conduct was just and necessary.

Nothing now remained to complete the career of the Rump but to put the king to death. In this assembly, composed of the most obscure citizens and officers of the army, a committee was appointed to bring in a charge against the king; and on their report a vote was carried, declaring it treason in a king to levy war against his parliament. It was therefore resolved that a high court of justice should be appointed, to try his majesty for this newly-invented treason. For form's sake they desired the concurrence of the few remaining Lords in the upper house; but there was virtue enough left in that body unanimously to reject the proposal. The Commons, however, were not to be stopped by so small an obstacle. They voted that the concurrence of the House of Lords was unnecessary, and that the people were the origin of all just power. And to add to their zeal, a woman of Herefordshire, illuminated by prophetical visions, desired admittance, and communicated a revelation which she pretended to have received from heaven. She assured them that their measures were consecrated from above, and ratified by the sanction of the Holy Ghost. This intelligence gave them great comfort, and much confirmed them in their present resolutions. Colonel Harrison, the son of a butcher, was commanded to conduct the king from Hurst Castle to Windsor, and from thence to London. His subjects, who crowded to see their fallen sovereign, were greatly affected at the change which appeared in his face and person. He had permitted his beard to grow, and his hair had become venerably gray, rather by the pressure of anxiety than by the hand of time; whilst the rest of his apparel bore the marks of misfortune and decay. He had long been attended by an old decrepid servant commonly called Sir Philip Warwick, who could only deplore his master's fate, without being able to revenge his cause. All the exterior symbols of sovereignty were now withdrawn, and his attendants had orders to serve him without ceremony. He could not, however, be persuaded that his adversaries would bring him to a formal trial; but he every moment expected to be dispatched by private assassination.

From the 6th to the 20th of January was spent in making preparations for this extraordinary trial. The court of justice consisted of a hundred and thirty-three persons named by the Commons; but of these about seventy only met upon the trial. The members were chiefly composed of officers of the army, most of them of very mean birth, together with some of the Lower House, and a few citizens of London. Bradshaw, a lawyer, was chosen president; Coke was appointed solicitor for the people of England; Dorislaus, Steele, and Aske, were named assistants. The court sat in Westminster Hall. When the king was brought forward before this court, he was conducted by the mace-bearer to a chair placed within the bar. Though long detained a prisoner, and now produced as a criminal, he still maintained the dignity of a king. The charge was then read by the solicitor, accusing him of having been the cause of all the bloodshed which had flowed since the commencement of the war; after which Bradshaw directing his discourse to Charles, told him that the court expected his answer. The king began his defence by declining the authority of the court. He represented, that

tribunal. He alleged that he was himself the king and fountain of law, and consequently could not be tried by laws to which he had never given his assent; that having been intrusted with the liberties of the people, he would not now betray them by recognising a power founded in usurpation; that he was willing, before a proper tribunal, to enter into the particulars of his defence; but that until then he must decline any apology for his innocence, lest he should be considered as the betrayer of, and not as a martyr for, the constitution. Bradshaw, in order to support the authority of the court, insisted that they had received their authority from the people, the source of all right. He pressed the king not to decline the authority of the court which was delegated by the Commons of England, and interrupted, overruled, and browbeat him in his attempts to reply. In this manner the king was three times produced before the court, and as often persisted in declining its jurisdiction. The fourth and last time he was brought before this self-created tribunal, he was insulted on his way thither by the soldiers and the mob, who cried out, "Justice! justice! Execution! execution!" but he continued undaunted. His judges now examined some witnesses, by whom it was proved that the king had appeared in arms against the forces commissioned by parliament, and then pronounced sentence against him. He seemed very anxious at this time to be admitted to a conference with the two houses, and it was supposed that he intended to resign the crown in favour of his son; but the court refused compliance, and considered his request as an artifice to delay justice.

The behaviour of Charles throughout this trying scene

was manly, firm, and dignified. In leaving the hall, the soldiers and rabble were again instigated to cry out Justice, and Execution, and to revile him with the most bitter reproaches; and, amongst other insults, one miscreant presumed to spit in his face. He patiently bore their insolence. "Poor souls," said he, "they would treat their generals in the same manner for sixpence." Those of the populace who still retained the feelings of humanity expressed their sorrow in sighs and tears. A soldier more compassionate than the rest could not help imploring a blessing on his royal head. An officer overhearing him, struck the honest sentinel to the ground before the king, who could not help saying that the punishment exceeded the offence.

On his return to Whitehall, Charles desired permission of the house to see his children, and to be attended in his private devotions by Dr Juxon, late bishop of London. These requests were granted, and three days were also allowed him to prepare for execution. Every night between his sentence and execution the king slept soundly nevolence to his greatest enemies. as usual, though the noise of the workmen employed in erecting the scaffold continually resounded in his ears. The fatal morning having at last arrived, Charles rose early; and calling one of his attendants, bade him employ more than usual care in dressing him, and preparing him for so great a solemnity. The street before Whitehall was the place destined for his execution; for it was intended in this way to increase the severity of his punishment. He was led through the banqueting house to the scaffold adjoining to that edifice, attended by his friend and servant Bishop Juxon, a man of the same mild and steady character as his master. The scaffold, covered with black, was guarded by a regiment of soldiers under the command of Colonel Tomlinson; and on it were to be seen the block, the axe, and two executioners in masks. The people, in crowds, stood at a distance. The king sur-

Reign of parliament, and having finished almost every article, he veyed all these solemn preparations with composure; and, Common-Charles I expected a different treatment from that which he had as he could not expect to be heard by the people at a disnow received. He perceived, he said, no appearance of tance, he addressed himself to the few persons who stood an upper house, which was necessary to constitute a just round him. He there justified his own innocence in the late fatal wars, observing that he had not taken arms till after the parliament had shown him the example; and that he had no other object in his warlike preparations, than to preserve that authority entire which had been transmitted to him by his ancestors. But, though innocent towards his people, he acknowledged the equity of his execution in the eyes of his Maker, and owned that he was justly punished for having consented to the execution of an unjust sentence against the Earl of Strafford. He forgave all his enemies; exhorted the people to return to their obedience, and acknowledge his son as his successor; and signified his attachment to the Protestant religion as professed by the church of England. So strong was the impression made by his dying words on those who could hear him, that Colonel Tomlinson himself, to whose care he had been committed, acknowledged himself a convert. At one blow his head was severed from his body. other executioner then, holding up the head, exclaimed, " This is the head of a traitor."

It is impossible to describe the grief, indignation, and astonishment, which took place, not only among the spectators, who were overwhelmed with a flood of sorrow, but throughout the whole nation, as soon as the report of this execution was conveyed to them. Each blamed him, self, either with active disloyalty to the king, or a passive compliance with his destroyers. The very pulpits which used to resound with insolence and sedition were now bedewed with tears of repentance; and all united in their detestation of those dark hypocrites, who, to satisfy their own enmity, involved a whole nation in the guilt of this catastrophe. Charles was executed on the 30th of January 1649, in the forty-ninth year of his age, and twentyfourth of his reign. He was of a middling stature, robust, and well-proportioned. His countenance was pleasant, but melancholy; and it is probable that the continual troubles in which he was involved might have given this expression to his features. As it had been remarked that the king, the moment before he stretched out his neck to the executioner, had addressed to Juxon, with a very earnest accent, the single word " Remember," great mysteries were supposed to be concealed under that word; and the generals vehemently insisted with the prelate that he should inform them of the king's meaning. Juxon told them that the king, having frequently charged him to inculcate on his son the forgiveness of his murderers, had taken this opportunity, in the last moment of his life, when his commands, he supposed, would be regarded as sacred and inviolable, to reiterate that desire; and that his mild spirit thus terminated its earthly course by an act of be-

## CHAP. V.

# THE COMMONWEALTH.

Dissolution of the Monarchy, and establishment of the Commonwealth.—Council of State.—Negociations with Prince Charles.
—Descent of Montrose in the North.—His defeat and execution.—Arrival of Charles in Scotland.—His treatment there. The Scots proclaim him King.—War with England.—Battle of Dunbar.—Subsequent operations.—The Scots march into England.—Battle of Worcester.—Adventures of the King, and his escape into France.—Cromwell's policy towards Scotland.— War with the Dutch.—Cromwell resolves to seize on the Sovereign power.—Parliament turned out.—Protest of Bradshaw and the Council.—Barebone's Parliament.—Dissolved.—Cromwell declared Protector.-Settlement of the Government. His vigorous administration.—Jamaica conquered.—Arbitrary

1649.

Commonwealth. 1649.

methods of raising money.—Another Parliament called.—The of Norwich and Sir John Owen were also condemned, and Common-Crown offered to Cromwell.—Refused.—Situation to which he afterwards pardoned. These executions greatly irritated wealth. was reduced by the frequent conspiracies of the Royalists and the Levellers. His death and character. Richard Cromwell declared Protector .- His abdication .- Rump Parliament reinstated.—Dissolved by the army.—Military Government.—Proceedings of Monk.—Negociations.—March to London.—His quarters established in Westminster.—City of London punished.—Secluded Members of Parliament recalled.—New Parliament assembled.—Charles II. leaves Spain.—His message to the Parliament.—He is recalled, and lands in England.—Character of Monk's proceedings in the matter of the Restoration.

The dissolution of the monarchy followed, as a natural consequence, the execution of the king. At the commencement of the struggle the demands of the two houses were limited to the redress of existing grievances; but now when it was over, the triumphant party refused to be content with any thing less than the abolition of the old, and the establishment of a new and more popular form of government. They had sinned too deeply against royalty to trust themselves to the mercy or moderation of a king. A republic was therefore their choice, first, because it promised to shelter them from the vengeance of their enemies; and, secondly, because it offered them the additional advantage of sharing among themselves all the power, the patronage, and the emoluments of office. In accordance with this decision, the head of the king had no sooner fallen on the scaffold at Whitehall, than a proclamation was issued, declaring it treason to give to any person the title of king without the authority of parliament; and at the same time was published the vote of the 4th of January (1649), by which it had been decreed that the supreme authority in the nation resided in the representatives of the people. The peers, though aware of their approaching fate, met on the day fixed at their adjournment, and proceeded to business; but after a pause of a few days the Commons voted that the House of Lords, as useless and dangerous, ought to be abolished; and they declared it high treason to acknowledge Charles Stuart, son of the late king, as successor to the throne. A council of state was next appointed, consisting of forty-one members, with powers limited in duration to twelve months, and charged with the preservation of domestic tranquillity, the disposal of the military and naval force, the superintendence of internal and external trade, and the negociation of treaties with foreign powers. A new great seal was then made, on one side of which were engraven the arms of England and Ireland, with this inscription, "The great seal of England;" and on the reverse was represented the House of Commons sitting, with this motto,—" On the first year of freedom, by God's blessing restored, 1649." The forms of all public business were changed, and instead of proceeding in the king's name, ran in that of the "keepers of the liberties of England." The Court of King's Bench was called the Court of Public Bench; and so cautious on this head, it is said, were some of the republicans, that, in reciting the Lord's prayer, they would not say, "thy kingdom," but "thy commonwealth, come." The king's statue in the exchange was thrown down; and on the pedestal these words were inscribed, Exit tyrannus, regum ultimus, " The tyrant is gone, the last of the kings." The merit or demerit of thus erecting a commonwealth on the ruins of the monarchy belongs chiefly to Cromwell, Ireton, Bradshaw, and Marten, who by their superior influence guided and controlled the opinions and passions of their associates in the senate and the army.

The Commons next proceeded to punish those who had been most remarkable for their attachment to their late sovereign. The Duke of Hamilton, Lord Capel, and the Earl of Holland, were condemned and executed; the Earl

afterwards pardoned. These executions greatly irritated wealth. the Scots; and the insolence of the Independents, with their victories, inflaming them still more, they determined to acknowledge Prince Charles as their king, but at the same time to abridge his power by limitations similar to those which they had attempted to impose upon his father. But as Argyll and the more rigid Covenanters still predominated, they made their loyalty conditional on his own good behaviour. The first propositions were made to Charles at Paris, where he had passed some time in hopes of obtaining assistance; and renewed offers were made to him at Breda, to which place he had withdrawn on finding France indisposed to lend him any aid. But as he had by this time commanded Montrose to attempt a descent in his favour upon Scotland by force of arms, he, with the characteristic duplicity of his race, protracted the negociations until the result of this enterprise should be known. With arms and money furnished by Sweden and Denmark, and accompanied by about six hundred Germans, Montrose, accordingly, arrived in Orkney from Hamburg, and by a compulsory levy of the islanders, raised his force to fourteen hundred men. He then passed over to the mainland of Scotland, where the people, remembering his former cruelties, fled in horror before him. But his career was destined to be a short one. Having advanced beyond the pass of Invercarron, his motley band was surprised by a superior force, surrounded, beaten, and dispersed. Montrose contrived to effect his escape, but having thrown himself on the protection of Macleod of Assynt, he was betrayed by that worthy for a thousand bolls of meal, and being brought prisoner to Edinburgh, he was condemned on his former attainder to be hanged for the space of three hours on a gibbet thirty feet in height, and his limbs were ordered to be stuck up in the principal towns of the kingdom; his head on a spike in Edinburgh, his arms on the gates of Perth or Stirling, his legs on those of Glasgow and Aberdeen, and his body to be interred by the hangman in Boroughmuir, unless the sentence of excommunication by the kirk were previously relaxed. Montrose's defeat and death, however, were productive only of a further limitation of the terms offered to Charles; and as he no longer refused to accept these conditions, and to take the covenant, if required to do so, he embarked with his court in a Dutch fleet, and arrived at the mouth of the Spey. But as the jealousy of the Scots had been roused by the late invasion, the covenant was exacted from him before he was suffered to land. His English attendants, with the exception of a few complying persons, who accommodated themselves to the times, were dismissed; and he was surrounded by the fanatical clergymen, who, though they approached his person in the most respectful manner, launched out in continual invectives on the iniquity of his father's house, the idolatry of his mother, and his own connection with inveterate malignants. Charles pretended to listen to their discourses, but nevertheless made an attempt to escape. Being overtaken, however, and brought back, he owned the greatness of his fault, and testified his repentance for what he had done.

Cromwell, in the mean time, having been appointed by the parliament to command the army in Ireland, prosecuted the war in that kingdom with his usual success. He had to encounter the royalists commanded by the Duke of Ormond, and the native Irish led on by O'Neale. But he quickly overcame their force; and most of the towns, intimidated by his energy, opened their gates at his approach. He was on the point of reducing the whole kingdom, when he was recalled by the parliament to defend his country against the Scots, who had raised a considerable army in support of the royal cause.

Common-

As Fairfax had conscientiously declined to draw his shires still held out against this approximation of parties, Commonsword against the Presbyterians of Scotland, Cromwell received the command of the forces destined to invade that kingdom, and, in a month from the time of the king's arrival, he was on the banks of the Tweed at the head of sixteen thousand veteran troops. Argyll, then at the head of the committee of estates, made the most vigorous preparations for his reception; while Leslie, who had never yet been beaten, opposed his great experience and cool sagacity to the genius of Cromwell. The latter, having established between Edinburgh and Leith a fortified camp, as a secure rallying point, wasted the Merse and the Lothians, in order to deprive Cromwell of subsistence; and when forced at length to retire within his entrenchments, he remained resolutely on the defensive, in spite of every expedient tried by his adversary to draw him out to action. At this time the king arrived at the Scottish headquarters, but his presence having excited the jealousy of the clergy, they ordered him to leave it, and forthwith proceeded to purge the camp of four thousand Malignants and Engagers, the only soldiers of credit and experience in the army; so that being now a host of saints, they concluded, somewhat hastily, that they could not be beaten. In the blindness of their folly, they murmured at their prudent general; and, in the extravagance of their fanaticism, they expostulated with the Lord in prayer on the urgent necessity of his interposition, in order to uphold the kirk, and deliver them from the sectaries. An opportunity of striking a blow to advantage having presented itself on a Sunday, Leslie proposed instantly to attack; but he was prevented by these insane fanatics, who affected great horror at the crime of Sabbath-breaking. Meanwhile Cromwell, straitened for provisions, withdrew his army, now reduced in numbers by sickness, to Dunbar. Leslie followed his movement, and encamped on the heights which command the town, taking care at the same time to occupy the passes by which alone the enemy could retire to Berwick. Cromwell's situation had become now most critical. His adversary's position was too strong to be assaulted with any hope of success; his retreat was intercepted; his provisions were nearly exhausted; sickness was daily thinning his ranks; destruction brooded over him. But the madness of the clergy restored the ascendency of this extraordinary man's fortune, and snatched from Leslie the fruits of his masterly combinations, when he was on the very eve of reaping them in a bloodless harvest of victory. They had been wrestling with the Lord in prayer, as they termed it, and pretending some special revelation, they now fancied that they had obtained the victory, and that the heretical army, together with Agag their general, would forthwith be delivered into their hands. These holy idiots, accordingly, forced their general to descend to the plain, and to attack the English. When Cromwell discovered through his glass that the Scots were actually in motion, he exclaimed, "They are coming down; the Lord hath delivered them into our hands." His anticipation was speedily realised. Descending from the hills during a tempestuous night, which had extinguished their matches, the Scots, consisting entirely of raw undisciplined levies, were overthrown at the first onset by the veteran troops of Cromwell, who had been carefully sheltered from the storm; three thousand were slain, nine hundred made prisoners, and the remainder dispersed, whilst the loss of the English scarcely exceeded forty men.

This disaster, so richly merited, showed, in a striking point of view, the danger of disunion. In a meeting held at Perth, the Scottish parliament accordingly resolved to call in the aid of the Malignants and Engagers, on condition of repentance of past errors; but two of the western

and withdrew from the general levy about five thousand wealth. men. Charles had by this time become thoroughly satisfied that soothing the religious prejudices of the kirk was indispensable to give him a chance of acquiring due preponderance in the state. On the first of January 1651, his coronation was performed with great solemnity at Scone. There, on his bended knees, and with his arm upraised, he swore by the Eternal and Almighty God to observe strictly the two covenants; to establish the Presbyterian government in Scotland and in his own family; to give his assent to acts for establishing it in his other dominions; to rule according to the law of God, and the venerated laws of the land; to abolish and withstand all false religions; and to root out heretics and enemies to the true God, when convicted as such by the kirk. Argyll then placed the crown upon the king's head, an act for which his own was afterwards the forfeit; and having seated him on the throne, both nobility and gentry swore allegiance, "according to the national covenant, and the solemn league and covenant."

In the meanwhile Cromwell was making rapid progress in subduing the kingdom. He had obtained possession of Edinburgh Castle, taken Tantallon by storm, attempted Dumbarton, though without success, and carried many places of inferior note. A severe attack of ague for a time retarded his operations; but in the month of July he marched with his army towards Stirling. The Scots faced him in their entrenched camp at Torwood, and resolved to pursue the same cautious conduct observed by Leslie till it had been so fatally overruled by the clergy. After observing them for a time, Cromwell withdrew to Glasgow, and the Scots took up a position at Kilsyth: he retrograded to Falkirk, and his opponents returned to their camp at Torwood. Both parties had now resumed the respective positions which they had originally occupied; but the aspect of affairs had materially changed. Whilst the attention of the Scots was engaged by the enemy in their front, a body of men had crossed the Frith in boats, and, having fortified a hill near Inverkeithing, were immediately followed by Lambert at the head of a powerful division. Holburn was dispatched from the camp at Torwood, with orders to drive the enemy into the sea; but being suddenly charged by Lambert at the head of a superior force, he was routed and put to flight. Cromwell then transported his army to the left bank of the river, and advanced on the rear of the Scots, who, in consequence, retired from the position which had thus been completely turned. The progress of the English excited the most fearful anticipations in the minds of the Scottish leaders; to Charles it suggested the execution of a project which he had long meditated, namely, to march into England, accompanied by such of his subjects of Scotland as were willing to share in the toils and perils of the enterprise. This scheme was opposed by Argyll and a few other chieftains, who regarded it as utterly desperate; but the king was inflexible; and the rest having expressed their readiness to stake their lives on the issue of the attempt, twelve thousand men began their march from Stirling, in the direction of Carlisle, and gained three days in advance before the movement was discovered.

Cromwell was surprised and embarrassed: he had not calculated on such a daring adventure, and his army was unprepared to follow at a moment's notice. But exerting all the energies of his powerful mind, he quickly assembled a large force, more formidable even for its quality than its numerical strength, and set out in quest of the fugitive invaders, who had met with none of the support upon which they had so confidently reckoned, either from the English royalists or Presbyterians. At last the Scot-

Common- tish army, which had thrown itself into Worcester, was he deliberated about the means of escaping into France; Commonattacked by Cromwell at the head of thirty thousand men, and, after a desperate contest, completely defeated. The battle was fought on the 3d of September 1651, the day on which, twelve months before, the English general had defeated the Scots at Dunbar. In the morning, Fleetwood, who had advanced from Upton to Powick, received orders to force the passage of the Team; whilst Cromwell, in order to preserve his communications, threw a bridge of boats across the Severn at Bunshill, near the confluence of the two rivers. The operations necessarily occupied a considerable time, and at one o'clock in the afternoon the attack was not fully developed. About this time, while Charles with his staff was reconnoitring the positions of the enemy from the tower of the cathedral, a fire of musketry was heard in the direction of Powick. He descended immediately, and riding to the scene of action, ordered Montgomery with a brigade of horse and foot to defend the line of the Team, and oppose the construction of the bridge. But it was now too late. After a hard struggle Fleetwood effected a passage, at the moment when Cromwell, having completed the bridge, moved four regiments to his assistance. The Scots, though attacked by superior numbers, made a gallant resistance, disputing every field and hedge, repeatedly charging with the pike, and struggling to protract the contest in the hope of preventing Fleetwood from effecting a junction with Cromwell. Meanwhile the latter having secured the communication across the river, directed a battery to open upon Fort Royal, a work lately raised to cover the Sidbury gate of the town, and, under cover of its fire, moved his troops in two divisions to Perrywood and Redhill. With great promptitude Charles immediately marched the whole of his disposable infantry, the Duke of Hamilton's troops of horse, and some volunteers, to attack one of these divisions, while the other was still separated from it by the Severn; and fortune smiled on his first efforts. The English militia recoiled from the shock, and some guns were taken by the royalists. But Cromwell had placed in reserve some veteran battalions, who soon restored the battle, and forced the royalists to retreat in their turn. Still they remained unbroken; availing them-Leslie, however, did not appear till it was too late. The infantry, overpowered by superior numbers, were now flying in confusion to the gate protected by the fort. The battle was irretrievably lost. Disorder everywhere prevailed. The enemy assaulted the town on all sides, and, after an whole royalist force.

The king, who had greatly signalised his personal courage during the battle, now entered upon a scene of adventures the most romantic that can be imagined. After cutting off his hair, the better to disguise his person, he worked for some days in the habit of a peasant, making faggots in a wood. He next attempted to retire into Wales, under the conduct of one Pendrel, a poor farmer, who was sincerely attached to his cause; but in this attempt he failed, as every pass was guarded to prevent his escape. Being obliged to return, he met one Careless, who had escaped the carnage at Worcester; and in his company the king was obliged to climb a spreading oak, among the branches of which they lay concealed during the day, while the soldiers of the enemy were heard in pursuit of Colonel Lane, a zealous royalist, in Staffordshire. Here liament, however, gave an evasive answer, and studied to

and Bristol being supposed the most suitable port, it was wealth. resolved that he should ride thither before this gentleman's sister, on a visit to a person who lived in the neighbourhood of that city. During this journey the king every day met with persons whose faces he knew, and at one time passed through a whole regiment of the enemy's army. But on finding that, for a month to come, no ship would sail from Bristol either for France or Spain, he was obliged to go elsewhere for a passage. He therefore repaired to the house of Colonel Wyndham in Dorsetshire, where he was cordially received; and thence pursuing his journey to the sea-side, he once more had a narrow escape at an inn, where he tarried for the night. The day had been appointed for a solemn fast; and a weaver, who had been a soldier in the parliamentary army, was preaching against the king in a little chapel fronting the house. To avoid suspicion, Charles was himself among the audience. But it happened that a smith, of the same principles with the weaver, had been examining the horses belonging to the passengers, and came to assure the preacher that he knew by the fashion of the shoes that one of the strangers' horses came from the north. The preacher immediately affirmed that this horse could belong to no other than Charles Stuart, and instantly went with a constable to search the inn. But the king had taken timely precautions, and left the inn before the constable's arrival. At Shoreham, in Sussex, a vessel was at last found, in which he embarked. He was known to so many, that if he had not set sail at that critical moment, it would have been impossible for him to escape. After forty-one days' concealment he arrived safely at Feschamp in Normandy. No fewer than forty persons of both sexes had at different times been privy to his escape, although a reward of a thousand pounds was offered for his person.

In the mean time Cromwell returned in triumph, leaving Ludlow to improve the victory; and his first care was to depress the Scots, on account of their having "with-stood the work of the gospel," as he called it. An act was passed for abolishing royalty in Scotland, and annexing that kingdom as a province to the English commonwealth. It was, however, permitted to send some memselves of every advantage of ground to check the advance bers to the English parliament; judges were appointed of the enemy, and anxiously expecting the arrival of the to distribute justice; and the people of that country, now cavalry under Leslie, which had remained in the city. freed from the tyranny of the ecclesiastics, were not much

dissatisfied with the government.

All parts of the British dominions being now reduced to perfect subjection to the parliament, they next resolved to chastise the Dutch, who had given some cause for complaint. It happened that Dorislaus, one of the late unavailing struggle in the streets, completed the victory king's judges, being sent by the parliament as their envoy by the capture of the place, and the annihilation of the to Holland, was assassinated by one of the royal party who had taken refuge there; and some time after, Mr St John, appointed their ambassador to that court, was insulted by the friends of the Prince of Orange. These were judged sufficient grounds for a declaration of war against Holland by the commonwealth of England. The parliament's chief dependence lay in the activity and courage of Blake their admiral, who, although he had not entered the navy till late in life, yet surpassed all who went before him in courage and skill. On the other side, the Dutch opposed to him Van Tromp, justly celebrated for his bold and enterprising genius. Many engagements took place between these renowned commanders with various success; but these fierce encounters served rather to show the excellency of the admirals than to determine their superiority. At last the Dutch, who experienced many disadvantages them below. After this he experienced all the varieties by the loss of their trade, and by the total suspension of of famine, fatigue, and pain, till he arrived at the house of their fisheries, were willing to treat of a peace. The par-

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Common-keep their navy on foot as long as they could; rightly but if as the council of state, they must know that the Commonjudging, that while the force of the nation was exerted by sea, it would diminish the formidable power of Cromwell

by land.

But this remarkable man quickly perceived their designs, and, secure in the attachment of the army, resolved to seize the sovereign power. He persuaded the officers to present a petition for payment of arrears and redress of grievances. His orders were obeyed. A petition was drawn up and presented, in which the officers, after demanding their arrears, desired the parliament to consider how many years they had sat, and what professions they had formerly made of their intention to newmodel the house, and establish freedom upon the broadest basis. They alleged, that it was now full time to give place to others; that, however meritorious their actions might have been, yet the rest of the nation had some right, in their turn, to manifest their patriotism in defence of their country. The house was highly offended, and appointed a committee to prepare an act, declaring that all persons who presented such petitions for the future should be deemed guilty of high treason. Against this the officers warmly remonstrated, and the parliament as angrily re-plied. Cromwell, informed of the altercation, started up in the utmost seeming fury, and turning to Major Vernon, cried out " that he was compelled to do a thing that made the very hair of his head stand on end." hastening to the house at the head of three hundred soldiers, and with marks of violent indignation on his countenance, he entered, took his place, and attended to the debates for some time. But when the question was about to be put, he suddenly started up, and, after some general remarks, began to load the parliament with the bitterest reproaches for their tyranny, ambition, oppression, and robbery of the public. Having finished his harangue, he stamped with his foot on the ground, which was the preconcerted signal for the soldiers to enter; and the place was immediately filled with armed men. He then turned, and again addressing himself to the members, said, " For shame, get you gone; give place to honester men, those who will more faithfully discharge their trust. You are no longer a parliament; I tell you, you are no longer a parliament; the Lord has done with you." Sir Harry Vane exclaiming against this conduct, "Sir Harry," cried Cromwell with a loud voice, "O Sir Harry Vane; the Lord deliver me from Sir Harry Vane." Then taking hold of one of the members by his cloak, he exclaimed, "Thou art a whoremaster;" to another he said, "Thou art an adulterer;" to a third, "Thou art a drunkard;" to a fourth, "Thou art a glutton;" and afterwards selecting different members in succession, he described them as dishonest and corrupt livers, a shame and scandal to the profession of the gospel. Suddenly checking himself, however, he turned to the guard and ordered them to clear the house. At these words Colonel Harrison took the Speaker by the hands and led him from the chair; Algernon Sidney was next compelled to quit his seat; and the other members, eighty in number, on the approach of the military, rose and moved towards the door. Cromwell now resumed his discourse. "It is you," he exclaimed, "that have forced me to do this. I have sought the Lord both day and night, that he would rather slay me than put me on the doing of this work." Then pointing to the mace, " Take away that fool's bauble," cried he; after which he cleared the hall, ordered the doors to be locked, and putting the keys usual place of meeting. As Bradshaw took the chair, however, the lord-general entered and told them, that if years." they were there as private individuals they were welcome,

parliament was dissolved, and with it also the council. wealth. "Sir," replied Bradshaw, with the spirit of an ancient Roman, "we have heard what you did at the house this morning, and before many hours all England shall know it. But, sir, you are mistaken in thinking that the parliament is dissolved. No power under heaven can dissolve them but themselves. Therefore take you notice of After this protest they withdrew. But the decisive blow had been struck. By the parricidal hands of its own children perished the long parliament, which, under a variety of forms, had for more than twelve years defended and invaded the liberties of the nation. It fell without a struggle, unpitied and unregretted. The members slunk away to their homes, where, by submission, they sought to purchase the forbearance of their new master; while their partisans, if such they had, reserved themselves in silence for the day of retribution, which, however, came

not until after Cromwell slept in his grave.

The whole civil and military power of the state now centred in Cromwell, who, by this bold transaction, became, in effect, king of Great Britain, with uncontrollable authority. Desirous, however, to amuse the people with the form of a commonwealth, he proposed to give his subjects a parliament, but such a one as should be altogether obedient to his commands. For this purpose it was decreed that the sovereign power should be vested in a hundred and fortyfour persons, under the denomination of a parliament; and the lord-general undertook to select them himself. persons pitched upon were the lowest, meanest, and most ignorant of the citizens, and the very dregs of the fanatics. To go farther than others in the absurdities of fanaticism was the chief qualification upon which each of these valued himself. Their very names, borrowed from scripture, and rendered ridiculous by their misapplication, served to show their excess of folly. One of them particularly, a canting leather-seller, called Praise-God-Barebone, gave his name to this odd assembly, which was called Barebone's Parliament. They were principally composed of Antinomians, a sect which, after receiving the spirit, supposed themselves incapable of error, and fifth-monarchy men, who every hour expected Christ's second coming on earth. They began by choosing eight of their number to seek the Lord in prayer, while the rest calmly sat down to deliberate upon the suppression of the clergy, the universities, and courts of justice; and besides all this, it was their intention to substitute the law of Moses in the room of the law of the land.

It was impossible such a legislature as this could stand; even the vulgar exclaimed against it, and Cromwell himself began to be ashamed of its absurdities. He had carefully chosen many persons among the members who were entirely devoted to his interests, and these he commanded to dismiss the assembly. They accordingly met by concert earlier than the rest of their fraternity; and observing to each other that this parliament had sat long enough, they hastened to Cromwell, with Rouse, their Speaker, at their head, and into his hands resigned the authority with which he had invested them. Cromwell accepted their resignation with pleasure; but being told that some of their number showed themselves refractory, he sent Colonel White to clear the house of such as ventured to remain there. They had placed one Moyer in the chair by the time the colonel arrived; and he being asked by the colonel what they did there, replied very gravely, That in his pocket, returned to Whitehall. In the afternoon they were seeking the Lord. "Then you may go elsethe members of the council of state assembled at their where," rejoined Colonel White, " for, to my certain knowledge, the Lord hath not been here these many

This shadow of a parliament being thus dissolved, the

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wealth.

Common- officers, by their own authority, declared Cromwell proaldermen were sent for to give solemnity to his appointment, and he was installed into his new office at Whitehall, in the palace of the kings of England. He was to be addressed by the title of Highness; and his power was proclaimed in London, and in other parts of the kingdom. It was now, indeed, in a great measure necessary that some person should take the supreme command; for affairs had been brought into such a situation, by the furious animosities of the contending parties, that nothing short of absolute power could prevent a renewal of bloodshed and confusion. The government of the kingdom was adjusted in the following manner. A council was appointed, which was not to exceed twenty-one, nor fall below thirteen persons, who were to enjoy their offices for life, or during good behaviour; and, in case of a vacancy, the remaining members were to name three, of whom the protector was to choose one. The protector was appointed the supreme magistrate of the Commonwealth, with powers such as the king was formerly possessed of. The power of the sword was vested in him jointly with the parliament when sitting, or with the council at other times. He was obliged to summon a parliament once every three years, and to allow them to sit five months without adjournment. The standing army was fixed at twenty thousand foot and ten thousand horse, and funds were assigned for their support. The protector was to enjoy his office for life, and on his death his place was to be supplied by the council. Of all these clauses, that in regard to the standing army was alone sufficient for Cromwell's purpose; for, while possessed of that instrument, he could at any time mould the rest of the constitution to his pleasure. He chose his council from among his officers, who had been the companions of his dangers and victories, and to each of them he assigned a pension of a thousand pounds a year. He took care to have his troops, upon whose fidelity he depended for support, paid a month in advance. The magazines were also well provided, and the public treasure was managed with frugality and attention; whilst by his activity, vigilance, and resolution, he discovered every conspiracy against his person, and every plot for an insurrection, before they took effect.

Thus Cromwell continued to govern, though without assuming the title of king, in as absolute a manner as the most despotic prince in Europe. As he was feared at home, so he made himself respected abroad. The Dutch, humbled by repeated defeats, were obliged to sue for peace; to consent to pay deference to the British flag; to abandon the interests of the king; to pay L.85,000 as an indemnification for former expenses; and to restore to the English East India Company a part of those dominions which they had been dispossessed of by the Dutch during the former reign. The ministry of France thought proper to pay court to the protector; and as he had furnished that court with a body of six thousand men to attack the Spanish dominions in the Netherlands, the French put Dunkirk into his hands as a reward for his attachment. By means of the fleet under Blake he humbled Spain and chastised the Algerines and Tunisians. Penn and Venables, two other admirals, made an attempt on the island of Hispaniola; but failing in this, they steered to Jamaica, which was surrendered to them without a blow. Yet so little was thought of this conquest at the time, that, on their return, the two admirals were committed to the Tower, by reason of the failure of the principal object of their expedition.

It is not to be supposed that a numerous standing army could be maintained, and so many foreign wars carried on, without incurring extraordinary expenses. In fact, the peared at that time, or which have since been published,

protector's revenues were so much exhausted, that he was Common. tector of the Commonwealth of England. The mayor and obliged to have recourse to methods which he probably would not have chosen had he not been driven to them by necessity. One or two royalist conspiracies, though detected and punished, served him as a pretext for imposing a tax upon that party, of the tenth penny on all their possessions; and in order to raise this oppressive impost, ten major-generals were instituted, who divided the whole kingdom into as many military jurisdictions. They had power to subject whom they pleased to this tax, and to imprison such as denied their jurisdiction. Under colour of these powers they exercised the most arbitrary authority; the people had no protection against their exactions; the very mask of liberty was entirely thrown off; and all property was placed at the disposal of a military tribunal. It was in vain that the nation cried out for a free parliament. Cromwell assembled one in consequence of their clamours, but as speedily dissolved it when he found it refractory to his commands. At last, as parliaments were always held in such estimation by the people, he resolved to give them one, but such as should be entirely of his own choosing, and chiefly composed of his creatures. Lest any of a different description should enter the house, guards were placed at the doors, and none admitted but such as produced a warrant from his council.

> The principal design of convening this assembly was to offer him the crown, with the title of king, and all the other ensigns of royalty. His creatures, therefore, took care to insinuate the confusion which existed in legal proceedings without the name of a king; that no man was acquainted with the extent or limits of the authority of the present magistrates; but that those of a king had been well ascertained by the experience of ages. The motion was at last formally made in the house, easily carried through, and nothing seemed now wanting but Cromwell's own consent to have his name enrolled among those of the kings of England. This consent, however, he had not resolution enough to give. His doubts continued for some days; and the conference carried on with the members who had made him the offer, as far as it is intelligible on his part, seems to argue that he was desirous of being compelled to accept the offer. The conference, however, terminated in his total refusal.

But with all these proffered honours, and with all his despotic power, the situation of Cromwell was far from being enviable. Perhaps no situation, however mean or contemptible, was more truly distressing than his, even at the time when the nation was loading him with congratulations and addresses. He had at last rendered himself hateful to every party, and he owed his safety solely to their mutual hatred and distrust. His arts of dissimulation were exhausted; none could be any longer deceived by them; and even those of his own party and principles disdained the use to which he had converted his zeal and professions. Though the whole nation silently detested his administration, he would not have been completely wretched if he could have found domestic consolation. But even his own family had embraced republican principles with so much vehemence, that they could not without indignation behold him invested with uncontrolled power; and even Mrs Claypole, his favourite daughter, upbraided him, on her death-bed, with all the crimes by which he had waded "through slaughter to a throne." To aggravate all this, conspiracies were formed against him; and it was at last openly taught, that his death was not only desirable, but that his assassination would be meritorious. A book was published by one Colonel Titus, a man who had formerly been attached to his cause, entitled "Killing no Murder." Of all the pamphlets which ap-

Common- this was one of the most masterly. Cromwell read it, and science. At length he yielded; but it was not till he had Commonwealth. is said never to have smiled afterwards.

The protector now found, that the grandeur to which he had sacrificed his former tranquillity was only an inlet to fresh inquietudes. He was haunted with perpetual apprehensions of assassination. He wore armour under his clothes, and always kept pistols in his pockets. His aspect was clouded by a settled gloom, and he regarded every stranger with suspicion. He was always attended by a numerous guard, and generally travelled in a hurry. He never returned from any place by the road he went; and never slept above three nights together in the same chamber. At last, however, he was delivered from this life of horror and anxiety by a tertian ague, of which he died on the 3d of September 1658, after having held the

reins of government nine years.1

"Till the commencement of the present century," says Dr Lingard, "when that wonderful man arose who, by the splendour of his victories and the extent of his empire, cast all preceding adventurers into the shade, the name of Cromwell stood without a parallel in the history of civilized Europe. Menlooked with a feeling of awe on the fortunate individual who, without the aid of birth, wealth, or connections, was able to seize the government of three powerful kingdoms, and to impose the yoke of servitude on the necks of the very men who had fought in his company to emancipate themselves from the less arbitrary sway of their hereditary sovereigns. That he who accomplished this was no ordinary person, all must admit; and yet, on close investigation, we shall discover little that was sublime or dazzling in his character. Cromwell was not the meteor which surprises and astounds by the brilliancy and rapidity of its course. Cool, cautious, calculating, he stole on with slow and measured pace, and, while with secret pleasure he toiled up the ascent to greatness, laboured to persuade the spectators that he was reluctantly borne forward by an exterior and resistless force, by the march of events, the necessities of the state, the will of the army, and even the decree of the Almighty. He looked upon dissimulation as the perfection of human wisdom, and made it the key-stone of the arch on which he built his fortunes. The aspirations of his ambition were concealed under the pretence of attachment to the 'good old cause;' and his secret workings to acquire the sovereignty for himself and his family were represented as endeavours to secure for his former brethren in arms the blessings of civil and religious freedom, the two great objects which originally called them into the field. Thus his whole conduct was made up of artifice and deceit. He laid his plans long beforehand; he studied the views and dispositions of all from whose influence he had anything to hope or to fear; and he employed every expedient to win their affections, and to make them the blind unconscious tools of his policy. For this purpose he asked questions, or threw out insinuations in their hearing; now kept them aloof with an air of reserve and dignity; now put them off their guard by condescension, perhaps by buffoonery; at one time addressed himself to their vanity or avarice, at another exposed to them with tears (for tears he had at will) the calamities of the nation; and then, when he found them moulded to his purpose, instead of assenting to the advice which he had himself suggested, feigned reluctance, urged objections, and pleaded scruples of con-

acquired by his resistance the praise of moderation, and wealth. the right of attributing his acquiescence to their impor-

tunity rather than to his own ambition.

1658.

"Exposed as he was to the continual machinations of the royalists and levellers, both equally eager to precipitate him from the height to which he had attained, Cromwell made it his great object to secure to himself the attachment of the army. To it he owed the acquisition, through it alone could he insure the permanence, of his power. Now, fortunately for his purpose, that army, composed as never was army before or since, revered in the lord-protector what it valued mostly in itself, the cant and practice of religious enthusiasm." " In minds thus disposed, it was not difficult to create a persuasion that the final triumph of 'their cause' depended on the authority of the general under whom they had conquered; while the full enjoyment of that religious freedom which they so highly prized rendered them less jealous of the arbitrary power which he occasionally assumed. In his public speeches he perpetually reminded them, that if religion was not the original cause of the late civil war, 'yet God soon brought it to that issue;' that amidst the strife of battle, and the difficulties and dangers of war, the reward to which they looked was freedom of conscience; that this freedom to its full extent they enjoyed under his government, though they could never obtain it till they placed the supreme power in his hands. The merit which he thus arrogated to himself was admitted to be his due by the great body of the saints: it became the spell by which he rendered them blind to his ambition and obedient to his will; the engine by which he raised, and afterwards secured, the fabric of his power.

" On the subject of civil freedom the protector could not assume so bold a tone. He acknowledged, indeed, its importance; it was second only to religious freedom: but if second, then, in the event of competition, it ought to yield to the first. He contended that under his government every provision had been made for the preservation of the rights of individuals, as far as was consistent with the safety of the whole nation. He had reformed the chancery, he had laboured to abolish the abuses of the law, he had placed learned and upright judges on the bench, and he had been careful in all ordinary cases that impartial justice should be administered between the parties. This was indeed true; but it was also true that by his orders men were arrested and committed without lawful cause; that juries were packed; that prisoners, acquitted at their trial, were sent into confinement beyond the jurisdiction of the courts; that taxes had been raised without the authority of parliament; that a most unconstitutional tribunal, the high court of justice, had been established; and that the major-generals had been invested

with powers the most arbitrary and oppressive.

"Some writers have maintained that Cromwell dissem-

bled in religion as well as in politics; and that when he condescended to act the part of the saint, he assumed for interested purposes a character which he otherwise despis-But this supposition is contradicted by the uniform tenor of his life. Long before he turned his attention to the disputes between the king and the parliament, religious enthusiasm had made a deep impression on his mind; it continually manifested itself during his long career both

The night on which Cromwell died was stormy. "The violence of the wind increased till it blew a hurricane. Trees were torn from their roots in the park, and houses unroofed in the city. So strange a coincidence could not fail of exciting remarks in a super-stitious age; and though the storm reached to the coasts of the Mediterranean, in England it was universally referred to the death of the protector. His friends asserted that God would not remove so great a man from the world without previously warning the nation of its approaching loss; the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating which has been approached by the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils, 'the princes of the air, were congregating the cavaliers more maliciously maintained that the devils of the princes of the air, were congregating the cavaliers more maliciously maintained that the devils of the princes of the air, were constructed that the cavaliers more maliciously maintained that the devils of the princes of the air, were constructed that the devils of the princes of the air, were constructed that the devils of the princes of the air, were constructed that the devils of the princes of the air was a prince of the princes of the air was a prince of the princes of the air was a prince of the air was a over Whitehall, that they might pounce on the protector's soul." (Lingard, History of England, vol. vii. p. 273. London, 1829, 4to.)

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Common in the senate and the field; and it was strikingly displayed in his speeches and prayers on the last evening of his life. It should, however, be observed, that he made re-

ligion harmonize with ambition."1

Oliver Cromwell was succeeded in his office of protector by his son Richard, who immediately called a parliament. To this assembly the army presented a remonstrance, desiring to have some person appointed for their general in whom they could confide. But the house voted such meetings and remonstrances unlawful; upon which the officers, surrounding Richard's house, forced him to dissolve the parliament; and he soon afterwards signed an abdication of the government. His younger brother Henry, who had been appointed to the command in Ireland, followed Richard's example, and resigned his commission without striking a blow.

The officers, thus left at liberty, resolved to restore the Rump Parliament, as it was called, consisting of that remnant of a parliament which had condemned Charles. But no sooner were they reinstated in authority, than they began to humble the army by cashiering some of the officers, and appointing in their room others on whom they could place more reliance. The officers, accordingly, resolved to dissolve the assembly. For this purpose Lambert, one of the general officers, drew together a chosen body of troops, and, placing them in the streets which led to Westminster Hall, when the Speaker, Lenthal, proceeded in his carriage to the house, he ordered the horses to be turned, and very civilly conducted him home. The other members were likewise intercepted; and the army returned to their quarters to observe a solemn fast, which generally either preceded or attended all their remarkable proceedings. A committee was then elected, of twenty-three persons, of whom seven were officers. These they invested with sovereign authority; and a military government was established, which gave the nation a prospect of endless servitude and tyranny without redress.

Upon learning that the officers had by their own authority dissolved the parliament, General Monk, who was then in Scotland with eight thousand veteran troops, protested against the measure, and resolved to defend the national privileges. As soon as he had put his army in motion, he found himself eagerly courted by all parties; but so cautious was he of declaring his mind, that, till the very last, no one knew which side he would take. As a remarkable instance of this politic or hesitating behaviour, when his own brother came to him with a message from Lord Granville in the name of the king, he refused all conversation with him upon hearing that he had told his errand to Mr Price, the general's own chaplain, and a man

of known probity and honour.

Informed that the officers were preparing an army to oppose him, Monk amused them with negociations; and the people, finding themselves not entirely defenceless, began to declare for a free parliament. The Rump, being invited by the navy and part of the army, again ventured to resume their seats, and to thunder votes in their turn against the officers and that party of the army by which they had been ejected. Without taking any notice of Lambert, they sent orders to the troops to repair immediately to the garrisons appointed for them. The soldiers obeyed; and Lambert at last found himself deserted by his whole army. Monk in the mean time proceeded with his army to London. The gentry, on his march, flocked round him with addresses, expressing their desire of a new taciturnity, at last reached to St Alban's, within a few miles

of the capital, leaving all the world in doubt as to his mo- Commontives and designs. Here he sent the parliament a mes- wealth. sage, desiring them to remove such forces as remained in London to country quarters. Some of the regiments willingly obeyed this order; and such as did not, Monk turned out by force; after which he took up his quarters in Westminster. The house voted him thanks for his services. He desired them to call a free parliament; and this soon inspired the citizens with courage to refuse submission to the present government. They resolved to pay no taxes until the members formerly excluded by Colonel Pride should be replaced. But for this they were punished by Monk, at the desire of the parliament. He arrested eleven of the most obnoxious of the common council; broke the gates and portcullises, and, having exposed London to the scorn and contempt of all who hated it, he returned in triumph to his quarters at Westminster. The next day, however, he made an apology for this conduct, and promised for the future to co-operate with the mayor and common-council in such schemes as they should ap-

The Commons were now greatly alarmed. They tried every method to detach the general from his new alliance; some of them even promised to invest him with the dignity of supreme magistrate, and to support his usurpation. But Monk was too cunning or too wise to hearken to such proposals; he resolved to restore the secluded members, and by their means to bring about a new election. The restoration of the expelled members was easily effected; and their number was so much superior to that of the Rump, that the chiefs of this last party now withdrew in their turn. The restored members began with repealing all the orders by which they had been expelled. renewed and enlarged the general's commission; fixed a proper stipend for the support of the fleet and army; and, having passed these votes, dissolved themselves, giving orders for the immediate assembling of a new parliament. Meanwhile Monk new-modelled his army to the purposes he had in view; and some officers, by his direction, presented him with an address, in which they promised to obey implicitly the orders of the ensuing parliament. He approved of this engagement, which he ordered to be signed by all the different regiments; and this furnished him with a pretence for dismissing all the officers by whom it was rejected.

In the midst of these transactions, Lambert, who had been confined in the Tower, escaped from prison, and began to raise forces; and as his activity and principles were sufficiently known, Monk took prompt measures to oppose his proceedings. He dispatched Colonel Ingoldsby, with his own regiment, against Lambert, before the latter had time to assemble his dependents. With four troops of horse Lambert had taken possession of Daventry; but the greater part of them having joined Ingoldsby, Lambert also surrendered, not without exhibiting strong marks of

pusillanimity.

All this time Monk still persisted in his reserve; nor had he intrusted his secret intentions to any person except one Morris, a gentleman of Devonshire. The latter was of a sedentary and studious disposition; and with him alone had the general deliberated on the great and dangerous enterprise of the restoration. Sir John Granville, who had a commission from the king, applied for access to the general; but he was desired to communicate his business to Morris. Granville refused, though twice urged, parliament; but that general, still continuing his inflexible to deliver his message to any but the general himself; upon which Monk, finding he could depend on this mi1660.

Spanish territories, but very narrowly escaped being detained at Breda by the governor, under pretence of treating him with proper respect and formality. From this he retired to Holland, where he resolved to wait the course of events.

The new parliament being assembled, Sir Harbottle Grimstone was chosen Speaker, a man known to be a royalist in his heart. The eyes of all were now turned towards the king; yet such were their fears, and such the dangers which attended freedom of speech, that for some days no one ventured to make any mention of his name. At length Monk gave directions to Annesley, president of the council, to inform them that one Sir John Granville, a servant of the king's, had been sent over by his majesty, and was now at the door with a letter to the House of Commons. After some manœuvring, this message was received, Granville was called in, the letter read, and the king's proposals accepted of. He offered a general amnesty to all persons whatsoever, and that without any other exceptions than should be made by parliament. He promised to indulge scrupulous consciences with liberty in matters of religion; to leave to the examination of parliament the claims of all such as possessed lands with contested titles; to confirm all these concessions by act of parliament; to satisfy the army under General Monk with respect to their arrears; and to give the same rank to his officers when they were enlisted in the king's army.

In consequence of this agreement between the king and the parliament, Montague, the English admiral, waited on Charles, to inform him that the fleet expected his orders at Scheveling. The Duke of York immediately went on board, and took the command as lord high admiral. The king embarked without delay, and landing at Dover, was received by Monk, whom he honoured with particular marks of attention. He entered London on the 29th of May 1660, which was his birth-day; and was attended by a great number of people, who testified their joy, as the multitude commonly do on such occasions, by loud accla-

"That the re-establishment of royalty was a blessing to the country," says Dr Lingard, "will hardly be denied. It presented the best, perhaps the only, means of restoring public tranquillity, amidst the confusion and distrust, the animosities and hatreds, the parties and interests, which had been generated by the civil war, and by a rapid succession of opposite and ephemeral governments. To Monk belongs the merit of having, by his foresight and caution, effected this desirable object without bloodshed or violence: but to his dispraise it must also be recorded, that he effected it without any previous stipulation on the part of the exiled monarch. Never had so fair an opportunity been offered of establishing a compact between the sovereign and the people, of determining by mutual consent the legal rights of the crown, and securing from future encroachment the freedom of the people. That Charles would have consented to such conditions, we have sufficient evidence; but when the measure was proposed, the lord-general declared himself its most determined opponent. It may have been that his cautious mind figured to itself danger in delay; it is more probable that he sought to give additional value to his services in the eyes of the new sovereign. But, whatever were the motives of marle. Morris, the general's friend, was appointed sehis conduct, the result was, that the king ascended the cretary of state. The choice which the king at first made

Common- nister's secrecy, opened to him his whole intentions, but, that he was entitled to all the powers claimed by his fa- Reign of with his usual caution, refused to commit any thing to pa- ther at the commencement of the civil war. In a few Charles IL per. In consequence of these overtures the king left the years the consequence became manifest. It was found that by the negligence or perfidy of Monk a door had been left open to the recurrence of dissension between the crown and the people; and that very circumstance which Charles had hailed as the consummation of his good fortune, served only to prepare the way for a second revolution, which ended in the permanent exclusion of his family from the government of these kingdoms."1

### CHAP. VI.

#### REIGN OF CHARLES II.

Charles II.—His first measures popular.—The regicides punished .- Indignities offered to the remains of Cromwell, Ireton, and Bradshaw.—Death of the Duke of Gloucester.—Parliament dis-solved.—State of the nation.—Profligacy and ingratitude of the King.—Slavish disposition of Parliament.—King's extravagance.

—Marriage with the Infanta of Portugal.—War with the Dutch.

—Naval engagements.—Action off Lowestoffe.—Battle of the Four Days.—Negociations.—The Dutch fleet appears in the Medway and the Thames.—Plague in London.—Great Fire.— Peace with Holland .- Clarendon disgraced .- The triple alliance. —Arbitrary proceedings of the King.—The Cabal.—Renewal of the war with Holland.—Desperate naval battle in Southwold Bay.—Successes of the French king against the Dutch.—Meeting of Parliament —Test Act.—Bold procedure of the Commons.—National Discontents.—Popish Plot.—Impeachment of Danby.—Exclusion Bill brought in.—Duke of York returns to England.—Petitioners and Abhorrers.—Whig and Tory.—Attempt to establish Episcopacy in Scotland.—Persecution of the Presbyterians.—Rising at Pentland.—Insurgents defeated.—Crueltica exercised by Arghhishop. Sharps Associated Scotlands.—Sharps Control Control of the Presbyterians.—Rising at Pentland.—Insurgents defeated.— Cruelties exercised by Archbishop Sharpe.—Act against Conventicles.-Scheme of Comprehension and Indulgence.-The King takes out lawburrows against his subjects.—Letters of Intercommuning.—Trial and execution of James Mitchell.—Infamous conduct of the Privy Council.—Murder of Archbishop Sharpe.—Second Insurrection.—Insurgents defeated at Bothwell Bridge.—Parliamentary proceedings.—Parliament dissolved, and a new one summoned to meet at Oxford.—Case of Fitzharris.—Parliament dissolved.—Arbitrary proceedings of the King.—Fitzharris condemned and executed.—Spies, informers, suborners, and plotters.-Bill of indictment against Shaftesbury ignored by the Grand Jury.—Affairs in Scotland.—Cameron and Cargill declare war on the government.—Skirmish at Airmoss.—Cargill excommunicates the King and the Ministers at Torwood.—Subsequent atrocities.—Insidious and diabolical proceeding of the Council.—Trial of the Earl of Argyll.
—London deprived of its Charters.—Compositions entered into
by other Corporations.—Designs against the King.—The Ryehouse Plot.—Consequent proceedings.—Death of Charles II.— His character.

Charles II. was thirty years of age at the time of his restoration. Being naturally of an engaging countenance; and possessed of an open, affable disposition, he became a favourite with all classes of his subjects. They had now experienced all the miseries of anarchy, and in proportion to these was the satisfaction they felt on the accession of the young monarch. His first measures were also calculated to give general satisfaction. He seemed desirous of obliterating the memory of past animosities, and of uniting every party in affection for their prince and country. He admitted into his council the most eminent men of the nation, without regard to former distinctions. The Presbyterians shared this honour equally with the royalists. Calamy and Baxter, presbyterian clergymen, were even made chaplains to the king. Admiral Montague was created Earl of Sandwich, and General Monk Duke of Albethrone unfettered with conditions, and thence inferred of his principal ministers and favourites, was, in like man-

Reign of ner, popular. Sir Edward Hyde, created Earl of Claren- tracted struggle they carried their point; the unhappy Reign of Charles II. don, was made prime minister and chancellor; the Marquis, created Duke of Ormond, was named steward of the household; the Earl of Southampton became high-treasurer; and Sir Edward Nicholas secretary of state. These men, united in the strictest bonds of friendship, supported each other's credit, and for a time steadily pursued the interests

of the public.

The parliament having been summoned without the king's consent, received at first only the title of a Convention; and it was not until after an act had passed for that purpose that they were acknowledged by the name of a Parliament. Both houses acknowledged the guilt of the former rebellion, and gratefully received in their own name, and in that of all the subjects, his majesty's gracious pardon and indemnity. The king having before promised an indemnity to all criminals, excepting such as should be excluded by parliament, he now issued a proclamation, declaring, that such of the late king's judges as did not surrender themselves within fourteen days should receive no pardon. Nineteen surrendered themselves; some were taken in their flight; and others escaped beyond sea. The Peers seemed inclined to great severity on this occasion, but were restrained by the king, who, in terms apparently the most earnest, pressed the act of general indemnity.

After repeated solicitations, the act of indemnity passed both houses, with the exception of those who had an immediate hand in the king's death. Even Cromwell, Ireton, and Bradshaw, though dead, were considered as proper objects of resentment. Their bodies were dug from their graves, dragged to the place of execution, and, after hanging some time, buried under the gallows. Of the rest who had sat in judgment on the late monarch's trial, some were dead, and others thought worthy of pardon. Ten only out of eighty were doomed to immediate destruction. These were enthusiasts who had all along acted from principle, and who, in the general spirit of rage excited against them, showed a fortitude which would have done honour to any cause.

This was all the blood that was shed at the restoration. The rest of the king's judges were reprieved, and afterwards dispersed in several prisons. The army which had for so many years governed the nation was now disbanded, and prelacy, with all the ceremonies of the church of England, was at the same time restored; yet the king pretended to preserve the air of moderation and neutrality. In regard to religion, Charles, in his gayer hours, was a professed deist; but in the latter part of his life he showed an inclination to the Catholic persuasion, which he had strongly

imbibed in his infancy and exile.

On the 13th of September this year died the young Duke of Gloucester, a prince of some promise. The king was never so deeply affected by any incident in his life. The Princess of Orange, also, having come to England, in order to share the joy attending the restoration of her family, with whom she lived in great friendship, soon afterwards sickened and died. The queen-mother paid a visit to her son, and obtained his consent to the marriage of the Princess Henrietta with the Duke of Orleans, brother to the French king. The parliament having met on the 6th of November, and carried on business with the greatest unanimity and dispatch, was dissolved by the king on the 29th of December 1660.

During the reign of Charles II. the spirit of the people seemed to take a turn quite opposite to that which it had exhibited in the time of his father. The latter found his subjects animated with a fierce though often ill-regulated zeal for liberty. They knew not what it was to be free, and therefore imagined that liberty consisted in throwing off entirely the royal authority. After a bloody and pro-

monarch was dethroned and put to death; but instead of Charles II. liberty they found themselves involved in the meshes of a more formidable tyranny than that which they had overthrown. From this, however, they were freed by the restoration; but they now ran into the contrary extreme; and instead of an unbounded spirit of opposition, there was nothing but an unbounded spirit of submission, through which Charles at length found means to render himself almost quite absolute, and to govern without requiring, or indeed without having any occasion for, parliaments. A similar revolution, or rather revulsion, took place in matters connected with religion. During the former reigns a spirit of the most gloomy enthusiasm had overspread the whole island, and men imagined that the Deity was only to be appeased by their denying themselves all social pleasure, and resisting every thing which tended to make life agreeable. The proceedings of Cromwell and his associates, to say nothing of the conduct of others, showed that this was not genuine religion; but, in avoiding one error, they ran into another equally dangerous. Every thing religious or serious was now discountenanced; riot and dissipation everywhere prevailed. The court set the example. Nothing but scenes of gallantry and festivity were to be seen; the horrors of the late war became the subject of ridicule; the formality of the sectaries was displayed on the stage, and even laughed at from the pulpit; in a word, the best mode in religion now was to have as little as possible, and, in deriding the hypocrisy of the sectaries, to transgress even the common duties of morality. In the midst of this riot and dissipation, the old and faithful followers of the royal family were left unrewarded. Numbers who had fought both for the king and his father, and had lost their whole fortunes in his service, were suffered to pine in want and oblivion; whilst their persecutors, who had acquired fortunes during the civil war, were permitted to enjoy them without molestation. The wretched royalists petitioned and murmured in vain. The monarch fled from their expostulations to scenes of mirth and festivity: and the act of indemnity was with some reason described as an act of forgiveness to the king's enemies, and of oblivion to his friends.

In 1661 the Scottish and English parliaments vied with each other in protestations of loyalty and attachment to the king. In England, monarchy and episcopacy were raised to the greatest splendour. The bishops were permitted to resume their seats in the House of Peers, and all military authority was acknowledged to be vested in the king. He was empowered to appoint commissioners for regulating corporations, and expelling such members as had intruded themselves by violence, or professed principles dangerous to the constitution. An act of uniformity was passed, by which it was required that every clergyman should be re-ordained, if he had not before received episcopal ordination; that he should declare his consent to every thing contained in the Book of Common Prayer, and should take the oath of canonical obedience. In consequence of this law, above two thousand of the presbyterian clergy resigned their cures at once. In Scotland the right of the king was asserted in the fullest and most positive terms to be hereditary, divine, and indefeasible. His power was extended to the lives and possessions of his subjects, and his original grant was held to be the source whence all that they enjoyed was derived. They voted him an additional revenue of L.40,000; and all the former violences were spoken of in terms of the utmost detestation.

But this intoxication of loyalty soon began to wear off. The king's profusion and extravagance in his pleasures, together with his indolence in administration, furnished Reign of opportunities of making very disadvantageous comparisons ed with laurel or with cypress." Early in the morning of Reign of Charles II. between him and Oliver Cromwell. And these dispositions the 3d the hostile fleets descried each other near Lowes-Charles II. were increased by the ejectment of so many ministers, and seven hours were spent in attempts on each and also by observing Dunkirk, which had been acquired to the togain the weather-gage. At length the English, 1665.

during Cromwell's vigorous administration, sold to the French for L.40,000, and that merely to supply the king's extravagance. From this time, August 1662, Charles found himself perpetually opposed; and his parliaments granted

supplies much more reluctantly than before.

A few months previously, the continual exigencies of the king had forced him to conclude a marriage with the Infanta of Portugal, for the sake of her portion, which was to be L.500,000 in money, together with the fortress of Tangier in Africa, and that of Bombay in the East Indies. The Lord Chancellor Clarendon, and the Dukes of Ormond and Southampton, urged many reasons against this match, particularly the likelihood of her never having any children; but all their objections were fruitless, and therefore Clarendon, like a true courtier, set himself to promote it as far as lay in his power. But the king's necessities being still greater than his supplies could meet, he resolved to sacrifice his minister, Clarendon, to the resentment of the parliament, to whom he had become obnoxious, in order to procure more money. In 1663 an extraordinary supply was demanded. On the 12th of June the king sent for the Commons to Whitehall; and having complained of their inattention, he informed them of a conspiracy which had been formed to seize the castle of Dublin, hoping by this means to furnish a reason for demanding a present supply. The artifice succeeded. Four subsidies were immediately granted, and the clergy in convocation followed the example of the Commons. On this occasion the Earl of Bristol ventured to impeach the Chancellor in the House of Peers; but as he did not support his charge, the affair was dropped for the present.

In 1664 Charles was induced to declare war against the Dutch, with the view, probably, of getting the money to be employed for that purpose into his own hands. In this war the English, under the command of Sir Robert Holmes, expelled the Dutch from Cape Coast Castle in Africa, and likewise seized on their settlements of Cape Verd and the Isle of Goree. Sailing thence to America, the admiral took possession of Nova Belgia, since called New York, and long afterwards a dependency of Britain. On the other hand, De Ruyter, the Dutch admiral, dispossessed the English of all their settlements in Guinea except Cape Coast. He afterwards sailed to America, where he attacked Barbadoes and Long Island, but was

at last repulsed.

At length a battle between the grand fleets of each nation was fought near Lowestoffe on the 3d of June 1665, the one under the Duke of York, to the number of a hundred and fourteen sail; the other commanded by Opdam, admiral of the Dutch navy, of nearly equal force. The English fleet was divided into three squadrons; the red, under the command of the duke; the white, under that of Prince Rupert; and the blue, under the Earl of Sandwich. James hoisted his flag on board the Royal Charles. The Dutch fleet sailed in seven divisions, comprising one hundred and thirteen ships. The bravest and noblest of the Dutch youths had repaired on board to share the dangers of the expedition; and as the admiral had received positive orders to fight, every heart beat high with the hope of victory. But Opdam did not share this confidence. In the inexperience of many of his captains, and the insufficiency of their crews, this able seaman discovered enough to make him doubt the result of the coming battle; and to those near him he observed, "I know what prudence would suggest; but I must obey my orders, and by this time to-morrow you shall see me crown-

the 3d the hostile fleets descried each other near Lowes-Charles IL toffe, and seven hours were spent in attempts on each side to gain the weather-gage. At length the English, tacking in the same direction as the enemy, soon pushed alongside of them, in a parallel line, upon which the signal was made for each ship to bear down and engage her opposite in the enemy's fleet. The sea was calm and the sky cloudless, but a slight breeze which blew from the south-west facilitated the execution of the duke's order. The two nations fought with their characteristic obstinacy, and during four hours the issue hung in suspense. On one occasion the duke was in imminent peril. All the ships of the red squadron except two had dropped out of the line to refit and prepare again for action, and the weight of the enemy's fire was poured into the flag-ship. The Earl of Falmouth, Lord Muskerry, and Boyle, son to the Earl of Burlington, were killed by the same shot, and James was bespattered with their blood. But the disabled ships gradually resumed their stations in the line; and as the fire of the English began to increase, that of the enemy was observed to slacken. At length the Eendract, bearing Opdam's flag, blew up, and the admiral with five hundred men perished in the explosion. Dismayed at the loss of their commander, the Dutch fled in confusion. Four of their sternmost ships running foul of each other, were destroyed by a fire-ship, and three others shortly afterwards experienced the same fate. Van Tromp endeavoured to keep the fugitive ships together; and as the darkness of the night retarded pursuit, the Dutch fleet in the morning was moored in safety within the shallows. In this battle the enemy lost four admirals, seven thousand men slain or made prisoners, and eighteen sail either burnt or taken. The loss of the victors was small in proportion, not exceeding six hundred men.

This success excited the jealousy of the neighbouring states, particularly France and Denmark, who immediately resolved to protect the republic against such a formidable enemy. De Ruyter, the great Dutch admiral, on his return from Guinea, was appointed, at the head of seventy-six sail, to join the Duke of Beaufort, the admiral, who it was supposed was then entering the British channel from Toulon. The Duke of Albemarle (Monk) and Prince Rupert now commanded the British fleet, which did not exceed seventy-four sail. Albemarle detached Prince Rupert with twenty ships to oppose the Duke of Beaufort; a piece of rashness against which Sir George Ayscue protested in vain. The fleets thus engaged on most unequal terms, and the memorable battle of the Four Days ensued. The first day the Dutch admiral Evertzen was killed by a cannon-ball, one of their ships was blown up, and three of the English ships were taken; darkness parted the combatants. The second day the battle was renewed with incredible fury. Sixteen fresh ships joined the Dutch; and the English were so shattered that their fighting ships were reduced to twenty-eight. They retreated towards their own coast, followed by the Dutch; and another fierce conflict commenced, but was put a stop to by the darkness of the night. In the morning of the third day the English continued their retreat, and tl e Dutch their pursuit. Albemarle came to the desperate resolution of blowing up his own ship rather than submit to the enemy, when he found himself happily reinforced by Prince Rupert with his squadron of twenty sail. By this time, however, it was night; but the next day, being the fourth, the fleets came again to close action, which was continued with great fury till they were parted by a mist. Sir George Ayscue had the misfortune to strike on the Galoper Sand, where he was taken, with a ship, the Prince Royal, of a hundred guns. Both sides claim-

Reign of ed the victory, but the Dutch certainly had the advan- fire on the batteries, while a heavy fire-ship running against Reign of Charles II, tage in this engagement. A second, however, equally the boom, hung upon it, and a second following in her Charles II. De Ruyter conducted his retreat in such a gallant and masterly manner, that he kept the pursuers at bay, and

soon moored his fleet in safety within the Wierings.

This success brought on negociations, which were protracted on various pretexts. The English exchequer was completely drained, and to prepare the fleet for sea again required an immediate supply of money. Parliament had indeed made a grant for the public service; but, though these circumstances it was, in an evil hour, proposed to lay up the larger ships in ordinary, and to equip two squadrons of light frigates for harassing the enemy's trade in the Channel and the German Ocean; and although the Duke of York stated that such a proceeding was in truth tantamount to an abandonment of the sovereignty of the sea, the difficulty of procuring money, and the expectation of a speedy peace, weighed so much with the king and council, as to obtain their consent to a measure which brought lasting disgrace on the government and the country. It was in fact disarming, and inviting attack. Nor did the enemies of England forego the opportunity which was thus offered. A secret treaty was on the eve of being concluded between that country and France; and four out of the seven United Provinces, desirous of peace, resolved to withdraw their contributions towards the expenses of the war. But the pensionary, De Witt, still thirsted for revenge. The Dutch fleet being ready for sea, whilst that of England was dismantled and in the docks, he determined not to throw away the opportunity which fortune had placed in his hands. The English argued, and the French remonstrated, but the pensionary continued inexorable. He left the Texel in company with De Ruyter, and ordered the fleet, to the amount of seventy, English government was not taken altogether by surprise. The warnings of the Duke of York had awakened them to a sense of their danger; and three months before orders had been issued to strengthen the fortifications at Sheerness, to throw a boom across the Medway at the stakes, to mount guns on the batteries, and to prepare a number of fire-ships. But these orders were very ill executed. The commissioners of the navy were already a million in debt; their credit was gone; to procure ready money, either by application to the treasury, or by loan from the bankers, was impossible; and, without immediate payment, the sailors refused to serve, the labourers to work, and the merchants to sell. Little had therefore Witt, in order to distract the attention of the government, ordered one division of his fleet to sail up the Thames as far as Gravesend, and the other to destroy the shipping in the Medway. The works at Sheerness opposed but a feeble resistance, and were levelled with the ground by a few broadsides. At the first alarm, Monk hastened to the mouth of the Medway, where he erected batteries, moored guard-ships for the protection of the boom, and sunk five ships before it in the narrowest part of the channel. He had scarcely completed these preparations, when the Dutch advanced with the wind and tide in their favour; but the obstructions in the main passage proved insurmountable; and they were forced to drop away with the ebb. In the night, however, they discovered another channel deep enough for large ships at high water, and in the morning worked their way through with-

bloody, happened soon after, with larger fleets on both wake, it broke under their united pressure. The guardsides, but commanded by the same admirals. In this the ships were soon in a blaze, and the Royal Charles, a first-Dutch were vanquished; but few prizes were made, and rate, became the prize of the assailants. Finding all his efforts here fruitless, Monk hastened back to Upnor Castle, and employed the night in mounting guns, collecting ammunition, and manning the batteries. Morning revealed a most humiliating spectacle, the Dutch fleet advancing triumphantly up the river. Two line-of-battle ships led the line; then came six enormous fire-ships; which, at a short distance, were followed by the rest of the squadron. The men of war anchored to receive and return the fire liberal in amount, it offered only a distant resource. In of the batteries on either bank; the fire-ships passed between them, and speedily set fire to the Royal James, the Oak, and the London, three first-rates. Indescribable consternation reigned in the capital. It was fully expected that the Dutch would sail up next tide to London Bridge, destroy the whole shipping, and reduce the metropolis to a heap of ruins. At the ebb, however, their commander, Van Ghent, made the signal to the fleet to fall down the river, and having burnt two of his vessels which had grounded, he rejoined the other division at the Nore. The disgrace which had thus been inflicted on England, so lately mistress of the seas, sunk deep in the hearts of the people. Unable to conceive how the Dutch, whom they had so often defeated, should ride triumphant in their rivers, burn their ships, and fill with dismay the capital and the country, their grief and indignation knew no bounds; and whilst many attributed the calamity to the imaginary machinations of the Catholics, others believed that the king had secretly leagued with the enemy to depress the nation, that he might the more easily establish a despotic government.

During these transactions London was desolated by one of the most calamitous visitations ever experienced by this or any other nation. In the winter of 1664, two or three isolated cases of plague had occurred in the outto join him in separate squadrons off the Nore. The skirts of the metropolis, and excited general alarm; but it was not till about the end of May 1665, that, under the malignant influence of excessive heat, and a close, stagnant atmosphere, the evil burst forth in all its terrors. From the centre of St Giles the infection spread with rapidity over the adjacent parishes, threatened the court at Whitehall, and, in spite of every precaution, crept into A general panic ensued. The nobility and gentry fled; the royal family followed; and all who had the power or the means prepared to imitate their example. By every outlet the tide of emigration flowed towards the country, till it was checked by the lord mayor refusing to grant certificates of health, and by the opposition of the neighbouring townships, which rose in their own defence, been done, and that little imperfectly. Meanwhile De and drove back the fugitives into the devoted city. The absence of the wealthier class of citizens, and the consequent breaking up of establishments, with the cessation of trade, served to aggravate the calamity; and although the charity of the opulent seemed to keep pace with the progress of the pestilence, forty thousand servants were left without a home, and the number of artizans and labourers thrown out of employment was still more considerable. The mortality was at first confined to the lower classes, carrying off a larger proportion of children than of adults, and of females than males; but, by the end of June, its diffusion became so rapid, its virulence so great, and its ravages so destructive, that the civil authorities, in virtue of the powers with which they had been invested by an act of James I. " for the charitable relief and ordering of persons infected with the plague," divided the parishes into districts, allotting to each a competent number of ofout impediment. The foremost ships then opened their ficers; and ordered a red cross, one foot in length, to be

Reign of painted on the door of every infected house, with the each for his turn with the resignation of the Christian or Reign of the healthy might be warned of the existence of the dis-Provision was also made for the interment of the dead. In the day-time persons were always on the watch to withdraw from public view the bodies of those who ex-

pired in the street; during the night the tinkling of a bell, accompanied with the lurid glare of torches, announced the approach of the pest-cart making its melancholy round to receive the victims of the previous twenty-four hours. " No coffins were prepared; no funeral service was read; no mourners were permitted to follow the remains of their relatives and friends. The cart proceeded to the nearest cemetery, and shot its burden into the common grave, a deep and spacious pit, capable of holding some scores of bodies, and dug in the church-yard, or, when the church-

yard was full, in the outskirts of the parish."

The distemper generally manifested itself by the febrile symptoms of shivering, nausea, headach, and delirium; but in some these affections were so mild as to be mistaken for a slight and transient indisposition. The insidious approaches of the mortal foe were not discovered, and the patient applied to his usual avocations, till suddenly faintness seized him, the fatal "tokens" or plaguespots appeared on his breast, and then his hour was come. In most cases, however, the pain and delirium left no room for doubt. The sufferings of the patients were dreadful, and often threw them into paroxysms of frenzy, during which they burst the bands that confined them to their beds, precipitated themselves from the windows, ran naked into the street, and plunged into the river. If the patient survived till the third or fourth day, buboes appeared, and when these could be made to suppurate recovery might be anticipated; but if the efforts of nature and the physician proved unavailing, death became inevitable. Men of the strongest minds were lost in amazement when they contemplated the woe and desolation wrought by the pestilence; the timid and credulous became the dupes of their own imaginations and the victims of their own terrors; whilst fanaticism scattered abroad its wild predictions and fierce denunciations to add to the inexpressible horror of the scene. During the months of July and August, when the weather was sultry and the heat oppressive, the eastern parishes, which had at first been spared, became the chief seat of the pestilence, and the substantial citizens suffered in common with their poorer neighbours. The regulations of the magistrates could now no longer be enforced. The nights were insufficient for the burial of the dead; coffins were borne along the street at all hours of the day; and the poor burst from their infected dwellings to seek relief for their families, who were perishing of famine as well as of the pestilence. "London," says Dr Lingard, in a passage worthy of Thucydides, " presented a wide and heart-rending scene of misery and desolation. Rows of houses stood tenantless and open to the winds; others, in almost equal numbers, exhibited the red cross flaming on the doors. The chief thoroughfares, so lately trodden by the feet of thousands, were overgrown with grass. The few individuals who ventured abroad walked in the middle, and, when they met, declined on opposite sides, to avoid the contact of each other. But if the solitude and stillness of the streets impressed the mind with awe, there was s wething yet more appalling in the sounds which occasionally burst upon the ear. At one moment were heard the ravings of delirium or the wail of woe from the infected dwelling; at another the merry song or the loud and careless laugh from the wassailers at the tavern or the inmates of the brothel. Men became so familiarised with the form, that they steeled their feelings against the terrors, of death. They waited

Charles II words "Lord have mercy on us" placed above it, that the indifference of the Stoic. Some devoted themselves Charles II. to the exercises of piety; others sought relief in the riot of dissipation or the recklessness of despair."

In September the heat of the atmosphere abated; but, contrary to expectation, the mortality increased. From this time infection became the certain harbinger of death, which followed often within the space of twenty-four hours, generally in the course of three days. An experiment, grounded on the practice of former times, was now ordered to be tried. Fires of sea-coal, in the proportion of one to every twelve houses, were kindled in the streets, courts, and alleys of London and Westminster, and were kept burning three days and nights, till a heavy, continuous rain extinguished them. By the supposed disinfecting power of heat, it was hoped to dissipate the pestilential miasm, or at least to abate its virulence; and, in fact, the next report exhibited a considerable diminution in the number of deaths. But whilst the survivors were congratulating themselves on the prospect of deliverance, the destroying angel was scattering a fiercer pestilence from his wings. In the following week, ten thousand victims sank under the accumulated virulence of the disease, and despair reigned in every heart. Yet even now, in this lowest depth of human misery, deliverance was at hand. The high winds which usually accompany the autumnal equinox cooled and purified the air; the fever assumed a less malignant form; the weekly number of deaths successively decreased; in the beginning of December seventythree parishes were pronounced clear of the disease; and in February the court, attended by the nobility and gentry, returned to Whitehall. Upwards of a hundred thousand individuals are said to have perished in London alone; and as the pestilence extended its destructive sway over the greater part of the kingdom, the fugitives from the metropolis carrying the infection with them wherever they found an asylum, the total amount of its ravages must have been truly dreadful.

This calamity was followed by another, if possible, still more dreadful. On the night of Sunday the 2d of September 1666, a fire broke out in Pudding Lane, near Fish Street, one of the most crowded quarters of the metropolis. It originated in a bakehouse; the buildings in the neighbourhood being constructed of wood, with pitched roofs, quickly caught the flames; and the stores with which they were filled consisting of the highly combustible articles used in the equipment of shipping, nourished the conflagration. The pipes from the new river were found empty, and the engine which raised water from the Thames was consumed. No decisive measures were adopted to check the progress of the devouring element, and several hours elapsed before the aid of the military was called for. Meanwhile the wind, which during the day blew from the east, augmented hourly in violence, and became a perfect hurricane. The fire spread with astonishing velocity, leaping as it were from roof to roof, and frequently igniting houses at a distance; "the night was as light as day for ten miles round;" a vast column or pillar of fire, about a mile in diameter, ascended to the clouds; the flames, as they rose, were bent, broken, and shivered, by the fury of the tempest; and every blast scattered through the air flakes of fire, which, falling on inflammable materials, kindled new conflagrations. The lurid red glare of the sky, the scorching heat of the atmosphere, the roaring of the flames, and the frequent crash of falling buildings, combined to fill every breast with astonishment and terror. While the storm raged, the conflagration bade defiance to every effort of human ingenuity or power. Houses had been blown up or demolished, and gaps thus made, in hopes of arresting the progress of the flames; but ignited flakes

Reign of were carried over the empty space, or the ruins again therefore set on foot, and concluded at Breda on the 21st Reign of the wind began to abate; and the church of the Temple, as well as Westminster Abbey and Whitehall, were saved by the destruction of the neighbouring buildings. Towards the evening of Thursday the weather became calm, and hopes were entertained that this dreadful calamity was approaching its close. But in the night new alarms were excited. The fire burst out again in the Temple, while it still raged with unabated fury near Cripplegate, and a large body of flame seemed to be making rapid advances towards the Tower. With the aid of gunpowder, however, large openings were made; and as the weather continued calm, the conflagration was thus prevented from extending its ravages, and, in consequence, gradually died out, although months elapsed before the combustion was altogether extinguished in the immense accumulation of ruins. By this deplorable calamity two thirds of London, including the whole space from the Tower to the Temple, were reduced to ashes. The number of houses consumed amounted to thirteen thousand two hundred, and that of churches, including St Paul's, to eighty-nine, covering three hundred and seventy-three acres within, and sixty-three without the walls.

The history of this fire accounts sufficiently for its origin, as well as for the destructive ravages it committed. But at this time political and religious prejudices had perverted the understandings by inflaming the passions of and distorting medium. By some it was considered as an evident visitation of Providence in punishment of sin: but the precise nature of the sin was not agreed upon; the more rigid religionists declaring it to consist in the immorality of the king and the courtiers, whilst the cavaliers were equally positive that nothing but the guilt of the late rebellion could have entailed such a chastisement on the nation. Others, again, attributed it to the disloyalty and revenge, either of the republicans, who sought to destroy the seat of the monarchy, or of the Catholics, who wished to punish the stronghold of Protestant heresy. Of these charges, however, no vestige of proof could ever be discovered; and in the report of the House of Commons, which is still extant, will be found a complete refutation of the calumny. But the men of that time were not to be reasoned out of what they had determined at all hazards to believe; and accordingly, on the monument erected to perpetuate this calamitous event, stands recorded the calumnious falsehood, that "the burning of this Protestant city was begun and carried on by the treachery and malice of the Popish faction." Next to the guilt of him who perpetrates an atrocious crime, says Dr Lingard, is the guilt of those who charge it upon the innocent. One good, however, resulted from this great evil. The plague was fairly burnt out, and the city rose like a phænix from its ashes; the streets being widened, the narrow and unwholesome alleys totally banished, and the houses built of brick instead of wood. In so frightful a devastation, it is remarkable that not a single life was lost.

These complicated misfortunes did not fail to excite many murmurs among the people. Whilst the blame of the fire was laid on the Papists, the Dutch war was exclaimed against as unsuccessful and unnecessary, and as an attempt to humble that nation, who were equally enemies to Popery with themselves. Charles himself also began to be sensible, that all the ends for which he had undertaken this war were likely to be entirely frustrated. Instead of supplies of parliament had hitherto been so scanty, that

Charles II. took fire, or the flames unexpectedly turned in a new di- of July 1667. By this treaty the only advantage gained Charles II. rection. On the evening of Wednesday the violence of by Britain was, the cession of the colony of New York. It was therefore accounted disgraceful by the nation, and the blame of it thrown upon the Earl of Clarendon, who, besides, was charged with the sale of Dunkirk, the bad payment of the seamen, the disgrace inflicted by the Dutch fleet, and his own ambition. His daughter, whilst yet in Paris, had countenanced the addresses of the Duke of York, and, under a solemn promise of marriage, had admitted him to the privileges of a husband. James, however, either of his own accord, or through the persuasions of his brother Charles, afterwards married her; and this was imputed as a crime to Clarendon. On these grounds the king, who had never much loved this nobleman, ordered the seals to be taken from him and given to Sir Orlando Bridgemen. Clarendon was again impeached; and though the charges were manifestly frivolous, yet so strong was the popular torrent against him, that he thought proper to withdraw into France. Soon after, Charles formed an alliance with Holland and Sweden, in order to prevent the French king from completing his conquest of the Netherlands, the greatest part of which he had already subdued; and he was unexpectedly stopped in his career by this league, in which it was agreed by the contracting powers to constitute themselves arbiters of the differences between France and Spain, and to check the exorbitant pretensions of both.

The king now began to govern in a very arbitrary manmen, and every occurrence was viewed through a false ner. He had long wished to extend his prerogative, and to be able to furnish himself with whatever sums he wanted for his pleasures, and he therefore sought ministers who would make no scruple of gratifying him in both particulars. In Clifford, Ashley (afterwards Shaftesbury), Buckingham, Arlington, and Lauderdale, who were distinguished by the term Cabal, a word formed from the initials of their names, he found a junta in all respects suited to his wishes. These men, it is probable, were as ready to betray their king as they speedily showed themselves to betray their country; yet it seems pretty evident that they were deceived by their master, who concealed from them the real state of his degrading connection with France, and also the secret of what he was pleased jocosely to denominate his religion. The first effects of the advice given by the Cabal were a secret alliance with France, and a rupture with Holland. The undivided disgrace of both transactions belongs to them, notwithstanding the king had taken a bribe from France, which, however, he kept from the knowledge of his ministers, lest they should claim their share in the wages of infamy. Soon after this the Duke of York declared himself a Catholic; and liberty of conscience was proclaimed to all sectaries, Dissenters as well as Catholics. A proclamation was also issued containing very rigorous clauses in favour of impressment; and at the heels of this came another full of menaces against those who should speak undutifully of his majesty's measures, nay, even against those who heard such discourses, unless they informed in due time against the offenders. These things gave great and just offence to the people; but they were especially alarmed at the alliance with France, and afraid of the perfidy by which the policy of that nation was cha-

In the meanwhile the Dutch, attacked by Louis on land, and by the combined navies of England and France on sea, and at the same time deserted by their ally Sweden, seemed on the very verge of destruction. But the being able to lay up money for his own purposes, the republic of the United Provinces was not wanting to itself in this crisis. War was declared with Holland on the he found himself considerably in debt. A treaty was 17th of March 1672; and by the beginning of May the

Reign of Dutch fleet put to sea. It consisted of seventy-five men Michael, which could with difficulty be kept affoat, to the Reign of Charles II. of war, and a considerable number of fire-ships, with which London, which had sustained less damage, and the battle Charles II.

to prevent the intended junction of the French and Engsail, being all he was able to muster; but with this force he contrived, under cover of a fog, to pass the enemy unnoticed, and to reach St Helens, where he awaited the arrival of the French squadron under D'Estrées. When the in quest of the enemy. He was discovered lying off Osterms; and baffling all the manœuvres employed to bring him to action, at last reached Goree. The duke then returned to Southwold Bay, in order that his ships might take in their full complement of men and provisions, in both of which they had previously been deficient. Meanwhile De Ruyter, learning the situation and employment of the English, suddenly resolved to become the aggressor; and sailing from Goree with his whole force on the evening of the 27th May, he would probably have surprised his enemies at anchor, had it not been for Cogolin, the captain of a French frigate, who, ignorant of the coast, had anchored during the night at a distance of several miles from Southwold Bay, and having descried two of the Dutch ships in the morning, fired off his guns in succession as a signal of the approach of the enemy. Still the bold and decided advance of De Ruyter had all the effect of a surprise. James, it is true, immediately ordered every ship to get under weigh, and take her station in the line; but the wind being easterly, and the tide running to leeward, not more than twenty sail could form to meet the enemy. The duke, with part of the red squadron, encountered De Ruyter and the fleet from the Maas; the Earl of Sandwich led the blue against Van Ghent and the fleet from Amsterdam; whilst D'Estrées opposed Banker with the ships from Zealand, though, probably from respect for conservative principles, the French commander cautiously avoided coming to close action with his opponent. The battle raged long and fiercely. The English had to contend with a bold, skilful, and experienced enemy, and, owing to the inexplicable inactivity of their French allies, no less than to the suddenness of the attack, they had to make head against a fearful disparity of force. Their ships, becoming intermingled with those of the enemy, could afford each other little support, whilst they were in imminent danger of being overwhelmed by the number of their adversaries. Still they fought with desperate courage, in order to protract their resistance till they could be joined by the remainder of the fleet from the bay. About eleven o'clock the flag-ship, the Prince, of one hundred guns, lay a complete wreck on the water, having lost all her rigging and above one third of her crew. Finding her no longer manageable, the duke ordered her to be towed out of the fire, and immediately shifted his flag to the St Michael of ninety guns. The gallant Earl of Sandwich was less fortunate. In his ship the Royal James, a first-rate, he had repeatedly beat off the enemies by whom he was surrounded; carried by boarding a seventy gun ship which lay athwart his hawse; and sunk a fire-ship which was drifting towards him. But after a contest of eight hours' duration, the Royal James became unmanageable; a second fire-ship now grappled her on the larboard side; and in a few minutes that magnificent vessel was in flames. The duke ordered the Dartmouth and a number of boats to hasten to her assistance, and between two and three hundred of the crew were saved; the rest, with their gallant commander, perished in the waves. Meanwhile the other ships joined the fleet, and the combat became more equal. About five the duke shifted his flag from the St they had proposed through the Spanish ambassador; and

De Ruyter stationed himself between Dover and Calais, continued with unabated fury. But, about seven o'clock, De Ruyter shrunk from the conflict, and sailed to overtake lish fleets. The Duke of York lay at the Nore with forty the Zealand squadron. The honour of the victory belonged to the English. With all the disadvantages of a surprise, and with wind and tide against them, they encountered a force greatly superior, and, notwithstanding the skill of the Dutch admiral and the bravery of his men, latter had joined, the combined fleet immediately sailed they maintained the combat with that cool determined courage which, when properly directed, nothing under tend, but prudently declined to engage even upon equal heaven can overcome, and ultimately compelled the enemy to retreat. The English lost one, and the Dutch three ships of the line; but the French suffered very little, not having entered into the heat of the engagement. It was even supposed by some that they had orders to observe this conduct, and to spare their own ships, whilst the Dutch and English weakened each other by their mutual fury in the combat.

The combined powers were more successful against the Dutch by land. Louis carried all before him, crossed the Rhine, took the frontier towns of the enemy, and threatened the new republic with dissolution. Terms were proposed to them by the conquerors. Louis offered them such as would have deprived them of all power of resisting an invasion from France by land; those of Charles would have exposed them equally to invasion by sea. At last the murmurs of the English at seeing this brave and industrious people, the supporters of the Protestant cause, totally sunk and on the brink of destruction, were too loud not to reach the king. He was obliged to call together the Parliament in order to take the sense of the nation respecting his conduct; and he soon found how his subjects stood affected towards him.

The parliament met on the 24th of February 1673.

They began with resisting some of the king's extraordinary stretches of prerogative, and taking means for promoting uniformity in religious matters. A law was passed entitled the Test Act, imposing an oath on all who should enjoy any public benefice. Besides taking the oaths of allegiance and supremacy, such persons were obliged to receive the sacrament once a year in the established church, and to abjure all belief in the doctrine of transubstantiation. As the Dissenters also had seconded the efforts of the Commons against the king's declaration of indulgence to Roman Catholics, a bill was passed for their ease and relief, which, however, met with some difficulty in passing through the Peers. The Dutch, in the mean time, continued to defend themselves with such valour, that the Commons began to despair of success. They therefore resolved that the standing army was a grievance; and declared that they would grant no more supplies to carry on the Dutch war, unless it appeared that the enemy were so obstinate as to refuse all reasonable conditions. To cut short these disagreeable altercations, the king resolved to prorogue the parliament; and with that intention he went unexpectedly to the House of Peers, and sent the usher of the black rod to summon the House of Commons to attend. The usher and the Speaker happened to meet nearly at the door of the house; but the Speaker being within, some of the members suddenly shut the door, and cried, "To the chair." It was then moved, and voted by acclamation, that the alliance with France was a grievance, that the evil counsellors of the king were a grievance, and that the Earl of Lauderdale was a grievance; upon which the house rose in great confusion. The king finding that he could expect no supply from the

Commons for carrying on a war so unpopular, resolved to

make a separate peace with the Dutch, on the terms which

Reign of having asked the advice of his parliament, a peace was con- kingdom. The plot having thus attained a sudden and Reign of Charles II cluded accordingly.

The prepossession which Charles had all along shown in favour of France, and his manifest inclination upon all occasions to attach himself to that kingdom, had given great offence to his people; and other circumstances also conspired to raise a general discontent. The toleration of Catholics, so much wished for by the king, and the bigotry of the Duke of York, the heir-apparent to the crown, who was zealous for the propagation of the Catholic religion, excited an alarm, not altogether without foundation, that the Protestant religion was in danger. But these fears and discontents were carefully fomented by wicked and denot to advance the greatest falsehoods. In 1678 an account of a plot, supposed to have been formed by the Papists, for burning London, putting the Protestants to death, and destroying the king and the Protestant religion, was circulated by one Kirby, a chemist; Tong, a weak, credulous parson; and Titus Oates, who had likewise been a clergyman, and was in reality one of the most abandoned miscreants that ever disgraced humanity. The circumstances attending this pretended discovery were so perfectly incredible and monstrous, that it seems amazing how any person of common sense could give ear to them; yet so violently were the minds of the nation at this time inflamed against the Catholics, that it not only produced the destruction of many individuals of the Romish persuasion, but a general massacre of that unfortunate sect was apprehended. The parliament, who ought to have repressed these delusions, and brought back the people to calm deliberate inquiry, showed themselves even more credulous than the vulgar themselves. The cry of the plot was immediately echoed from one house to the other; the country party could not let slip so favourable an opportunity of managing the passions of the people; and the courtiers were afraid of being thought disloyal if they ventured to doubt the guilt of those who were accused of designs against the king's person. The whole nation was seized by a sort of epidemic madness. Danby, the prime minister, himself entered into it very furiously, and persisted in his inquiries notwithstanding all the king's advices to the contrary; and Charles himself, who was the only person that ought to have been most concerned, was the only one who treated it with contempt. Nothing, however, could check the popular phrenzy; and for a time the king was obliged to give way to it. Meanwhile accident after accident, occurring in a manner unparalleled in history, contributed to maintain the delusion, and to give temporary credibility to the infernal perjuries of Oates, Bedloe, and their associates in infamy. Letters were seized which discovered the Duke of York's correspondence with France, in opposition to the religion and interests of his country; Danby's correspondence, which involved the king in the disgrace of similar machinations, was also detected; and, to crown the whole, Godfrey, the magistrate who had first given publicity to the plot, was either murdered, or, which seems at least equally probable, committed suicide. This last occurrence made every good Protestant imagine that he felt a Catholic poniard at his throat; and, whilst it aggravated the terrors, confirmed the credulity, of the people. The verdict of wilful murder returned by the coroed the panic with which the nation was now seized. It was no longer safe to deny that Godfrey had been murdered by the Papists, or that the latter had conspired the destruction of the king, the constitution, and the church of Eng-

bloated maturity, it was greedily adopted by the popular Charles II. party as an engine against the court; and whilst the extraordinary hallucination lasted, every species of injustice and iniquity was perpetrated without compunction or remorse. Coleman, Ireland, Grove, Pickering, and others suffered death for an imaginary conspiracy, on the contradictory testimony of incredible witnesses, and after trials in which the judges and the juries seemed to vie with each other in abetting perjury. Nor was the reign of delusion and blood short-lived. For two years, Protestant credulity and vengeance were satiated, from time to time, with the invention of new horrors and the immolation of fresh victims; signing men, who, to promote their own interests, scrupled nor were these legal murders stayed till the execution of the venerable Lord Viscount Stafford excited pity and remorse in the public mind. This event seems to have contributed to awaken the nation from its trance; the still small voice of reason and humanity began again to be heard; men gradually shook off both the delusion and the panic by which they had been hurried into such excesses; and when they recovered the use of their faculties sufficiently to enable them to take a deliberate survey of the late proceedings, they were horrified alike at the iniquity which had been committed, and at the character of the diabolical miscreants by whose instrumentality it had been

> In the midst of this general uproar and persecution, the lord treasurer Danby was impeached in the House of Commons by Seymour the Speaker. The principal charge against him was, his having written a letter to Montague, the king's ambassador at Paris, directing him to sell the king's good offices at the treaty of Nimeguen, to the king of France, for a certain sum of money; contrary to the general interests of the confederates, and also to those of his own kingdom. But although the charge was just, Danby had the good fortune to find the king resolved to defend him. Charles assured the parliament that, as he had acted in every thing by his orders, he held him entirely blameless; and although he would deprive him of all his employments, yet he positively insisted on his personal safety. The Lords, however, still went on to impeach him, and Danby was sent to the Tower; but no worse consequences followed.

> These proceedings were carried on by a House of Commons which had continued in existence above seventeen years. They were now dissolved, however, and another parliament was called; but this one proved as unmanageable as the preceding. The members resolved to check the growth of Popery by striking at the root of the evil; and therefore brought in a bill for the total exclusion of the Duke of York from the crown of England and Ireland, which passed the Lower House by a majority of seventynine. They next voted the king's standing army and guards to be illegal; and proceeding to fix limits to the king's power of imprisoning delinquents, the celebrated statute of Habeas Corpus was passed, which confirms to the subject an absolute security against oppressive power.

During these troubles the Duke of York had retired to Brussels; but an indisposition of the king induced him to return to England, to be ready, in case of accident, to assert his right to the throne. After prevailing with his brother to disgrace his natural son the Duke of Monmouth, who had now become very popular, he set out for ner's inquest on the body of Godfrey imparted the stamp of Scotland, under pretence of quieting the apprehensions of authority to all the reports previously in circulation. The the English nation, but in reality to strengthen his interests ignorant believed and trembled, the artful secretly foment- in that part of the kingdom. This proceeding, however, served still more to inflame the country party, who were strongly attached to the Duke of Monmouth, and resolved to support him against the Duke of York. Mobs, petitions, and burnings of the pope in effigy, were the artifices land, with the extermination of every Protestant in the employed to keep up the terrors of the people, and to

Reign of alarm the court. The parliament had shown favour to the they spared his life. At Lanark they renewed the cove- Reign of Charles II. various tribes of informers, and that of course served to increase the number of these miscreants. Plots also became more numerous. Conspiracy was set up against conspiracy; and the people, uncertain what to believe or whom to trust, were kept in a state of the most dreadful

But it was not by plots alone that the adverse parties endeavoured to supplant each other. Tumultuous petitions on the one hand, and adulatory addresses on the other, were sent up from all quarters. Wherever the country party prevailed, petitions were sent to the king, filled with grievances and apprehensions. Wherever the church or court party had the ascendency, addresses were framed, containing expressions of the highest regard for his majesty, and the deepest abhorrence of those who endeavoured to disturb the public tranquillity. Thus the nation came to be distinguished into Petitioners and Abhorrers. The names of Whig and Tory, also, were now first used as terms of reproach. The whigs were so denominated from a cant name given to the Presbyterian conventiclers, "whig" being milk turned sour; and the tories received that honourable appellation from the Irish banditti so called, whose usual phrase, in ordering people to stand and deliver, was the Irish word toree, " give me."

Scotland.

During all this time the king had tyrannized over the Scots in a very cruel manner. Being apprized of the tendency of Presbyterian principles to a republican form of government, Charles, like his predecessors, had endeavoured to introduce Episcopacy there, but in a much more violent manner than had formerly been attempted. The rights of patrons had for some years been abolished, and the power of electing ministers had been vested in the kirk-sessions and lay elders; but it was now enacted, that all incumbents who had been admitted upon this title should receive a presentation, and be instituted anew by the bishop, under the penalty of deprivation. In consequence of this, three hundred and fifty parishes were at once declared vacant. New ministers were sought for all over the kingdom, and none was too vicious or ignorant to be rejected. The people, as might have been expected, were displeased to the highest degree, but gave no sign of mutiny or sedition, notwithstanding their discontent. This submission made their case still worse; it being rather hastily imagined, that, as they did not complain for a little ill usage, they would submit with equal patience

Affairs remained tolerably tranquil, till, in 1661, a severe act was passed in England against conventicles, which severity was imitated by the Scottish parliament, who passed an act of the same kind. Military force was next let loose on the people. Wherever they had forsaken their churches, the guards were quartered throughout the country. These legalized banditti were commanded by Sir James Turner, a man of a furious temper and dissolute life, who went about and received lists from the clergy, of those who absented themselves from the churches, or were supposed to frequent conventicles. Without proof or legal conviction, he exacted fines, and quartered soldiers on the supposed criminals till he received payment. An insurrection being dreaded during the Dutch war, new forces were levied, and intrusted to the command of Dalziel and Drummond, two men of savage dispositions, and the Scottish parliament gave full scope to whatever enormities they chose to commit.

Representations were now made to the king, who pro-1668 the people rose in arms, and having surprised Tur-

nant, and published a manifesto, in which they professed Charles IL submission to the king, and only desired the re-establishment of Presbytery, and the re-instatement of their former Scotland. ministers. Their force never exceeded two thousand men; and although the country in general bore them great favour, men's spirits were so subdued, that the insurgents could expect no further increase of numbers. took the field to oppose them. The number of the Covenanters had now been reduced to little more than a thousand, and these were no way capable of contending with regular forces. Having advanced towards Edinburgh, and met with no support, they attempted to make their way back to the west by the Pentland Hills. But at a spot called Rullion Green they were attacked by the king's troops, and received the first charge with great firmness. This, however, was the whole action. They immediately fell into confusion and fled. About forty were killed on the spot, and a hundred and thirty taken prisoners.

As long ago as the year 1661 the Presbyterians had deputed Sharpe, then one of their number, to lay their grievances before the king. Instead of doing so, however, their deputy abandoned the cause altogether, became their violent enemy, and, as a reward of his treachery, was created Archbishop of St Andrews. After the affair of Pentland this man was the foremost to take vengeance on the unhappy insurgents, whose oppressed state and inoffensive behaviour made them objects of universal compassion. Ten were hanged on one gibbet in Edinburgh, and thirty-five before their own doors in different parts of the country. Some of them were previously tortured, and, after death, their mutilated limbs were stuck up in different parts of the kingdom. All of them might have saved their lives upon condition of renouncing the covenant; but this they absolutely refused. The executions were proceeding without mercy, when the king wrote a letter to the privy council, in which he ordered that such of the prisoners as simply promised to obey the laws for the future should be set at liberty, and that the incorrigible should be sent to the plantations. This letter was brought to the council by Burnet, but was not immediately delivered by Sharpe, whose renegade vengeance was not yet satiated. It had been customary to put these unfortunate men to the torture, in order if possible to make them confess that to be false which they believed to be true. By Sharpe's criminal delay had been tortured Hugh Maccail, a young preacher, who would otherwise have escaped; and so violent were the torments inflicted on him by the iron boot, that he expired under them. He seemed to die in an ecstacy of joy. His last words, uttered with an accent which struck all the bystanders with astonishment, were in the highest degree impressive and sublime. "Farewell sun, moon, and stars," exclaimed this lofty-minded enthusiast; "farewell world and time; farewell weak, frail body. Welcome eternity; welcome angels and saints; welcome Saviour of the world; and welcome God, the judge of all!"

In 1670 an act was passed against conventicles, with a professed design of mitigating the former persecuting laws, though even the mitigation was oppressive and tyrannical. By this act, the hearer in a conventicle, that is, in a dissenting assembly where more than five persons besides the family were present, was liable to a fine of five shillings for the first offence, and ten shillings for the second; while the preacher was fined twenty pounds for the first offence, and forty for the second. The person in whose house the conventicle assembled was declared subject to the same mised some redress. But his lenity came too late. In amount of fine as the preacher. In a remarkable clause it was provided, that if a doubt should arise as to the inner in Dumfries, resolved to put him to death; but finding terpretation of any part of the act, the judges should alhis orders much more violent than his execution of them, ways explain such doubt in the sense least favourable to

1670.

Reign of conventicles, inasmuch as it was the intention of parlia- was subjected to the same penalties which the law inflict- Reign of Charles II. ment entirely to suppress them.

No religion was ever extirpated by subjecting its pro-Scotland. fessors to imprisonment, confiscation, and death; and the government, which had plunged headlong into all the excesses of persecution, soon perceived that they had produced a very different effect from that which had been intended; that Presbytery had burst forth with fresh vigour in the midst of blood and oppression; and that the people, by being driven desperate, had become formidable. In this situation recourse was had to a notable expedient, which at once betrayed the jealousy of the government, and rendered it ridiculous. From some supposed analogy between the case of one subject dreading bodily harm from another, and a king jealous of his people, Sir George Mackenzie, afterwards king's advocate, conceived the brilliant idea of causing his majesty to take out a general writ of lawburrows against his whole Scottish subjects. Accordingly, a bond of the peace was framed, by which the subscribers became bound, under heavy penalties, neither to frequent conventicles themselves, nor to allow their families and tenants to be present at such unlawful assemblies, and, in general, not in any way to infringe the public peace. By this extraordinary proceeding, the government, while it betrayed its fears, prostituted the dignity of the king, and incurred the ridicule of attempting to give additional sanction to public law by private contract.

> But the violent methods used by the king having been found ineffectual to accomplish this purpose in Scotland, a Scheme of Comprehension was tried in 1678, by which it was proposed to diminish greatly the authority of the bishops, to abolish their negative voice in the ecclesiastical courts, and to leave them little more than the right of precedency among the presbyters. But this, too, was rejected by the people, who well knew its character and ten-The next project was that of an Indulgence, by which the most popular of the expelled preachers, without being required to accede any terms of submission to the established religion, were settled in vacant churches; and small salaries of about twenty pounds a year were offered to the rest till they should be otherwise established. These tardy and suspicious boons were at first accepted by some of the less firm and decided preachers; but the trick,—for it was nothing more,—was soon discovered; and every man's motto became Timeo Danaos et dona ferentes. The replaced ministers soon repented their compliance; the bounty was rejected as the wages of criminal silence; conventicles multiplied; and the Covenanters, now at open hostility with the law, met in arms at their places of worship, though, after divine service, they dispersed quietly.

The expedients tried by the government having thus failed, the persecution of the Covenanters was renewed under the administration of Lauderdale, and strenuously abetted by Archbishop Sharpe. By an old law, but seldom put in execution, a man who was accused of any crime, and did not appear to take his trial, might be intercommuned, that is, he might be publicly outlawed; and whoever afterwards, either on account of business, relationship, or even charity, had the least intercourse with him,

ed on the criminal himself. A great many Letters of In-Charles II. tercommuning were now issued against the Covenanters. By this severe and absurd proceeding, crimes and punishments went on multiplying in a geometrical progression; and, lest the cry of an oppressed people should reach the throne, the council prohibited, under severe penalties, all noblemen and gentlemen of landed property from leaving

the kingdom. The course of these violent proceedings was distinguished by an event which, in all its circumstances, is eminently characteristic of the men who bore rule at this period. We allude to the trial and execution of James Mitchell for an attempt to assassinate the Archbishop of St Andrews ten years before. One evening in July 1668, as Sharpe was sitting in his coach at the head of Blackfriar's Wynd, waiting for the Bishop of Orkney, and while the latter was in the act of stepping into it, Mitchell, then a Presbyterian preacher, discharged a pistol at the dignified apostate; but the Bishop of Orkney, happening at the instant to extend his arm, intercepted the shot, and was severely wounded in consequence. This occurred in the principal street of the city; yet so generally was the archbishop hated, that the assassin was allowed to walk off without interruption; and, having turned down a street or two, he threw aside a partial disguise he had worn, re-appeared in public, and remained altogether unsuspected. Six years after this, Sharpe happening one day to notice a man who seemed to observe him narrowly, and dreading lest another attempt at assassination should be made, caused him to be arrested and examined. Two loaded pistols were found upon his person; and, as he was now concluded to have been the author of the former attempt, Sharpe promised, that if he would confess his guilt, he should be dismissed without any punishment. Mitchell (for it was he), was credulous enough to believe the archbishop, and was immediately produced before the council by the faithless primate. But this righteous conclave having no proof against him, and hoping to implicate in his crime the whole body of the Covenanters, solemnly renewed the promise of pardon, upon condition that he would make a full disclosure. Mitchell accepted the terms offered him; but when the council found, by this man's confession, that only one person, then dead, had been privy to his design, their rage and disappointment knew no bounds. He was immediately carried before the Court of Justiciary, and required to adhere to his confession, with certification that if he did not comply, he would forfeit the benefit of the assurance which had been given him. Mitchell now saw with whom he had to deal. On being judicially interrogated, he refused to confess, and was, in consequence, put to the torture, which he endured with singular fortitude; obstinately persisting in his refusal to criminate himself, till he fainted through excessive agony. As the boots (the instrument of torture) had failed to extort a confession, he was sent to the Bass, then used as a state prison for the persecuted Covenanters, and remained there loaded with irons, in the greatest misery, till the end of the year 1678, the period at which we have arrived. Infuriated at the failure of all their coercive measures, and resolved, by some new examples, to strike terror into the breasts of the

Letters of Intercommuning, which bore an analogy to the Aquæ et Ignis Interdictio of the Roman law, concluded thus: "We command and charge all our lieges and subjects, that none presume to reset, supply, or intercommune with any of the foresaid our rebels, nor furnish them with meat, drink, house, harbour, or victuals, nor any other thing useful or conformable to them; nor have any intelligence with them by word, writing, message, or otherwise, under pain of being repute and esteemed art and part with them in the crime foresaid, and to be pursued therefore with all rigour." (Laing, iv. 77, 78, 2d ed.; Wodrow, i. 392, 416-418; Burnet, ii. 156-183.)

Reign of Covenanters, the council once more produced him; and he house, afterwards Viscount Dundee, an active and merci- Reign of Charles II. was now indicted at the instance of Sir George Mackenzie, his majesty's advocate, upon 4 act of 16 Parl. of James VI., by which the invading of privy counsellors is made death. No proof of his guilt could be adduced except his former confession, which he judicially denied. But it was proved against him by the testimony of Lauderdale the commissioner, Rothes the chancellor, Maitland the lord-treasurer depute, and the archbishop of St Andrews, all of whom,—when it was alleged in behalf of the accused, that any confession he had emitted was upon promise of life et spe veniæ, - expressly swore, that no assurance of life had been given him, although the records of the privy council remain to this hour the incontestible monument of their perjury! The prisoner then produced a copy of the act of council which contained the assurance of his life, and moved that the original might be exhibited. This, however, was refused, on the pretence that the fact was already sufficiently established by the parole testimony of privy counsellors; and the unhappy man was accord-

ingly condemned and executed.1 When Lauderdale, who probably felt some remorse on account of the iniquitous means which had been used to obtain his conviction, wished to commute Mitchell's sentence, the unrelenting primate interposed, and insisted upon its execution, as the only way of securing his own life against a repetition of similar attempts in future. But he calculates ill who seeks protection by means of perjury, injustice, and cruelty. Some acts of local oppression, added to the hatred which was so generally entertained for him, brought down upon the primate the very fate which he thus sought to avoid. On the 3d of May 1679, he was waylaid and murdered in Magus Muir, near St Andrews, by a troop of fanatics, who had been driven to madness by his tyranny, and who, in perpetrating this unholy deed, were actuated solely by their own enthusiasm or revenge. But the act committed by these men was nevertheless imputed to the party to which they ostensibly belonged; and the consequence was, that all who attended field conventicles were ordered to be indiscriminately massacred. This brought matters to a crisis.

The Covenanters, finding themselves obliged to meet in large bodies, and bring arms for their own security, drew up a declaration against prelacy, which they published at Rutherglen, a small burgh near Glasgow; and in the market-place they burned the several acts of parliament which had established that mode of ecclesiastical government, and had prohibited all conventicles. For this purpose they chose the 20th of May, the anniversary of the Restoration, having previously extinguished the bonfires which had been kindled on that occasion. Graham of Claver-

less agent of the council, attacked a great conventicle Charles II upon Loudon Hill, but was repulsed with the loss of thirty men. The Covenanters, finding themselves thus unwarily engaged in rebellion, were obliged to persevere, and therefore pushed on to Glasgow, which, though repulsed at first, they afterwards made themselves masters of. Here they dispossessed the established clergy, and issued proclamations, in which they declared that they fought against the king's supremacy, against popery and prelacy, and against a popish successor to the crown.

Alarmed at this rising, Charles dispatched against the Covenanters a small body of English cavalry under the Duke of Monmouth, who, having joined the Scottish guards, and some regiments of militia levied from the well-affected counties, marched with great celerity in quest of the insurgents. They had taken post at Bothwell Bridge, between Hamilton and Glasgow; a good position, to which there was no access but by the bridge, which a small body might have defended against the king's army. The whole force of the Covenanters never exceeded 8000 men, and they had in reality no other generals than their clergymen. Monmouth attacked the bridge, and a party of the Covenanters stoutly maintained their post as long as their ammunition lasted. When they sent for a fresh supply, they received orders to quit their post and retire; and this imprudent measure occasioned an immediate defeat. Monmouth passed the bridge without opposition, and, drawing up his forces opposite to the enemy, soon put them to the rout, which, indeed, was effected by his cannon alone. About seven hundred were killed in the pursuit, for, properly speaking, there was no action. Twelve hundred were taken prisoners, and treated with humanity by Monmouth. Such as promised to live peaceably under the present government were dismissed; and about three hundred who refused this condition were shipped for Barbadoes, but unfortunately perished during the voyage. Two of their clergymen, however, were hanged. Soon afterwards an act of indemnity was passed; but Lauderdale took care that it should afford little protection to the unhappy Covenanters; for, although orders were given thenceforward to connive at all conventicles, he found means, under a variety of pretences, to elude the execution of them.

That Charles had formed a scheme for overturning the established religion, and substituting popery in its place, as well as for rendering himself absolute, is now certainly known. But in this he met with strenuous opposition from his parliaments; and as the present one seemed to surpass its predecessors in resisting the schemes of the court, the king was induced to dissolve them and to call another in 1680. By this step, however, he gained no-

i Sir George Mackenzie, at whose instance Mitchell, as we have seen, was prosecuted and capitally convicted, asserts, in his Hisroy, page 327, that when this unfortunate man was brought before the council, "he fell upon his knees and confessed the whole matter, without asking either life or promise of any favour;" which confession he also signed. This is abominable equivocation. Even supposing that Mitchell did not "ask either life or promise of any favour," if the council ultroneously gave him an assurance of pardon, was the obligation less binding on that account? But it appears from the face of the record, which still remains to impeach the Lord Advocate's veracity, that Sir George Mackenzie assisted at the council when Mitchell confessed and obtained assurance of his life, and as if this had not have sufficient to everture the statement of the public property. life; and, as if this had not been sufficient to overturn the statements of the public prosecutor, he himself, two sentences farther on, says that Mitchell, "being persuaded that extrajudical confession was not binding, resiled; whereupon the council declared, that he had forfeited any PROMISE that was made to him!" The same learned person affirms, that the act of council was "justly refused," had forfeited any PROMISE that was made to him!" The same learned person affirms, that the act of council was "justly refused," because, "being posterior to the confession, it could not prove that the confession was upon promise of life; and that act designed to annul the confession, and so could not be made use of for astructing it." The act of council however states, in the most explicit terms, that "the confession was emitted upon promise of life," which implies that the "promise" was anterior to the "confession;" and so to the legal sophism, that the "act designed to annul the confession, and so could not be made use of for astructing it," to the extent of proving the "promise of life," it is sufficient to observe, that the act of council was legally probative of what had occurred there, and that if it was held competent to prove the "confession," it must have been equally so to establish the "promise" on which it was emitted. No one can doubt, therefore, that the production of the act was "refused," because it would have clearly instructed the "promise that was made" to Mitchell, and because four privy counsellors had, in order to effect this man's destruction, resolved to perjure themselves by swearing, in the face of the record of their own proceedings, that no assurance of life had been given him. Mackenzie adds, that the pannel's counsel, Sir George Lockhart, "refused to speak for him, being unwilling to offend Lauderdale." (History, ubi supra.) (History, ubi supra.)

Reign of thing; for they voted the legality of petitioning the king, ference between Fitzharris and himself. The libel con-Reign of in their addresses to the crown, had expressed their disapprobation of such petitions. Great numbers of this class were seized by their order in all parts of England, and committed to close custody; and the liberty of the subject, which had been so carefully guarded by their own recent law, was violated by such arbitrary and capricious imprisonments. But one Stowel of Exeter put a stop to these proceedings. He refused to obey the serjeant at arms who had been sent to apprehend him; and, standing upon his defence, declared that he knew of no law by which the House of Commons could pretend to commit him. The house, finding it equally dangerous to proceed or recede, got off by an evasion. They voted that Stowel was indisposed; and a month was allowed him for his recovery, about which, as may well be supposed, they gave themselves no further concern.

But the chief point laboured by the present parliament was the exclusion bill, which, though voted by a former house, had never yet made any further progress. In the present House of Commons it passed by a great majority, but was thrown out by the House of Peers. All the bishops except three voted against it; being of opinion that the church of England was in greater danger from the prevalence of Presbyterianism than from the introduction of popery. The Commons were extremely mortified at the rejection of their favourite bill, and in retaliation they passed several other disagreeable acts. Amongst these was one which set forth, that, till the exclusion bill was passed, they could not, consistently with the trust reposed in them, grant the king any manner of supply; and that whoever should hereafter lend, by way of advance, any money upon the branches of the king's revenue, should be responsible to parliament for his conduct. Finding that there were no hopes of extorting either money or compliance from the Commons, Charles came to a resolution of once more dissolving the parliament; and this accordingly took place while they were voting that the dissenters ought to be encouraged, and that the city of London had been burned by the papists.

It was for some time doubtful whether the king would ever call another parliament. But his necessities surmounted all his fears, and in 1681 he summoned a parliament to meet at Oxford, that he might thus have an opportunity of punishing the city of London, by showing his suspicions of their loyalty. In this, however, as in all they trode exactly in the footsteps of their predecessors. The same Speaker was chosen, and the exclusion bill urged more fiercely than before. Ernely, one of the king's ministers, went so far as to propose that the duke should be banished five hundred miles from England, and that on the king's decease the next heir should be appointed regent. Yet even this expedient, which left the duke only the barren title of king, failed to obtain the approbation of the house; nothing but a total exclusion could satisfy them.

The opposite factions had for some time indulged their animosities by reviling and ridiculing each other in pamphlets and libels; but this practice, too common in party warfare to deserve particular mention, was at length attended with an incident which deserves notice. One Fitzharris, an Irish adventurer, employed a Scotsman named Everard, who, like himself, hung loose on society, to write a libel against the king and the Duke of York. The Scot, who was actually a spy for the opposite party, supposing this a trick to entrap him, discovered the whole to Sir William Waller, a justice of the peace; and, to convince the magistrate of persons in a place where they everheard the whole con- nored by the grand jury; the hall resounded with ap-

Charles II and fell with extreme severity on the Abhorrers, who, cocted betwixt them was replete with the utmost rancour Charles II. and scurrility. Waller carried the intelligence to the king, and obtained a warrant for committing Fitzharris, who at the time happened to have a copy of the libel in his pocket. Finding himself in the hands of a party from which he could expect no mercy, Fitzharris resolved to change his game, and to throw the odium of the libel upon the court, who, he said, had employed him to draw it up with the view of imputing it to the exclusionists, and thus rendering them hateful to the people. And, in order to enhance his services in the estimation of the country party, he revealed to them a new popish plot, still more tremendous than any of those previously hatched, and accused the Duke of York as a principal accomplice in the conspiracy. The king, however, imprisoned Fitzharris in Newgate. But the Commons immediately espoused his cause, and voted that he should be impeached by themselves, in order to screen him from the ordinary forms of justice. The Lords rejected the impeachment; the Commons asserted their right; and a commotion was likely to ensue, when the king, in order to break off the contest, went to the house and dissolved the parliament, with a fixed resolution never to call another.

From this moment the king ruled with despotic sway. His temper, which had generally been easy and merciful, now became arbitrary and cruel; he entertained spies and informers round the throne, and imprisoned all those whom he thought most daring in their designs. In particular, he resolved to humble the Presbyterians. They were divested of all their employments, and their offices given to such as were favourable to the court, and approved the doctrine of non-resistance. The clergy began to testify their zeal and their principles by their writings and sermons; but although the partizans of the king were the most numerous, those of the opposite faction were the most enterprising. The king openly espoused the cause of the former; and thus placing himself at the head of a faction, he deprived the city of London, which had long headed the popular party, of their charter. Terror was also employed to confirm this new species of monarchy. Fitzharris was brought to trial, condemned, and executed. The whole gang of spies, witnesses, informers, and suborners, who had long been encouraged and supported by the leading patriots, finding now that the king was entirely master, turned short upon their ancient employers, and tendered evidence against those who had first put former parliaments, the country party predominated; and them in motion. The king's ministers gave encouragement to these miscreants; and in a short time the same injustice and the same cruelties were practised under pretence of Presbyterian, as had formerly been committed under the delusive apprehension of Catholic treasons. But the king's chief resentment was levelled against the Earl of Shaftesbury; and not without reason, as he had been very active in the late disturbances. No sums were spared to seek for evidence, nor even to suborn witnesses, against this intriguing and formidable man. A bill of indictment was presented to the grand jury, and witnesses were examined, who swore to such incredible circumstances as must have invalidated their testimony, even if they had not been branded as perjured villains. Amongst his papers, indeed, was found a draught of an association, which might have been construed into treason; but it was not in the earl's handwriting, nor could it be proved that he had ever communicated this scheme to any body, or signified his approbation of any such project. But the sheriffs had taken care to summon a jury whose principles coincided with those of the earl; and in that, more than in any insufthe truth of his information, secreted him and two other ficiency of proof, consisted his safety. The bill was igReign of plause; and the day was closed with the ringing of bells, lives the sincerity of their belief. Even those innocent of Reign of Charles II. the burning of bonfires, and other demonstrations of popual offence towards the government were insidiously involve Charles II.

lar joy.

But it was in Scotland that the character of the restored government appeared in its most hideous features. The duke, after a temporary exile from Britain, had been sent to that country; and there, during his administration, he exercised a tyranny, if possible still more frightful than that of Lauderdale. The battle of Bothwell Bridge had tamed the spirit of the Covenanters, and many of them, by frequenting the churches of the indulged ministers, succeeded in screening themselves from the vengeance of the government. But there was still left a remnant of faithful adherents of the covenant, inconsiderable in number, and despicable in point of influence, but men of stern character, exalted enthusiasm, and indomitable zeal, who followed their spiritual guides, Cargill and Cameron, into the wilderness, and, amidst the glens and morasses, were fed by them with the manna of the divine word. Hunted like partridges on the mountains, and subjected to military execution wherever they were caught, these men, naturally led to inquire into the authority of those by whom their sufferings were inflicted, came as naturally to the conclusion, that the king having broken the condition upon which he received the crown of Scotland, by rejecting the covenant, had therefore forfeited all right to the exercise of the regal authority. Deeply convinced of the truth of this doctrine, Cameron, accompanied by twenty persons of his sect, proceeded to Sanquhar, and there published " A Declaration and Testimonie of the true Presbyterian, Anti-Prelatic, Anti-Erastian, and persecuted Party in Scotland," setting forth their grievances, disowning the king by reason of his tyranny, proclaiming war against him as a tyrant and usurper, and testifying against the reception of the Duke of York, a professed Papist, in Scotland, as repugnant to their principles, and their vows to the most high God. This persecuted remnant, who mustered in all twenty-six horse and forty foot, now prepared to support their bold defiance by force of arms; but they were surprised, defeated, and dispersed, by three troops of dragoons, at Airmoss, in the district of Kyle. Cameron fell in the skirmish, fighting with heroic courage; his brother, with seven of his companions, shared his fate; Hackston of Rathillet, who had been a passive spectator merely of the murder of Sharpe, and a few others, were wounded and made prisoners. Cargill escaped from the field, and prepared to avenge the death of his friends. Having repaired to Torwood in Stirlingshire, and assembled a number of his disciples, henceforward known by the name of Cameronians, he proceeded, after a lecture and sermon, to excommunicate the king, " for his mocking of God, his perjury, his uncleanness of adultery, his drunkenness, and his dissembling with God and man;" the Duke of York, for idolatry; the Duke of Monmouth, for invading God's people at Bothwell Bridge; the Duke of Lauderdale, for blasphemy, apostacy, and adultery; and the Duke of Rothes, Sir George Mackenzie, and Dalziel of Binns, for different offences. He concluded by declaring that "no power on earth, of kings, princes, magistrates, or ministers of the gospel, could, without the repentance of the persons openly and legally appearing, reverse this excommunication;" and there can be no doubt whatever that his affirmation was most devoutly believed.

These proceedings exasperated the council beyond all measure, and hurried them into the commission of unparalleled atrocities. The prisoners brought from Airmoss were executed with every circumstance of barbarity; a strict search was made, not only after their associates, but also for the professors of their doctrines; and of the latter, many, including females, testified with the loss of their

all offence towards the government were insidiously involved in the same fate with those who had openly defied it. Taking advantage of the spirit which the cruelties of the government had alone excited and inflamed, the privy council sought to entrap fresh victims by means of ensnaring questions, thus imitating the great master they served, in tempting men to sin, that they might have the pleasure of punishing them for it. Was Archbishop Sharpe's death murder? Was the rising at Bothwell Bridge rebellion? Is Charles a rightful king or a tyrant? Such were the interrogatories put to the victims of rage and suspicion, who being for the most part too sincere to dissemble their opinions, and too fearless to be intimidated even by the most cruel tortures, were commonly dismissed from the iron boot to the court of justiciary, and thence, by a rapid transition, to the scaffold.

But the mass of the people were not the only objects of this fierce and frantic tyranny. Anon it took a higher flight, and struck at the Earl of Argyll, a man whose only fault appears to have consisted in his submission to the frightful misrule under which his country had so long groaned; a submission dictated by a love of peace, not by an approval of its enormities. When required, as a privy counsellor, to take a self-contradictory test, which the Scottish parliament had prescribed, Argyll accepted it with an explanation, that he took it in as far as it was consistent with itself and the Protestant religion, adding, that he would " not debar himself from endeavouring in a lawful way, and in his station, to make such changes in the church and state as he might judge beneficial." For this explanation he was imprisoned in the castle of Edinburgh, brought to trial, and, by an infamous perversion of his words, a charge of treason made out against him. Nairne, a superannuated judge, carried into court at midnight to make a majority on the relevancy of the indictment, fell asleep during the proceedings, and was only wakened to give his vote. A jury of Argyll's personal enemies, with the Marquis of Montrose at their head, found him guilty of treason, leasing-making, and leasing-telling, though not of the perjury libelled; and he received sentence of death. although the execution of it was suspended during the king's pleasure. But Argyll did not choose to trust to the tender mercies of his enemies. He escaped from the castle in disguise, and thus saved his life; but sentence of attainder was passed against him. After the defeat of the exclusionists, and the dissolution of parliament, the duke was recalled to England; but the consequent change of administration was productive of little or no relief to this oppressed country.

In 1683 the city of London was deprived of its charter, which was only restored upon terms of abject submission, and its giving up the nomination of its own magistrates. This was so arbitrary a proceeding, that all the other corporations in England began to dread the same treatment, and, in fact, were successively induced to surrender their charters into the hands of the king. Considerable sums were exacted for the restoration of these charters, and all the offices of power and profit were left at the disposal of the crown. Resistance now, however justifiable, was no longer safe; and prudent men saw no other expedient but submitting with patience to the present griev-

ances.

There was a party in England, however, which still cherished their former ideas of freedom, and resolved to restore liberty to their country by dethroning the monarch who acted in a manner so despotic and arbitrary. The principal members of this confederacy were Monmouth, Shaftesbury, Russell, Essex, Howard, Algernon Sidney, and John Hampden, grandson to the great man

men in Cheshire; Lord Russell entered into a correspondence with Sir William Courtney, Sir Francis Knowles, and Sir Francis Drake, who promised to raise the west; and Shaftesbury, with one Ferguson, a restless plotter, undertook to manage the city, upon the aid of which the confederates chiefly relied. These schemes had been laid in 1681. But the caution of Lord Russell, who induced the Duke of Monmouth to postpone the enterprise, saved the kingdom from the horrors of a civil war; whilst Shaftesbury was so struck with a sense of his impending danger, that he left his house, and lurking about the city, attempted in vain to force the Londoners into open insurrection. Enraged at the numberless cautions and delays which clogged and defeated his projects, he at last threatened to begin with his own friends singly; but after a long struggle between fear and exasperation, he abandoned all hopes of success, and fled to Amsterdam, where he soon afterwards died. But the loss of Shaftesbury, though it retarded, did not put an end to the designs of The remaining six formed a council, corthe patriots. responded with Argyll and the malcontents in Scotland, and, though they widely differed in principles from one another, resolved to prosecute the scheme of the insurrection. Monmouth aspired to the crown; Russell and Hampden proposed to exclude the Duke of York from the succession, and to redress the grievances of the nation; Sidney was for restoring the republic; and Essex shared the same wishes and opinions. Lord Howard was an abandoned man, who, having no fixed principles of any kind, sought to embroil the nation, in hopes of advancing his own private interest during the confusion.

Besides these there was a subordinate set of conspirators, who frequently met together, and carried on projects quite unknown to Monmouth and his council. Among them was Colonel Rumsey, a military adventurer; Lieutenant-Colonel Walcot, a man of the same stamp; Goodenough, under-sheriff of London, a zealous and noted party-man; Ferguson, an independent minister; and several attorneys, merchants, and tradesmen of London. But Rumsey and Ferguson were the only persons who had access to the great leaders of the conspiracy. These men took the resolution of assassinating the king in his way to Newmarket; and as Rumboldt, one of the party, possessed a farm upon the road called the Rye-house, the conspiracy was thence called the Rye-house Plot. The scheme they had fixed on was to stop the king's coach by overturning a cart on the highway at this place, and to shoot him through the hedges. But the house in which the king lived at Newmarket having accidentally taken fire, he was obliged to leave that place eight days sooner than was expected, and to this circumstance he owed his safety. Soon afterwards the conspiracy was discovered; Russell, Sidney, and Walcot, were executed; Essex cut his own throat; Hampden was fined forty thousand pounds; and scarcely one escaped who had been in any manner concerned, except the Duke of Monmouth, who was the most culpable of all.

This was the last blood shed on account of plots or conspiracies, which had abounded during the greater part of this reign. Severe punishments, however, were inflicted on many who had treated the Duke of York unworthily. The infamous Titus Oates was fined a hundred thousand pounds for calling him a popish traitor, and was imprisoned till he paid the mulct, which he was absolutely incapable of doing. A similar sentence was passed upon Dutton Colt; and Sir Samuel Barnadiston was fined ten thousand pounds for having in some private letters reflected on the government. The government of Charles

Reign of of that name. Monmouth engaged the Earl of Maccles- was now as absolute as that of any prince in Europe; but Reign of Charles II field, Lord Brandon, Sir Gilbert Gerard, and other gentle- to please his subjects by a popular act, he judged it pro-Charles IL per to marry the Lady Anne, his niece, to Prince George, brother to the king of Denmark; which was the last trans-

action of this extraordinary reign.

On the second of February 1685, about eight in the morning, the king was seized with a fit of apoplexy, as he came dressed out of his closet, where he had been for some time after he rose from bed. Being immediately bled, he was restored to his senses, and hopes were entertained of his recovery. But on the fourth day the physicians despaired of his life, and therefore sent for the queen. He was in his perfect senses, when she arrived. She threw herself on her knees, and asked his pardon for all her offences. He replied that she had offended in nothing, but that he had been guilty of offences against her, and asked her pardon. He spoke with great affection to the Duke of York, and gave him excellent counsel for his future conduct, advising him to adhere to the laws with strictness, and invariably to support the church of England. the duke seemed anxious to convince his brother before he died how little he intended to follow his advice. Having removed the bishops, and several of the lords who attended at the bedside of the king, he sent for Huddleston, a Catholic priest, who, in the presence of the duke, the Earl of Bath, and Trevannion, a captain in the guards, gave extreme unction to the king, and administered to him the sacrament according to the rites of the church of All this was done in about the space of half an hour. The doors were then thrown open; and six prelates, who had before attended the king, were sent for to give him the sacrament. Kenn, bishop of Bath and Wells, read the visitation of the sick, and, after the dying man had said that he repented of his sins, the absolution. The king assisted with seeming devotion at the service; but his mouth being distorted with fits, and his throat contracted, he could not swallow the elements. He professed, however, his satisfaction with the church of England, and expired on the 6th of February, after a reign of twenty-four years, and in the fifty-fifth year of his age.

In person Charles was tall and well-proportioned, with a swarthy complexion and features austere and forbidding. His constitution, originally sound and robust, he had in his youth impaired by indulgence, and afterwards laboured to restore by attention to diet and exercise. In disposition he was kind, familiar, communicative; delighting in social converse; averse to parade and ceremony; and eager, on all occasions, to escape from the trammels ' of official dignity to the ease and comfort of colloquial familiarity. He had good talents; but these were joined to an insuperable antipathy to application, which disqualified him for business, and kept him in a state of ignorance disgraceful to one in his station. He sought amusement alone, and seems to have cared little for any thing beyond the gratification of this propensity. He looked upon the practice of dissimulation as the grand secret in the art of reigning. Surrounded by men who made it their object, as it was their interest, to deceive him, his only protection, he argued, consisted in the employment of the same weapon, and it was necessary for him to deceive, that he might not be deceived. During his whole reign he was the slave of women; and his court became a school of vice, in which all the restraints of morality and even decency were laughed to scorn; whilst the distinctions he lavished on his mistresses enabled them to put a bold front on their infamy, and, holding out an encouragement to crime, tended to sap in youthful breasts those principles of modesty which are the best guardians of female virtue. "There may have been other periods of our history in which immorality prevailed,

Reign of savs Dr Lingard; "but none in which it was practised James II. with more ostentation, or brought with it less disgrace." Of Charles's pecuniary transactions with France it is impossible to think without feelings of shame, or to speak except in the language of reprobation. They were equally disgraceful in themselves, and humiliating to the nation, which had at its head a king who thus sold himself to its natural rival and enemy. That he cherished designs subversive of the liberties of the subject, is evinced by the whole tenor of his conduct, especially during the latter part of his reign; and had he been as active in his habits as he was unprincipled in his character and despotical in his disposition, the constitution might have been overthrown, and a monarchy as absolute as any in Europe erected on its ruins. With respect to what he was pleased to call his religion, he appears to have been a deist; and although he had embraced the Catholic worship before the restoration, yet he was not formally reconciled to the church of Rome until the eve of his death. By this means he was enabled to play the hypocrite, and, for five-and-twenty years, to hold himself out as an orthodox protestant, whilst he satisfied his conscience by secretly professing Catholicism, and in reality believed no religion at all. Finally, in all the relations of life, whether public or private, he was equally unprincipled, profligate, false, immoral, vicious, and corrupt; whilst, from the example of his debauched and licentious court, public morals contracted a taint, which it required little less than a century to obliterate,

### CHAP. VII.

# REIGN OF JAMES II.

Accession of James II.-Slavish Addresses.-Remarkable one by the Quakers-Imprudent Measures of the King.-Measure the Quakers.—Impruoent measures of the King.—Measure in favour of the Catholics.—Monmouth's Conspiracy.—Defeat and Execution of Argyll.—Landing of Monmouth.—Battle of Sedgemore.—Defeat, Capture, and Execution of Monmouth.—James endeavours to establish Popery.—Parliament dissolved.—Catholics promoted.—Opposition of the English Clergy.—An ambassador sent to Rome.—Declarations in favour of liberty of conscience.—The seven Bishops imprisoned.—Popular commotions.—Trial and acquittal of the Bishops.—Attachment of the army to the Protestant Cause.—Birth of the Prince of Wales.—Treachery of Sunderland.—Proceedings of the Prince of Orange.-Invited to England by the malcontents.warned of his danger by the French king.-Rejects all offers of assistance.—Paralysed by the news of the intended invasion.

—Perfidy of Sunderland.—Vain attempts at conciliation.—

Landing of William Prince of Orange.—Defection of James's army.—Distressing situation of the King, who is deserted even by his orange of the control of the by his own children.—Conduct of William.—James attempts to quit the kingdom, but is seized and detained.—His distress.— Return to London.—Ordered to leave the palace.—Urged to remain by some of his adherents.—His refusal.—Lands in France.—The throne declared vacant.—William raised to the Sovereignty in conjunction with the Princess Mary his wife.

The first act of James II.'s reign was to assemble the privy council, in which, after bestowing some praise on the memory of his predecessor, he made professions of his resolution to maintain the established government both in life in defence of the nation, he declared that he would the Earl of Argyll, who formed the scheme of exciting and privileges.

cepted that of the Quakers, which is remarkable for its and loaded them with arms and ammunition.

good sense and simplicity. "We are come," said they, Reign of to testify our sorrow for the death of our good friend James II. Charles, and our joy for thy being made our governor. We are told that thou art not of the persuasion of the church of England, no more than we; wherefore we hope that thou wilt grant us the same liberty which thou allowest thyself, which doing, we wish thee all manner of happiness.

The king, however, soon showed, either that he was not sincere in his promises, or that he entertained so lofty an idea of his own regal power, that even his utmost sincerity could tend but little to the security of the liberties of the people. All the customs, and the greater part of the excise, which had been voted to the late king for his life only, were levied by James without any new act for that purpose. He went openly to mass with all the ensigns of his dignity, and even sent one Caryl as his agent to Rome to make submissions to the pope, and to pave the way for the re-admission of England into the bosom of the Catholic church. By the suggestions of these men all his measures were undertaken. One day when the Spanish ambassador ventured to advise his majesty against putting too much confidence in such kind of people, "Is it not the custom in Spain," said James, "for the king to con-sult with his confessor?" "Yes," answered the ambassador, "and that is the reason why our affairs succeed so very ill."

James's first parliament, which was composed mostly of and which for a time wholly paralysed the character of zealous tories, was strongly inclined to comply with the measures of the crown, and passed a unanimous vote, settling on James during life all the revenue enjoyed by the late king till the time of his decease. For this favour James assured them that he would secure them in the full enjoyment of their laws: but with regard to religion no answer could be extorted from him, for that he was resolved at all hazards to change. In every thing except religion, however, James merited commendation. He applied himself to business with unremitting attention; he managed his revenue with the strictest economy; he retrenched superfluous expenses, and showed himself zealous for the glory of the nation; he endeavoured to expel from court the vice which had prevailed so much during the former reign, and to restore decency and morality; he presided daily at the council, and at the boards of admiralty and treasury; he even entered into the whole detail of the concerns of the great departments of the state. But his bigoted attachment to the Roman Catholic religion sullied all his good qualities, and rendered him feared for his violence, where he was not despised for his weakness.

But whilst every thing remained in tranquillity at home, a storm was gathering abroad. For a long time the Prince of Orange had entertained hopes of ascending the British throne, and had even used endeavours to exclude James. Monmouth, who, since his last conspiracy, had been pardoned, but ordered to depart the kingdom, had retired to Holland, where he was received by the Prince of Orange with the highest marks of distinction, and became his chief favourite. When the news of Charles's death arrived, indeed, the prince made a show of changing his tone, and dismissed Monmouth, but still kept up a close correspondence with him. The duke retired to Brussels; and, church and state; and as he had heretofore ventured his having resolved to invade England, he was seconded by still go as far as any man in maintaining all its just rights an insurrection in Scotland. But the generosity of the Prince of Orange did not correspond with the warmth of This discourse was received with great applause, not his professions. The unfortunate duke derived from his only by the council, but by the whole nation. Addresses own plate and jewels his whole supply for the war; whilst came from all quarters, full of duty, nay, of the most ser- the enthusiasm of a rich widow supplied Argyll with ten vile adulation. From this charge, however, must be ex- thousand pounds, with which he purchased three vessels,

Reign of 1685.

Having landed in Scotland, Argyll published his mani- when the Bishop of Bath and Wells informed him that Reign of But a formidable body of the king's forces having marched against him, his army fell away; and he himself, after being wounded in attempting to escape, was taken prisoner by a peasant, carried to Edinburgh, and, after suffering many indignities, publicly executed.

By this time Monmouth had landed in Dorsetshire with scarcely a hundred followers. His name, however, was so popular, and so great was the hatred of the people to James on account of his religion, that in four days he had assembled a body of above two thousand men, and conobliged to dismiss great numbers for want of arms. Alarmed at his invasion, the king recalled six regiments of British troops from Holland; and a body of regulars, to the number of three thousand, was sent, under the command of the Earl of Feversham, and of Lord Churchill, to check the progress of the rebels. They took post at Sedgemore, a village in the neighbourhood of Bridgewater, and were joined by considerable numbers of the country militia. Here Monmouth resolved to make a stand; and having drawn up his followers in the best order he could, he drove the royal infantry from their ground, and was on the point of gaining a complete victory, when the cowardice of Gray, who commanded the horse, ruined all. This nobleman fled at the first onset; and the insurgents being charged in flank, gave way after a contest of three hours. About three hundred were killed in the engagement, and a thousand in the pursuit. Monmouth fled above twenty miles from the field of battle, till his horse sunk under him. He then alighted, and, exchanging clothes with a shepherd, fled on foot, attended by a German count who had accompanied him from Holland. Being at length quite exhausted with hunger and fatigue, they both lay down in a field, and covered themselves with fern. Meanwhile the shepherd being found in Monmouth's dress, increased the diligence of the search; and by means of bloodhounds he was detected in his miserable situation, with raw peas in his pocket, on which he had subsisted for some days. He burst into tears when seized by his enemies, and petitioned, with abject importunity, for his

to the reigning queen, as well as to the king himself; and he begged his life, when admitted into the presence of James, with a meanness unsuitable to his pretensions and high rank. But all his entreaties and submissions were of no avail. James told him that he was much affected at his misfortunes, but that his crime was too dangerous in its example to be left unpunished. In his last moments Monmouth behaved with a magnanimity worthy of his former courage. When he came to the scaffold, he conducted himself with decency and even with dignity. He spoke little, he made no confession, nor did he accuse any of his friends. The circumstances attending his death excited horror among the spectators. The executioner missed his aim, and struck him slightly on the shoulder. Monmouth raised his head from the block, and looked him full in the face, as if reproaching him for his mistake. The man struck twice again, but feebly, and then threw away the axe. The sheriff forced him to renew his attempt; and the head of the duke, who seemed already dead, was at last severed from his body.

Those concerned in the Duke of Monmouth's conspiracy were punished with the utmost severity. Immediately after the battle of Sedgemore, Feversham hanged up above nation so much disgust, and which had been abolished for

James II. festoes, put himself at the head of two thousand five hun- these unhappy men were now by law entitled to a trial, James II. dred men, and strove to influence the people in his favour. and that their execution would be deemed murder. Nineteen were put to death in the same manner at Bridgewater by Colonel Kirke, a man of a thoroughly savage and bloody disposition. This miscreant, practised in the arts of slaughter at Tangiers, where he had served in garrison, took pleasure in committing acts of wanton barbarity, and ravaged the whole country without making any distinction between friend and foe; his own regiment being designated, by way of eminence, "Kirke's Lambs." The natural brutality of this man's temper was inflamed by continual intoxication. No fewer than eighty were executed tinuing to make a rapid progress, in a short time found by his orders at Dorchester; and on the whole, at Exehimself at the head of six thousand men; but he was daily ter, Taunton, and Wells, two hundred and fifty are computed to have fallen by the hand of justice, as it was called, under the auspices of Judge Jefferies, who had been sent down to try the delinquents. This man, not satisfied with the sacrifice of the principals, charged the juries to search out the aiders and abettors of the rebellion; and those persons who, in compassion for the wretched fugitives, had afforded them an asylum, were denounced and punished as such. Even women did not escape, and two, Lady Lisle and Mrs Gaunt, were sentenced to be burned alive for similar acts of humanity. Jefferies, on his return from his campaign in the west, was immediately created a peer, and soon after invested with the dignity of chancellor. In his Memoirs James complains, with apparent indignation, of "the strange havock made by Jefferies and Kirke in the west," and attributes the unpopularity which afterwards deprived him of the crown to the violence and barbarity of those pretended friends of his authority.

James now began to throw off the mask, and to endeavour openly to establish popery and arbitrary power. He told the House of Commons that the militia were found by experience to be of no use; that it was necessary to augment the standing army; and that he had employed a great many Catholic officers, in whose favour he had thought proper to dispense with the test required to be taken by all who were employed by the crown. These stretches of power naturally led the Lords and Commons into some degree of opposition; but they soon acquiesced in the king's measures, and then the parliament was dis-

missed for their tardy compliance. The parliament being dissolved, James's next step was He also wrote to the queen dowager; he sent a letter to secure a Catholic interest in the privy council. Accordingly four Catholic lords, Powis, Arundel, Bellasis, and Dover, were admitted as members. Sunderland, who saw that the only way to gain preferment was by popery, became a convert. Rochester, the treasurer, was turned out of his office because he refused to conform. Even in Ireland, where the Duke of Ormond had long supported the royal cause, this nobleman was displaced as being a Protestant, and the Lord Tyrconnel, a furious Catholic, was placed in his stead. In his zeal for popery, it is said that James stooped so low as even to attempt the conversion of Colonel Kirke; but the daring soldier told him that he was pre-engaged, for he had promised the king of Morocco, when he was quartered at Tangiers, that if ever he changed his religion he would turn Mahommedan. At last the clergy of the church of England began to take the alarm, and commenced an opposition to court measures. The pulpits now thundered out against popery; and it was in vain that James attempted to impose silence on this topic. Instead of avoiding the controversy, the Protestant preachers pursued it with greater warmth.

To effect his designs, the king determined to revive the High Commission Court, which had formerly given the twenty prisoners, and was proceeding with his executions ever by act of parliament. An ecclesiastical commission was

James II. invested with full and unlimited authority over the whole church of England. The next step was to allow liberty of conscience to all sectaries. This was done in the belief that the truth of the Catholic religion would, upon a fair trial, gain the victory. Besides, the same power that granted liberty of conscience might restrain it; and the Catholic religion alone would thus predominate. He therefore issued a general indulgence, declaring that nonconformity to the established religion was no longer penal: but in Scotland he ordered his parliament to grant a toleration only to the Catholics, without interceding in the least for the other dissenters. In Ireland the Protestants were totally expelled from all offices of trust and profit, and Catholics put in their places. These measures sufficiently disgusted every part of the British empire; but to complete the work, James publicly sent the Earl of Castlemaine as ambassador extraordinary to Rome, in order to express his obedience to the pope, and reconcile his kingdoms to the Catholic communion. This proceeding was too precipitate to be relished even by the pope himself; and therefore the only return he made to this embassy was the sending a nuncio into England. Soon after this the Jesuits were permitted to erect colleges in different parts of the kingdom, and to exercise the Catholic worship in the most public manner.

In 1686 a second declaration in favour of liberty of conscience was published almost in the same terms with the former, but with this particular injunction, that all divines should read it after service in their churches. The clergy resolved to disobey this order. Loyd, bishop of St Asaph, Kenn of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawney of Bristol, together with Sancroft the primate, concerted an address in the form of a petition to the king, which, with the warmest expressions of zeal and submission, signified that they could not read the declaration consistently with their consciences or the respect they owed the Protestant religion. The king received their petition with marks of surprise and displeasure. He said he did not expect such an address from the church of England, particularly from some amongst them; and persisted in his orders for their obeying his mandate. As the petition had been delivered in private, the king summoned the bishops before the council, and there questioned them whether they would acknowledge it. They for some time declined giving an answer; but being urged by the chancellor, they at last owned the petition. On their refusal to give bail, an order was immediately issued for their commitment to the Tower, and the crown lawyers received directions to prosecute them for a seditious libel. The king gave orders that they should be conveyed to the Tower by water, as the whole city was in commotion in their favour. But the people, when informed of their danger, ran to the river side in great multitudes, craving their blessing, and calling upon Heaven to protect them; whilst the very soldiers by whom they were guarded kneeled down before them and implored their forgiveness. The 29th of June 1686 was fixed for the trial of the bishops. Twenty-nine peers, a great number of gentlemen, and an immense crowd of persons. waited upon them to Westminster Hall. The discussion was learnedly managed by the lawyers on both sides. The jury withdrew into a chamber, where they passed the whole night; but next morning they returned into court, and pronounced the bishops not guilty. Westminster Hall instantly rang with loud acclamations, which were communicated to the whole extent of the city, and even reached the camp at Hounslow, where the king was at dinner in Lord Feversham's tent. His majesty demanded the cause

Reign of accordingly issued, by which seven commissioners were but the soldiers shouting for the delivery of the bishops, Reign of "Call you that nothing?" said he; "but so much the James II. worse for them."

1687.

As the king found the clergymen everywhere averse to his measures, he was willing next to try what he could do with the army, thinking that if one regiment could be brought to promise implicit obedience, their example would soon induce others to comply. He therefore ordered one of the regiments to be drawn up in his presence, and desired that such as were against the late declaration of liberty of conscience should lay down their arms. He was surprised to see the whole battalion ground their arms, except two officers and a few Roman Catholic soldiers. A few days before the acquittal of the bishops the queen was delivered of a son. This, if any thing could at that time, might have served to establish James on the throne; but so violent was the animosity against him, that a story was propagated that the child was supposititious; and the monarch's pride scorned to take any precautions to refute the calumny.

Though the enthusiasm of James himself was sufficiently extravagant, the wildest of his religious projects seem to have been suggested by his enemies in order to accomplish his ruin. The Earl of Sunderland, whom he chiefly trusted, was a man of abandoned principles, insatiable avarice, and fitted by nature for stratagem, deception, and intrigue. The love of money was his ruling passion, and he accordingly sold his influence to the highest bidder. To such a degree was he mercenary, that he became at once the pensioner of the Prince of Orange and of the king of France. The former, who had long fixed his eye on the English throne, watched James's motions, and took every advantage of his errors. He had laid his schemes so extensively, that nothing but the birth of a male heir to the crown of England seemed likely to prevent him from obtaining an almost immediate possession of the kingdom; and he had the address to render two thirds of the powers of Europe interested in his success. The treaty of Augsburg, formed to break the power of France, could not accomplish its object without the accession of England. The house of Austria, in both its branches, preferred their political views to their zeal for the Roman Catholic faith, and promoted the dethronement of James as the only means of humbling Louis XIV. Odeschalchi, who under the name of Innocent XI. then filled the papal chair, was also gained to the measures of the Prince of Orange by other considerations, as well as through his fixed aversion to France.

Seeing the national discontent now raised to the highest pitch, the Prince of Orange resolved to take advantage of it. He began by giving one Dykevelt, his envoy, instructions to apply in his name to every religious sect in the kingdom. To the church party he sent assurances of favour and regard; protesting that his education in Holland had no way prejudiced him against Episcopacy. To the non-conformists he sent exhortations not to be deceived by the insidious caresses of their known enemy, but to wait for a real and sincere protector. In consequence of these insinuations, the prince soon received invitations from the most considerable persons in the kingdom. Admirals Herbert and Russell assured him in person of their own and the national attachment. Henry Sidney, brother to Algernon, and uncle to the Earl of Sunderland, came over to him with assurances of a universal combination against the king. Lord Dumblane, son to the Earl of Danby, being master of a frigate, made several voyages to Holland, and carried from many of the nobility tenders of duty, and even considerable sums of money, to the Prince of Orange. Soon after, the Bishop of London, the Earls of Danby, Nottingham, Devonshire, Dorset, and several other of those rejoicings, and being informed that it was nothing lords, gentlemen, and principal citizens, united in their

James II. people, though long divided between whig and tory, now joined against their misguided sovereign as against a common enemy. William therefore determined to accept their invitation; and this the more readily, as he perceived that the malcontents had conducted themselves with prudence and secrecy. Having the principal servants of James in pay, he was minutely informed of the most secret actions and designs of that prince. His intelligence came through Sidney from Sunderland, who betrayed the very measures which he himself had advised. The prince had a fleet ready to sail, and troops provided for action, before the beginning of June 1688.

The king of France was the first who gave James warning of his danger, and offered to assist him in repelling it. But he declined this friendly offer, lest it should be said that he had entered into a private treaty with that monarch to the prejudice of the Protestant religion. Being also deceived and betrayed by Sunderland, he had the weakness to believe, that the reports of an invasion were invented in order to frighten him into a strict connection with France. He gave credit to the repeated assurances of the States, that the armament preparing in their ports was not designed against England; nay, he even believed the assertions of the prince himself, whose interest it was to deceive. Sunderland descanted against the possibility of an invasion, and turned into ridicule all who believed the report. Having, with the consent of James, taken possession of all the foreign correspondence, he suppressed every kind of intelligence that might alarm; and all others whom James trusted, except Dartmouth, affected long to place no faith in the reports of an invasion. Louis finding his first offers rejected, next proposed to march down his army to the frontiers of the Dutch provinces, and thus detain their forces at home for their own defence. But this proposal met with no better reception than the former one. Still Louis, unwilling to abandon a friend and ally whose interest he regarded as closely connected with his own, ventured to remonstrate with the Dutch against the preparations they were making to invade England. But the Dutch treated his remonstrances as an officious impertinence, and James himself declined his mediation.

The king of England, having thus rejected the assistance of his friends, and being left to face the danger alone, was astonished with an advice from his minister in Holland, that an invasion was not only projected, but avowed. When he first read the letter containing this information, he grew pale, and the letter dropt from his hand. He saw himself on the brink of destruction, and knew not to whom to apply for protection. In this emergency, Louis wrote to James in his own hand, that to divert the Dutch from their intended invasion of England, he would lay siege to Maestricht with thirty thousand men. James communicated this intelligence to Sunderland, and the latter to the Prince of Orange, by whom six thousand men were thrown into Maestricht; and the design of Louis being thus rendered impracticable, it was laid aside.

James had now no resource but in retreating from those precipitate measures which had plunged him into inextricable distress. He paid court to the Dutch, and offered to enter into any alliance with them for their common security. He replaced, in all the counties of England, the deputy lieutenants and justices who had been deprived of their commissions for their adherence to the test and penal law. He restored the charters of such corporations as he had possessed himself of, annulled the High Commission Court, reinstated the expelled president and fellows of Magdalen College, and even caressed the bishops whom he had so lately persecuted and insulted. But all these

Reign of addresses to him, and entreated his speedy descent. The concessions were now too late, and were regarded as the Reign of effects of fear, not of repentance.

In the mean time, William set sail from Helvoetsluys with a fleet of near five hundred sail, and an army of above fourteen thousand men. Fortune, however, seemed at first very unfavourable to his enterprise. He was driven back by a dreadful storm; but he soon refitted his fleet, and again set sail for England. It was given out that this invasion was designed for the coast of France; and many of the English, who saw the fleet pass along their coast, little suspected the place of its destination. It happened that the same wind which sent the Dutch to their place of destination, detained the English fleet in the river; so that the Dutch passed the Straits of Dover without molestation, and, after a voyage of two days, landed at Broxholme in Torbay, on the 5th of November 1688, the anniversary of the gunpowder treason.

But although the invitation from the English was general, the prince for some time had the mortification to find himself joined by very few. He continued for ten days in expectation of being joined by the malcontents, and at last was beginning to despair of success, and to deliberate about re-embarking his forces, when he was joined by several persons of consequence; and the whole country soon afterwards flocked to his standard. The first person who went over to the prince was Major Burrington, and he was quickly followed by the gentry of the counties of Devon and Somerset. Sir Edward Seymour made proposals for an association, which was signed by great numbers; and every day there appeared some new proof of that universal combination into which the nation had entered against the measures of the king. This was followed by the defection of the army. Lord Colchester, son to the Earl of Rivers, first deserted to the prince; Lord Cornbury, son to the Earl of Clarendon, carried off the greatest part of three regiments of cavalry at once; and several officers of distinction informed Feversham their general, that they could not in honour fight against the Prince of Orange. Soon after this the unhappy monarch found himself deserted by his own servants and creatures. Lord Churchill had been raised from the rank of page, and had been invested with a high command in the army; he had been created a peer, and owed his whole fortune to the king's bounty; yet even he deserted among the rest, and carried with him the Duke of Grafton, natural son to the late king, besides Colonel Berkeley and others.

In this universal defection, James, not knowing where to turn, began to think of requesting assistance from France, when it was now too late. He also wrote to Leopold, emperor of Germany; but that monarch only returned for answer, that what he had foreseen had happened. James had some dependence on his fleet; but in reality they were entirely disaffected. In a word, his interests were deserted by all, for he had long deserted them himself. His army, however, still amounted to twenty thousand men; and had he led them immediately to battle, it is possible they might then have fought in his favour. But his misfortunes had deprived him of his natural firmness and resolution; and seeing himself deserted by those in whom he thought he could place most confidence, he became suspicious of all, and was in a manner deprived even of the power of deliberation. In this extremity of distress, the Prince of Denmark, and Anne, James's favourite daughter, perceiving the desperation of his circumstances, resolved to take part with the Prince of Orange. Informed of this event, the king was stung with the most bitter anguish. "God help me," said he; " my own children have forsaken me." To add to his distress as a parent, he was accused of being accessory to the death of his own child.

On the 30th of November 1688, James dispatched three

James II. 1688.

Reign of noblemen to treat with the Prince of Orange. But though claration to the disbanded army to re-assemble themselves. Reign of James II. the latter knew very well that the king's commissioners were in his interests, his behaviour showed plainly that he now thought the period for treating was past. For some time he would not admit them to an audience; and when he did, he gave no satisfactory answer. James now began to be alarmed for his personal safety; but what most affected him was the terror of the queen for herself and her infant son. He therefore resolved to send them abroad. They crossed the river in a boat, at Whitehall, on a stormy day, and were carried to Gravesend in a coach, under the conduct of the Count de Lauzun; a yacht, commanded by Captain Gray, which lay there ready for the purpose, soon

transported them in safety to Calais.

The king was now so dispirited and distracted, that he resolved to leave the kingdom at once, and thus plunge every thing in confusion. He threw the great seal into the Thames; he left none with any authority to conduct the government in his absence; and he vainly hoped to derive advantage to his affairs from anarchy and disorder. About twelve at night, on the 10th of December, he disguised himself, took a boat at Whitehall, and crossed the river. Sir Edward Hales, with another friend, met him at Vauxhall with horses. He mounted; and being conducted through by-ways by a guide, he passed in the night-time to the Medway, which he crossed by Ailesford-bridge. At Woolpeck he took fresh horses, sent thither before by Shelden, one of his equerries, who was in the secret of his flight. Having arrived at Embyferry near Feversham, he found a custom-house hoy, hired by Sir Edward Hales, lying ready to receive him on board. But the wind blew fresh, and the vessel had no ballast. The master, therefore, easily persuaded the king to permit him to take in some ballast at Shilness. It being half ebb when they ran ashore, they intended to sail as soon as the vessel should be afloat; but when the vessel was almost afloat, she was boarded by three fishing boats belonging to Feversham, containing fifty men, who seized the king and his two companions, under pretence of their being Papists who wanted to escape from the kingdom. They turned up Feversham water with the tide; but still the king remained unknown. Sir Edward Hales placed privately fifty guineas in the hands of the captain, as an earnest of more should he permit them to escape. He promised, but so far from keeping his word, he took what money they had, under pretence of securing it from the seamen; and having possessed himself of their all, left them to their fate. The unfortunate fugitives were at length carried in a coach to Feversham, amidst the insults, clamours, and shouts of the sailors. When the king was brought to the inn, a seaman who had served under him knew him, and melted into tears; and James himself was so much moved at this instance of his affection, that he wept. The other fishermen, who had previously treated him with indignity, when they saw his tears, fell upon their knees. The lower class of inhabitants gathered round him; but the better sort fled from his presence. The seamen, however, formed themselves into a guard, and declared, that " a hair of his head should not be touched." In the mean time, Sir James Oxendon, under pretence of guarding him from authority. Dundee added his native ardour to his advice. the rabble, came with the militia to prevent his escape. taken out of the hands of the sailors. The commanders of the militia showed him no respect; and he was even insulted by the common soldiers. A letter which he intended to send to London for clothes, a change of linen, and some money, were stopped by those who pretended to protect his person.

In the mean time the Prince of Orange exercised in his

He ordered the secretary at war to bring him a list of the James 11 king's troops. He commanded the Lord Churchill to collect his troop of horse guards. He sent the Duke of Grafton to take possession in his name of Tilbury Fort. The assembly of peers adjourned to the council-chamber at Whitehall, and, to give the appearance of legality to their meeting, chose the Marquis of Halifax as their president. Whilst this assembly was sitting, on the 13th of December, a poor countryman, who had been engaged by James, brought an open letter from that unfortunate prince to London. It had no subscription; and it was addressed to none. It described in one sentence only, his deplorable condition when in the hands of a desperate rabble. This poor messenger of a fallen sovereign waited long at the council door, without being able to attract the notice of any who passed; but when the Earl of Mulgrave became apprised of his business, his lordship had the courage to introduce him to the council. He delivered his open letter, and told the unhappy state of the king. The assembly were much moved, and sent the Earl of Feversham with two hundred of the guards towards Feversham. His instructions were first to rescue James from danger, and afterwards to attend him to the sea coast, should he wish to retire. He chose, however, to return to London; but the Prince of Orange sent a message to him, desiring him to approach no nearer the capital than Rochester. The messenger missed James by the way; and the king sent Feversham with a letter to the Prince of Orange, requesting his presence in London to settle the nation, while he himself proceeded thither, and arrived on the 16th of December.

The Prince of Orange received the news of his return with little satisfaction. His aim from the beginning was to force him by various means to relinquish the throne. The Dutch guards were ordered to take possession of Whitehall, and to displace the English; and the king was soon after commanded by a message, which he received in bed at midnight, to leave his palace next morning, and to depart for Ham, a seat of the Duchess of Lauderdale's. But he desired permission to retire to Rochester, which was readily granted. The harsh measures of the prince had now taken effect, and the king meditated an escape to France. Surrounded by the Dutch guards, he arrived at Rochester on the 19th of December. The restraint put upon his person, and the manner in which he had been forced from London, raised the indignation of many, and excited the compassion of all. The English army, both officers and soldiers, began to murmur; and had it not been for the timidity and precipitation of James himself, the nation would probably have returned to their allegiance. He remained three nights at Rochester, in the midst of a few faithful friends, the Earls of Arran, Dumbarton, Ailesbury, Litchfield, and Middleton, and, amongst other officers of merit, Lord Viscount Dundee. They all argued against his intended flight; and several bishops, some peers, and many officers, entreated his stay in some part of England. They represented that the opinions of men began to change, and that events would daily rise in favour of his "The question, Sir," said he, "is, Whether you shall stay The king found a change in his condition when he was in England or fly to France? Whether you shall trust the returning zeal of your native subjects, or rely on a foreign power? Here you ought to stand. Keep possession of a part, and the whole will submit by degrees. Resume the spirit of a king. Summon your subjects to their allegiance. Your army, though disbanded, is not dispersed. Give me your commission. I will gather ten thousand of your troops. I will carry your standard at their own person all the functions of royalty. He issued a de- head through England, and drive before you the Dutch

Reign of and their prince." The king replied, that he believed James II. it might be done, but that it would raise a civil war, and he would not do so much mischief to a nation that would soon come to their senses again. Middleton urged his stay, though in the remotest part of the kingdom. "Your majesty," said he, " may throw things into confusion by your departure; but it will be but the anarchy of a month. A new government will soon be settled, and you and your family will be ruined."

These spirited remonstrances had no effect upon James. He resolved to quit the kingdom; and having communicated his design to a few of his friends, he left the house where he had lodged at midnight, accompanied by his son the Duke of Berwick, and went in a boat to a smack which lay waiting for him without the fort at Sheerness. In the morning of Tuesday the 25th December, the king landed at Ambleteuse in France, and taking post, soon joined his consort at St Germains.

James having thus abandoned his dominions, the Prince of Orange remained master of all. By the advice of the House of Lords, the only member of the legislature remaining, he was desired to summon a parliament by circular letters; but the prince, unwilling to act upon so imperfect an authority, convened all the members who had sat in the House of Commons during any parliament of Charles II., to whom were added the mayor, aldermen, and fifty of the common council of London; and being thus supported by an assembly deriving its authority from himself, he wrote circular letters to the counties and corporations of England, directing them to return members to this parliament or convention. When the house met, thanks were voted to the Prince of Orange for the deliverance he had wrought; after which they proceeded to settle the kingdom. A vote soon passed both houses, that King James II. having endeavoured to subvert the constitution of the kingdom, by breaking the original contract between the king and the people, and having by the advice of Jesuits and other wicked persons violated the fundamental laws, and withdrawn himself out of the kingdom, had abdicated the government; and that the throne was thereby

The king being thus deposed, it was easy for William to get himself appointed as his successor. Proposals were indeed made by some for electing a regent; and others were for investing the Princess of Orange with regal power, and declaring the young prince supposititious. But to these proposals William opposed the decisive argument, that he had been called over to defend the liberties of the British nation, and that he had happily effected his purpose; that he had heard of several schemes proposed for the establishing of the government; that, if they chose a regent, he thought it incumbent upon him to inform them that he would not be that regent; that he would not accept of the crown under the princess his wife, though he was convinced of her merits; that therefore, if either of these schemes was adopted, he could give them no assistance in the settlement of the nation, but would return home to his own country, satisfied with his aims to secure the freedom of theirs. Upon this, after a long debate in both houses, a new sovereign was preferred to a regent by a very small majority. It was agreed that the Prince and Princess of Orange should reign jointly as king and queen of England; whilst the administration of government should be placed in the hands of the prince only. The Marquis of Halifax, as Speaker of the House of Lords, made a solemn tender of the crown to their highnesses, in the name of the Peers and Commons of England. The prince accepted the offer; and that very day, the 13th of February 1689, William and Mary were proclaimed king and queen of England.

# CHAP. VIII.

#### REIGN OF WILLIAM AND MARY.

Reign of and Mary 1689.

First measures of William.—National discontents.—Scheme in favour of the Dissenters rejected .- Precarious condition of William's government.—Proceedings in Scotland.—William acknowledged as King.—Attempts of Viscount Dundee in favour of James.—Battle of Killicrankie, and death of Dundee.—State of Ireland.—Insurrection in favour of James.—The Protestants take arms in their own defence, and are defeated at Drumore. Landing of James in Ireland.—Subsequent operations.—Gallant defence of Londonderry.—Odious measures resorted to by James.—Disembarkation of King William's army.—Its composition.—Arrival of William.—Battle of the Boyne, and defeat of James.—Battle of Aughrim, and defeat of St Ruth, James's General.—Siege of Lamenck.—Pacification of Ireland.—Affairs of Scotland.—Massacre of Glenco.—Conduct of William respecting this atrocious barbarity.—The Dover expedition.— Violent discontents in Scotland, in consequence of the supposed perfidy of the King.—Plots in favour of James.—France declares in his favour.—Battle of La Hogue, and total defeat of the French fleet under Tourville.—James offered the crown of Poland, which he declined .- Offer by William to secure the succession to the Prince of Wales, James's son, also declined by him.—Death of James.—Conduct of Louis on this occasion.— The Pretender acknowledged by France as king of Great Britain and Ireland.—Death of Queen Mary.—National discontent.—William forced to disband his troops.—Altercations between the King and the Parliament.—Confederacy against France.—Death and Character of William.

William began his reign with issuing a proclamation for continuing in office all Protestants who had been in place on the first of the preceding December. On the 17th of the month he formed his privy council, which consisted chiefly of those persons who had been most active in raising him to the throne. To gratify as many as possible of his friends, the several boards, and even the chancery, were put into commission. The benches of the Exchequer and Common Pleas were filled with persons who had distinguished themselves against the measures of the late king. But the Earl of Nottingham, who had violently opposed the elevation of William, and the Earl of Shrewsbury, who had adhered to his views, were made secretaries of state. The Marquis of Halifax, and the Earl of Danby, though rivals in policy, were admitted into the cabinet; the first as lord privy seal, the second as president of the council. William's Dutch friends in the mean time were not forgotten by the king. Bentinck, his favourite, was made a privy counsellor, groom of the stole, and privy purse; Auverquerque was appointed master of the horse; Zuylstein received the office of master of the robes; and Schomberg was placed at the head of the ordnance.

Though these instances of gratitude were no doubt necessary to William, the generality of the nation were displeased. The tories were offended at being excluded from favour, especially as they had departed from their usual principles in order to serve him. The nation in general were much prejudiced against foreigners, and universal discontent ensued upon seeing them preferred. king, who had been bred a Calvinist, was also strongly inclined to favour that sect; and finding the clergy of the church of England but little inclined to take the oaths to the new government, he began openly to indulge his own prejudices in favour of dissenters. Having come to the House of Lords to pass some bills, on the 16th March, he made a speech, urging the necessity of admitting all Protestants indiscriminately into the public service. He informed them, that he was employed in filling up the vacancies in offices of trust; he expressed his hopes that they had become sensible of the necessity of a law to settle the oaths to be taken by such persons as should be admitted into place; and he doubted not, that whilst they

Reign of provided against Papists, they would at the same time William leave room for the admission of all Protestants who were and Mary able and willing to serve their country. But this proposition was rejected with vehemence. The adherents of the church complained that the ruin which they feared from the Papists in the preceding reign was now to be dreaded from the Protestant dissenters; and they affirmed, that if the established religion was to be destroyed, it mattered little by whose hands it might fall. A bill brought in by the ministry for abrogating the former oaths of supremacy and allegiance was rejected; and an attempt to dispense with the sacramental test was made without success in another form. The court party proposed that any man, by producing a certificate of his having received the sacrament in any Protestant congregation, should be held sufficiently qualified for office. But this motion was also rejected in the House of Lords by a great majority. William repeated his attempts at a comprehension; but he was ultimately unsuccessful, and in the coronation-oath the church party inserted a clause, that the king should maintain the Protestant religion " as established by law."

For these and other reasons the government of William was for some time in a very tottering condition. The king, either through want of health or inclination, interfered but little in the affairs of the nation; Ireland was strangely neglected; whilst Halifax and Danby, who had in a manner raised the king to the throne, caballed with his enemies. They perceived that the people, with the same levity which had induced them to desert their former sovereign, were beginning to be discontented with their new prince. Every thing seemed to tend to a change. Halifax himself declared, that were James to conform with the Protestants, he could not be kept four months from re-ascending his throne; and Danby averred, that, were the late king to give satisfaction for the security of religion, it would be difficult to oppose his restoration. From these apparent discontents of the nation, the friends and emissaries of James assumed more boldness in tampering with the servants of the crown and inflaming the army. The former they alarmed with the prospect of a sudden change; the latter they roused into indignation by the alleged preference shown by William for his countrymen the Dutch.

Though the kingdom of Scotland did not at first recognise the authority of William, yet the party of James never attained sufficient strength to be of any effectual service to him in that kingdom. Thirty Scottish Peers, and near eighty gentlemen, then in London, had waited on the Prince of Orange in the beginning of January, and, without any authority from the regency still subsisting in Edinburgh, formed themselves into a kind of convention. The Prince of Orange in a formal manner asked their advice; and when he withdrew, they adjourned to the council chamber at Whitehall. The Duke of Hamilton being chosen president, explained the distracted state of Scotland, representing, that disorders, anarchy, and confusion prevailed, and urging the necessity of placing the power somewhere till a convention of estates should be called to form a lasting and solid settlement. When the heads of an address to the Prince of Orange had been settled, and ordered to be engrossed, the Earl of Arran unexpectedly arose, and proposed to invite back the king. The meeting, however, adhered to the Prince of Orange, and waited on him in a body, requesting him to take the administration into his own hands. He thanked them for the trust they had reposed in him; and a convention was ordered to meet at Edinburgh on the 14th of March, it being provided that no exception or limitation whatever should be made, except that the members should be Protestants.

This convention, however, was opposed by some of the Rannoch to hold the diet of rendezvous at Lochaber; and

partisans of James; and the archbishop of Glasgow, the Reign of Earl of Balcarras, and the Viscount Dundee, were autho- William rized by an instrument signed by him, at that time in Ire-and Mary. land, to call a convention of the estates at Stirling. But this measure was disappointed, first by the wavering disposition of the Marquis of Atholl, and afterwards by the procrastination and folly of the party. At last Viscount Dundee, pretending alarm on account of a design alleged to have been formed by the Covenanters to assassinate him, left Edinburgh at the head of fifty horse. As he passed under the walls of the castle, the Duke of Gordon, who then held the command of the fortress, and favoured the cause of James, called him to a conference. Dundee scrambled up the precipice, and informed the duke of his designs in favour of James, at the same time conjuring him to hold out the castle, under a certainty of being relieved. The novelty of the sight collected a multitude of spectators. The convention took the alarm. The president ordered the doors to be locked, and the keys to be laid upon the table. The drums beat to arms in the town; and a parcel of ill-armed retainers were gathered together in the street by the Earl of Leven. Dundee in the mean time rode off with his party. But as soon as they found themselves secure, the Duke of Hamilton adjourned the convention, which relieved the adherents of James from dreadful apprehensions for their own safety. Fifty members retired from Edinburgh; and that circumstance produced unanimity in all the succeeding resolutions of the convention. Soon after this it was determined in a committee that James had "forefaulted" his right to the crown, by which was meant that he had perpetually excluded himself and his whole race from the throne, which was thereby become vacant. This resolution being approved

by the convention, another was drawn up raising Wil-

liam and Mary to the vacant throne; and in consequence

they were publicly proclaimed at Edinburgh on the 11th

of April 1689.

The castle of Edinburgh was still kept in the name of James by the Duke of Gordon; but despairing of any relief, and pressed by a siege, his Grace surrendered it on the 13th of June, upon honourable terms. The adherents of James, terrified at this unexpected misfortune, now turned their eyes to the Viscount Dundee, who having been in vain urged by the convention to return, was at length declared a fugitive, an outlaw, and a rebel. General Mackay had been sent to Scotland by William, with four regiments of foot and one of dragoons. But Dundee, apprised of the general's design to surprise him, retired to the Grampian Mountains with a few horse, and thence marched to Gordon Castle, where he was joined by the Earl of Dunfermline with fifty gentlemen. He next passed through the county of Moray to Inverness, which Macdonald of Keppoch had invested with seven hundred men, after having ravaged the lands of the clan of Mackintosh in his way from his own country. Dundee promised to the magistrates of Inverness to repay, at the king's return, the money extorted from them by Macdonald, and thus induced the latter to join him with all his men. But as he could not prevent the Highlanders from first returning home with their spoil, he accompanied them to Lochaber, and on the 8th of May arrived in Badenoch, whence he wrote letters to the chiefs of the different clans, appointing them to meet at a general rendezvous in Lochaber on the 18th of the same month. In the mean time, passing suddenly through Athole, he surprised the town of Pertli. and hoping to gain over two troops of Scottish dragoons who lay at Dundee, he marched suddenly to that place; but the fidelity of Captain Balfour, their commander, disappointed his views. Dundee then returned through Athole and

Reign of there he was reinforced by several Highland chieftains, ings' flying through the Pass on the north side, and the Reign of William so that his little army was increased to about fifteen hunand Mary dred men. He now turned against Mackay, who had advanced to Inverness, but on the approach of Dundee re-1689. treated to Strathbogie, leaving the whole Highlands exposed to the enemy.

But notwithstanding this partial success, Dundee found himself surrounded with many difficulties. The officers of the Scottish dragoons, who maintained a secret correspondence with him, sent him false intelligence, as an excuse for their own fears, informing him that a party of Irish, who had endeavoured to land in Scotland under the Duke of Berwick, were driven back, and the duke himself taken prisoner; and that Mackay had been reinforced with a regiment of English horse, and another of foot. Crediting this information, Dundee retreated to Badenoch; the natives of the low country who served in his little army quitted him without leave; the Highlanders plundered the country wherever they went; and he himself at last fell sick, while Mackay hovered on his rear. A slight skirmish occurred, in which the Highlanders had the advantage; but they nevertheless lost their baggage during the action. Dundee at length arrived at Ruthven; but Mackay, reinforced with a body of twelve hundred men, advanced against him, and other regiments had arrived at Perth and Dumblane, on their way to join. The Highlanders now deserted every night by hundreds, and their leader was forced to retire to Lochaber, where only two hundred of his whole force remained with him; whilst,

to complete his misfortunes, he at the same time received

intelligence of the surrender of the castle of Edinburgh.

Meanwhile, letters having arrived from King James promising immediate succours from Ireland, Dundee ordered the neighbouring clans to assemble round his standard. But still he wanted the necessary means for prosecuting the war. The Highlanders were armed only with their own proper weapons, and he had no more than forty pounds weight of powder in his whole army. All difficulties, however, were surmounted by the activity of the general, for whom his army entertained an enthusiastic zeal. Having collected a force of about two thousand five hundred men, including three hundred Irish recruits, he resolved to give battle to Mackay, who, with a force considerably superior in numbers, was advancing against him. The encounter took place on the 17th of July 1689, near the head of the Pass of Killikrankie. The Highlanders took post on the face of a hill, a little above the house of Urrard, and to the westward of the great Pass; whilst the king's forces were drawn up on a level piece of ground, in the form of an amphitheatre, bounded on two sides by the heights, and on the third by the river Garry. Dundee delayed his attack until about sunset, when suddenly the Highlanders rushed down like furies, covering themselves from the fire of the king's troops with their targets. " At last," says an eye-witness, " they cast away their muskets, drew their broadswords, and advancing furiously on the king's troops, broke them, and obliged them to retreat; some flying to the water, some another way." The charge was complete. The 21st or Scotch fusileers was on the left of General Mackay's front line, Hastings' and Leslie's, now the 13th and 15th regiments, in the centre, and Lord Leven's, now the 25th, on the right; the whole consisting of two regiments of cavalry and nine battalions of infantry. After the right of the line had given way, the regiments on the centre and the left, which were covered by the river Garry and the woody precipice below the house of Urrard, kept their ground, and for a short time withstood the shock of the Highland charge with the broadsword; but at length they gave way on all sides, Hast-

fusileers dashing across the river, followed by the High- William landers. But Dundee having fallen early in the attack, and Mary the consternation occasioned by his death prevented an immediate pursuit through the great Pass. Had they been closely followed, and had a few men been placed at the southern entrance, not a man of the king's troops would have escaped to tell the story of their defeat. As it was, they lost nearly two thousand men, and the remainder were completely broken and dispersed. But the victory, though gallantly achieved, was productive of nothing but barren glory; and with the fall of Dundee ended all the hopes of James in Scotland. Colonel Cannon, who succeeded him in the command, possessed neither his popularity nor his abilities. After some insignificant actions, in which the valour of the soldiers was more conspicuous than the conduct of their leader, the Highlanders dispersed in disgust; and the war soon afterwards ended favourably for William, without the trouble of repulsing his enemies.

During the troubles in England, which had terminated in placing William on the throne, the two parties in Ireland were kept in a kind of tranquillity by their mutual fears. The Protestants were terrified at the prospect of another massacre; and the Catholics expected every day to be invaded by the united force of the English and Dutch. Their terrors, however, were ill founded; for although Tyrconnel sent several messages to the prince, stating his readiness to deliver up the kingdom to any force that might make a surrender decent, his offers were always rejected. This is said to have been owing to Halifax, who is alleged to have represented to the king, that if Ireland yielded, no pretence would remain for keeping an army in pay; that without an army to protect his authority, he might be as easily turned out as he had been brought in; that the English nation could never remain long in a state of contentment; and that they had already begun to show symptoms of strong disaffection with the new government.

Tyrconnel, disappointed in his views of surrendering Ireland to the Prince of Orange, affected to adhere to King James. The whole military force of the kingdom at that time amounted only to four thousand men, and of these six hundred were in Dublin; whilst all of them were so much disposed to quit the service, that the lord-deputy was obliged to issue commissions for levying new forces. The effect of this was, that there suddenly appeared in various parts of the kingdom a half-armed rabble, who, having no pay from the king, subsisted by depredation, and disregarded all discipline. The Protestants in the north armed themselves in their own defence; and the city of Londonderry, relying on its situation, and a slight wall, shut its gates against the newly-raised army. Protestant parties also appeared everywhere, declaring their resolution to unite in self-defence, to preserve the Protestant religion, to continue their dependence on England, and to promote the meeting of a free parliament.

In these circumstances William sent General Hamilton, like a torrent, fierce, rapid, irresistible; and the rout an Irishman and a Roman Catholic, to treat with Tyrconnel; but instead of persuading that lord to yield to William, Hamilton advised him to adhere to James. In the mean time James himself assured the lord-deputy that he was ready to sail from Brest with a powerful armament; upon which Hamilton marched against the northern insurgents, who were routed with considerable slaughter at Drumore, whilst Hillsborough, where they had fixed their head-quarters, was taken without resistance. The city of Londonderry, however, resolved to hold out to the last extremity.

On the 7th of March 1689, James embarked at Bress.

3 K

Reign of The whole force of his expedition consisted of fourteen William ships of war, six frigates, and three fire-ships; whilst and Mary twelve hundred of his native subjects in the pay of France, and a hundred French officers, composed his army. He landed at Kinsale without opposition on the 12th of the month; and his first care was to secure, in the fort, the

money, arms, and ammunition which he had brought from France, and to put the town in some posture of defence. This done, he advanced to Cork, where Tyrconnel arrived soon after, and brought intelligence of the rout at Drumore. The king was so much pleased with his attachment and services, that he created him a duke, and then began his advance towards Dublin. But the condition of the rabble who flocked to his standard was not calculated to raise his hopes of success. Their very numbers distressed their sovereign, and ruined the country; insomuch that James resolved to disband the greatest part of them. than one hundred thousand were already on foot in the different parts of the island. Of these he reserved fourteen regiments of horse and dragoons, and thirty-five regiments of foot; the rest he ordered to their respective homes, and armed those who were retained in the best manner he could.

On reaching Dublin, James immediately proceeded to business. He ordered all Protestants who had abandoned the kingdom to return; he commanded all Papists, except those in his army, to lay aside their arms, and put an end to the depredations which they had committed in the excess of their zeal; he raised the value of the currency by proclamation; and he summoned a parliament to meet on the 7th of May, in order to settle the affairs of the kingdom. The Protestant clergy represented their grievances in an address; and the university of Dublin appeared with complaints and congratulations. He assured the first of his absolute protection, and a full redress; and he promised the latter not only to defend, but even

to enlarge, their privileges.

On the 8th of April he left Dublin, resolving to lead his army against the insurgents in person; but as they retired before him, he resolved to lay siege to Londonderry. The place, however, made a vigorous resistance; but being reduced to the last extremity, it would have been obliged to surrender had it not been relieved on the 28th of July by seven ships laden with provisions, upon which the siege was immediately raised. In the mean time, the distressed situation of James, and his absolute dependence upon France, drove him to the adoption of measures equally odious and impolitic. His soldiers had for some time been supported by their officers, or subsisted by depredation. But the funds of the officers were at length exhausted, and the country itself could no longer endure the riot and injustice of the soldiers. Pressed by these difficulties, he resolved, by the advice of his council, to coin copper pieces, which should be received in lieu of silver. The inconveniences and iniquity of this measure were obvious; but all Ireland possessed not the means of paying the army in current coin till the middle of June. Of the French remittances only 200,000 livres remained; and the king found it absolutely necessary to reserve that sum, in order to forward his measures regarding Britain, and to procure intelligence of the motions of his enemies. The army was satisfied even with this mock semblance of money, and the people received the fictitious coin in hopes of being repaid in a more favourable state of affairs. A tax of L.20,000 a month, granted for thirteen months by the parliament, furnished government with an appearance of resources; and in the mean time the king endeavoured to support the former revenue by opening a trade with France to supply the want of commerce with England.

To add to the distress of James, Ireland was now invad- Reign of ed by ten thousand men under the command of the Duke William of Schomberg. On the 12th of August 1689, they appear and Mary. ed in ninety transports, on the coast of Donaghadee, in the county of Down; and next day Schomberg landed his army, horses, and train of artillery, without opposition. On the 15th he marched to Belfast, and continued in that place four days to refresh his troops. He then invested Carrickfergus, and threw into it a thousand bombs, which laid the houses in ashes. When the garrison had expended their powder to the last barrel, they marched out with all the honours of war; but Schomberg's soldiers broke the capitulation, disarmed and stripped the inhabitants, without regard to sex or quality, and perpetrated many disgraceful cruelties by way of retaliation on the Papists. Schomberg was an experienced general, who had passed a life of eighty years almost continually in the field; yet he found himself at a loss how to carry on the war with Ireland. Not considering the dangers which threatened the health of his troops by confining them too long in one place, he kept them encamped in a low damp situation near Dundalk, almost without fuel; the consequence of which was, that the men were seized with fevers and fluxes, and died in great numbers. Nor were the enemy less afflicted with similar disorders. In both camps sickness prevailed; and as the rainy season was now approaching, the hostile armies, after remaining for some time in sight of each other, quitted their camps at the same time, and retired

into winter quarters. The ill success of this campaign, and the miserable situation of the Protestants in Ireland, at length induced William to attempt their relief in person. Accordingly, he left London on the 4th of June 1690, and arrived on the 14th at Carrickfergus; whence he passed to Lisburn, the head-quarters of the Duke of Schomberg. At Lough-Britland he reviewed his army, which amounted to thirtysix thousand men, consisting of English, Dutch, Germans, Danes, and French; and being supplied with every necessary, as well as in high health and spirits, they seemed certain of victory. The Irish army abandoned Ardee at their approach, and fell back to the south of the Boyne, where they were joined by James, who had marched from Dublin at the head of his French auxiliaries. The banks of the Boyne were precipitous, and on the south side the ground was hilly, and intersected with ditches. The river itself was deep, and it rose to a considerable height in consequence of the tide. These advantages induced James, contrary to the opinion of his officers, to maintain possession of this post. His army was inferior in numbers, in discipline, and in every other quality, to that of his adversary; but convinced that a retreat would dispirit his troops, and tarnish his own reputation, he resolved to put the fate of Ireland on the issue of a battle. William had no sooner arrived on the ground than he rode along the river in sight of both armies, to examine the position of the hostile force, and make proper dispositions for battle; but being observed by the enemy, a cannon was privately brought out and pointed against the spot where for the moment he stood. The shot killed several of his followers, and he himself was slightly wounded in the shoulder. The report of his being slain was instantly propagated throughout the Irish camp, and even transmitted to Paris; but as soon as his wound was dressed, William rode through the camp, and quickly undeceived his army. The next day, being the 30th of June, the battle began at six o'clock in the morning. William directed the river to be forded in three different places, and the attack to be simultaneously commenced from as many points. Schomberg, with the right wing, consisting of ten thousand men, passed the fords up the river, traversed a bog on the opposite side, and attacked

William short resistance, gave way, and retired precipitately to and Mary secure the Pass of Dunleck, which formed the only line of retreat. The centre next crossed the river, but were gallantly opposed by the French and Irish, with whom they maintained a doubtful contest, till William, passing the river farther down at the head of his cavalry, threatened the enemy's flank, and forced them to fall back on the rest of the army of James, which was retiring in a body around their king. The left met with little or no resistance from the force opposed to them; and, indeed, the whole of James's dispositions seem to have been made for retreat rather than for battle. Hence, with a comparatively small loss, William succeeded in forcing his position at all points, and in establishing his whole army on the opposite bank of this deep and difficult river. Whilst the armies were yet engaged, James, who had so often shown the most heroic courage in battle, rode ingloriously off the field. This dispirited his troops, who fell into irretrievable disorder, and fled in all directions, neglecting his injunction to defend the Pass of Dunleck, and leaving nearly two thousand men killed and wounded on the field. The loss sustained by William's army was, owing to the difficult nature of the ground, considerably greater, though much inferior to what it would have been if James had skilfully availed himself of the strength of his position, and headed the columns of attack as they debouched from the fords. Among the slain was the brave Duke of Schomberg. He was killed by a discharge from his own troops, who, not knowing that he had been accidentally hurried into the midst of the enemy, fired upon the body of men who surrounded him. When James first deserted his troops, O'Regan, an old Irish captain, was heard to observe, that if the English would exchange generals, the conquered army would fight them over again. James withdrew precipitately to Waterford, where he immediately embarked for France.

But the victory at the Boyne was by no means decisive, and the adherents of James resolved to continue their opposition. Sarsfield, a popular and experienced general, put himself at the head of the army which had been routed at the Boyne, and took measures for defending the banks of the Shannon. But James superseded him in the command, which he conferred on St Ruth, a proceeding which gave great dissatisfaction to the Irish. On the other hand, General Ginckel, who had been appointed to command the English army in the absence of William, who had gone over to England, advanced towards the Shannon to meet the enemy. The only place where the river was fordable was at Athlone, a strong walled town, situated on both banks of the river, and in the possession of King James's party. The English soon made themselves masters of that part which was on the one side of the river; but the part on the opposite bank being defended with great vigour, it was resolved in a council of war that a forlorn hope should ford the stream in the face of the enemy; and this desperate enterprise being performed with great resolution, the enemy were driven from their works, and the town surrendered at discretion. St Ruth marched to its relief, but he came too late, and, as he approached, his own guns were turned against him. Upon this he instantly counter-marched, and took post at Aughrim, ten miles distant, where he determined to wait the English army. Ginckel, though he had only eighteen thousand men, whilst the Irish were above twenty-five thousand strong, did not decline the combat. A fierce contest ensued; but St Ruth having fallen, his troops gave way on all sides, and retreated in disorder to Limerick, where they determined to make a final stand, after having lost near five thousand of their best men.

Ginckel, wishing to put an end to the war at once, suf-

Reign of with great impetuosity the left of James, which, after a fered as many of the Irish as chose, to retire to Limerick. Reign of In this last retreat, however, the Irish forces made a brave William The siege commenced on the 25th of August and Mary defence. 1691; and six weeks were spent before the place without any decisive effect. The garrison was well supplied with provisions, and provided with all means of defence. On the other hand, the winter was approaching, and Ginckel had orders to finish the war upon any terms. Accordingly, he offered conditions to the Irish, which, even had they been victors, they could scarcely have refused with prudence. He agreed that all persons in arms should be pardoned; that their estates should be restored, their attainders annulled, and their outlawries reversed; that none should be liable for debts incurred through deeds done in the course of hostilities; that all Roman Catholics should enjoy the same toleration in regard to their religion as in the reign of Charles II.; that the gentry should be permitted to retain their arms; that the inferior class should be allowed to exercise their various callings and professions; that no oath but that of allegiance should be required of any one; and that if the troops, or any number of them, should choose to enter into any foreign service, they should be conveyed to the Continent at the expense of the king. Sarsfield, who had obtained the title of Earl of Lucan from James after his abdication, was permitted to retain a dignity which the laws could not recognise. The lords justices having arrived from Dublin on the 1st of October, signed the articles along with Ginckel, and thus the Irish Catholics put a period to a war which threatened their party with absolute ruin. In consequence of this treaty, about fourteen thousand of those who had fought for King James passed over to France in transports provided by government for conveying them thither; and in this manner all James's expectations from Ireland were entirely frustrated, and the kingdom submitted quietly to the English government.

In the beginning of the year 1692 an action of unexampled barbarity disgraced the government of William in Scotland. In the August preceding, a proclamation had been issued, offering an indemnity to such insurgents as should take the oaths to the king and queen on or before the last day of December; and the chiefs of such tribes as had been in arms for James soon after took advantage of the proclamation. But Macdonald of Glenco was prevented by accident rather than design from tendering his submission within the limited time. In the end of December he went to Colonel Hill, who commanded the garrison in Fort William, to take the oaths of allegiance to the government; and the latter having furnished him with a letter to Sir Colin Campbell, sheriff of the county of Argyle, directed him to repair immediately to Inverary to make his submission in a legal manner before that magistrate. But the way to Inverary lay through almost impassable mountains, the season was extremely rigorous, and the whole country was covered with a deep snow. So eager, however, was Macdonald to take the oaths before the limited time should expire, that, though the road lay within half a mile of his own house, he stopped not to visit his family, and, after various obstructions, arrived at Inverary. The time had elapsed, and the sheriff hesitated to receive his submission; but Macdonald prevailed by his importunities, and even tears, in inducing that functionary to administer to him the oath of allegiance, and to certify the cause of his delay. At this time Sir John Dalrymple, afterwards Earl of Stair, being in attendance upon William as secretary of state for Scotland, took advantage of Macdonald's neglecting to take the oaths within the time prescribed, and procured from the king a warrant of military execution against that chief and his whole clan. This was done at the instigation of the Earl of Breadalbane, whose

Reign of lands the Glenco men had plundered, and whose treachery his sign-manual, a thing altogether unusual and unprece- Reign of William to government in negociating with the Highland clans Macdonald had himself exposed. The king was accordingly persuaded that Glenco was the main obstacle to the pacification of the Highlands; and the fact of the unfortunate chief's submission having been concealed, the sanguinary orders for proceeding to military execution against his clan were in consequence obtained. The warrant was both signed and countersigned by the king's own hand; and the secretary urged the officers who commanded in blink the inquiry which had been commenced, the king the Highlands to execute their orders with the utmost rigour. Campbell of Glenlyon, a captain in Argyll's regiment, and two subalterns, were ordered to repair to Glenco on the first of February with a hundred and twenty men. Campbell, being uncle to young Macdonald's wife, was received by the father with all manner of friend-ship and hospitality. The men were lodged at free quarters in the houses of his tenants, and received the kindest entertainment. Till the 13th of the month the troops lived in the utmost harmony and familiarity with the people; and on the very night of the massacre the officers passed the evening at cards in Macdonald's house. In land advanced L.400,000 towards the establishment of a the night Lieutenant Lindsay, with a party of soldiers, called in a friendly manner at his door, and was instantly admitted. Macdonald, while in the act of rising to receive his guest, was shot dead through the back with two bullets. His wife had already dressed; but she was stripped naked by the soldiers, who tore the rings off her fingers with their teeth. The slaughter now became general, and neither age nor infirmity was spared. Some women, in defending their children, were killed; boys, imploring mercy, were shot dead by officers on whose knees they hung. In one place nine persons, as they sat enjoying themselves at table, were butchered by the soldiers. In Inverriggon, Campbell's own quarters, nine men were first bound by the soldiers, and then shot at intervals, one by one. Nearly forty persons were massacred by the troops; and several who fled to the mountains perished by famine and the inclemency of the season. Those who escaped owed their lives to a tempestuous night. Lieutenantcolonel Hamilton, who had received the charge of the execution from Dalrymple, was on his march with four hundred men, to guard all the passes from the valley of Glenco; but he was obliged to stop by the severity of the be completely healed. The distresses of the people, upon weather, which proved the safety of the unfortunate clan. Next day he entered the valley, laid the houses in ashes, and carried away the cattle and spoil, which were divided among the officers and soldiers.

It can scarcely be imagined that a massacre attended with circumstances of such unparalleled treachery and cruelty could pass without some animadversion at the time, or escape the indignant reprobation of history afterwards. However willing we may be to ascribe to the immediate agents in this horrid business all that is most revolting and hideous in the execution of the sanguinary warrant obtained by Secretary Dalrymple at the instigation of Breadalbane, and to transfer to them a large share of the guilt and odium which will ever attach to it, still, after all allowances are made, it is impossible to exculpate William from knowingly consenting to a proceeding which nothing but dire necessity could ever justify. That he was beset by sanguinary ministers, and kept in ignorance of the fact it will also be observed that he signed and countersigned an order for exterminating a whole clan without instituting any previous inquiry; and that afterwards, when the precaution of Secretary Dalrymple in requiring the king

dented, might well have excited suspicion in the mind of William William; nor, with the knowledge of this fact, coupled and Mary with the neglect of all inquiry in the first instance, and ' the impunity of the instigators of the crime afterwards, is it easy to believe that this otherwise excellent prince was altogether free of guilty participation in the foul and

bloody tragedy of Glenco. To efface the remembrance of this massacre, and to now caused his commissioner to declare in the Scottish parliament, "That if the members found it would tend to the advancement of trade that an act should be passed for the encouragement of such as should acquire and establish a plantation in Africa, America, or any other part of the world where plantations might be lawfully acquired, that his majesty was willing to declare he would grant to the subjects of this kingdom, in favour of these plantations, such rights and privileges as he granted in like cases to the subjects of his other dominions." Relying on this and other flattering promises, the nobility and gentry of Scotcompany for carrying on an East and West India trade; and twelve hundred veterans who had served in King William's wars were sent to effect a settlement on the isthmus of Darien or Panama, which, from its situation, was equally adapted for trading with both the Indies. The new colony was well received by the natives, and matters began to wear a promising aspect, when the king, at the earnest solicitations of the English and Dutch East India Companies, resolved to gratify the latter at the expense of his Scottish subjects, and sent orders to the governor of Jamaica and the English settlements in America to issue proclamations, prohibiting, under the severest penalties, all his majesty's subjects from holding any correspondence with the Scottish colony, or assisting it in any way with arms, ammunition, or provisions. Thus the new settlers were abandoned to their fate, although many of them had been covered with wounds in fighting the king's battles; and thus vanished all the hopes of the Scottish nation, which had engaged in the design with incredible alacrity, and with sanguine expectations that the misfortunes of their country would, by this new channel of commerce, receiving authentic accounts of the fortune of their colony, scarcely admit of any description; and the whole nation joined in reproaching their sovereign with double dealing, inhumanity, and base ingratitude, to a people who had lavished their treasure and best blood in support of his government, and in the gratification of his ambition.

But the total reduction of Ireland, and the dispersion and extermination of the Highland chieftains who favoured his cause, did not entirely put an end to the hopes of James. His chief expectations were founded on a conspiracy among his English adherents, and in the succours promised him by the French king. A plot was first formed in Scotland by Sir James Montgomery, a person who, from being an adherent of William's, now turned against him; but as the project was ill contrived, so it was as lightly discovered by the instigator. To this succeeded another, which seemed to threaten more serious consequences, as it was managed by the Whig party, the most of Macdonald's submission, may be readily admitted; but formidable in the state, a number of whom joined themselves to the Tories, and made advances to the late king. They assembled together; and, in order to lose no time. it was resolved to send over to France two trusty persons, truth became known, no punishment was inflicted on the Lord Preston and Mr Ashton, to consult with the exiled instigators of the massacre. Besides, the extraordinary monarch. Both of them, however, were seized by order of Lord Caermarthen, and condemned. Ashton was exto countersign the order to which he had already affixed ecuted without making any confession; but Lord Preston

Reign of wanted equal virtue or resolution, for on an offer of par-William don, he discovered a great number of associates, amongst thoughts were entertained of the late king of Britain in the William Lord Clarendon.

The French having at last become sensible of their bad policy in not better supporting the cause of James, resolved to attempt a descent upon England in his favour; and, in pursuance of this scheme, James was supplied with an army consisting of a body of French troops, some English and Scottish refugees, and the Irish regiments which had been transported into France from Limerick, and by long discipline and severe duty had become excellent soldiers. This army was assembled between Cherbourg and La Hogue, and commanded by King James in person. More than three hundred transports were provided for landing the expedition on the opposite coast; and Tourville, the French admiral, at the head of sixty-three ships of the line, was appointed to favour the descent; his orders being at all events to attack the enemy in case they should oppose him. Every thing therefore promised a change of fortune to the exiled king, and he might now entertain hopes of recovering his crown. But these preparations on the side of France were soon known at the English court, and measures taken for a vigorous and effective resistance. The secret machinations of the banished king's adherents were discovered to the English ministry by spies; and it was thus found that the Tories were more faithful than even the Whigs, who had placed King William on the throne. The Duke of Marlborough, Lord Godolphin, and even the Princess Anne herself, were violently suspected of disaffection.

Preparations, however, were made with great tranquillity and resolution, to resist the coming storm. Admiral Russell was ordered to put to sea with all possible expedition; and he soon appeared with ninety-nine ships of the line, besides frigates and fire-ships. At the head of this formidable fleet he set sail for the coast of France; and, near La Hogue, he discovered the enemy under Tourville, who prepared to give him battle. The engagement began be-tween the two flag ships with the greatest fury, and the rest of the ships in succession followed their example. The battle lasted ten hours; but at length victory declared in favour of numbers, and the French fled for Conquet road, having lost four ships in the action. The pursuit continued for the two days following. Three French ships of the line were destroyed on the day succeeding the principal conflict; and eighteen more, which had taken refuge in the bay of La Hogue, were burnt by Sir George Rooke. The ships were drawn up in the shallows, and seemed to be secure against attack; but nothing could resist the bravery and enterprise of the British seamen, who, crowding in barges, under cover of such frigates as could be brought sufficiently near, boarded the enemy's ships, overpowered their crews, and then set them on fire. When James beheld his late subjects thus daringly occupied in completing the destruction of the French fleet, he could not restrain his admiration of their gallantry; and, whilst witnessing the wreck of all his hopes, exclaimed, "Ah, none but my brave English could do this." thus were frustrated the preparations of France, which from this time seemed to relinquish all claims to the empire of the ocean.

The battle of La Hogue, which took place on the 21st of May 1692, put a final period to the hopes of James. No further attempts were made in his favour, except some plots to assassinate King William, which ended only in the destruction of those who had formed them. But it was never thoroughly proved that James countenanced these designs; and it rather appears that he expressed abhorrence of such attempts. In 1697 the Abbé de Polignac, 28th of December 1694. The grief he felt for her loss

and Mary. whom were the Duke of Ormond, Lord Dartmouth, and new election which happened on the death of John Sobi-and Mary eski; and that James had already been named by some of the diet as his successor. Louis was eager to seize an opportunity of ridding himself with honour of a prince whose pretensions he could no longer support; and the friends of James were also sanguine as to the project; but he himself refused it. The same year, at an interview between King William and Louis XIV. it was proposed that the Prince of Wales, James's son, should succeed to the throne of England after the death of William. William with little hesitation agreed to this request, and even engaged to procure the repeal of the act of settlement, and the passing of another declaring the Prince of Wales his successor to the throne. But this proposal was also rejected by James. He told the king of France, that though he could endure with patience the usurpation of his nephew, he would never permit his own son to be guilty of the same injustice; that should his son reign in his father's life-time, that circumstance would amount to a formal renunciation; and that the Prince of Wales, by succeeding to the Prince of Orange, would thereby yield his sole right, which devolved to him through his father alone.

From this time James lost every hope of being restored to the throne, and resigned himself entirely to religious austerities. His constitution, though vigorous and athletic, had for some time begun to yield to the infirmities of age, and to that melancholy which superstition, uniting with misfortune, had impressed on his mind. In the beginning of September 1701, whilst he was at public prayers, according to his daily custom, he fell suddenly into a lethargy; and though he recovered his senses soon after, he languished for some days, and expired on the 6th of The French king paid him several visits September. during his sickness, and exhibited every symptom of com-

passion, affection, and even respect.

Embarrassed as to how he ought to proceed upon the unexpected death of James, Louis called a council to deliberate whether he should acknowledge the Prince of Wales as king of Great Britain and Ireland. The king himself had hesitated long in this delicate point; but the Dauphin, the Duke of Burgundy, and all the princes of the blood, declared that it would be unbecoming the dignity of the crown of France not to own that the titles of the father had devolved immediately on the son. Louis approved of this view, and determined in person to acquaint the dying king with his resolution. When he arrived at St Germains, James lay almost insensible from his disorder; but rousing himself, he began to thank his most Christian majesty for all his favours. Louis, however, interrupted him: "Sir," said he, "what I have done is but a small matter; but what I have to say is of the ut-most importance." The people then began to retire, but Louis ordered them to remain. "I come to acquaint you, Sir," he added, " that when God shall please to call your majesty from this world, I shall take your family under my protection, and acknowledge your son as king of Great Britain and Ireland."

Though the defeat of the French fleet at La Hogue had put an end to all danger of any further attempt from that quarter, William by no means possessed his throne in any degree of tranquillity. The want of a common enemy produced dissensions amongst the people, and the king began to experience as much trouble from his parliament at home as from any enemy in the field. The uneasiness he felt on account of the refractory disposition of his subjects was not a little heightened by the death of his queen, who was carried off by the small-pox on the

and Mary lance of power and the fluctuating interests of Europe. William's chief motive for accepting the crown had been to engage England more deeply in the concerns of Europe; and as his great object had been to humble the French, so his politics mainly consisted in forming alliances against France. But many of the English had no such animosity against that country; and considering the interest of the nation as sacrificed to foreign connections, they complained that the continental war fell most heavily on them, though they had the least interest in its success. These complaints were at first heard by William with indifference; and he continued to bestow all his attention on the balance of power and the interests of Europe. But in attending to foreign affairs he overlooked internal polity; and, as he formed alliances abroad, he increased the influence of party at home. In accepting the crown, William had resolved to preserve as much of the prerogative as could decently be retained; and he sometimes exerted a branch of it, the power of refusing his assent to bills which had passed both houses, with equal firmness and decision. Hence perpetual bickerings took place between him and his parliaments. But William at last became fatigued with opposition, and admitted every restraint which they chose to impose on the prerogative in England, upon condition of being properly supplied with the means necessary for humbling France.

The war with France continued during the greatest part of this king's reign; but at length the treaty of Ryswick, in 1697, put an end to a contest in which England had engaged without policy, and from which she came off without advantage. In the general pacification her interests seemed entirely neglected; and for all the treasures she had transmitted to the Continent, and all the blood which had been shed there, the only equivalent received was an acknowledgment of William's title by the king of France.

The king being now freed from foreign war, set himself to strengthen his authority at home; and as he could not endure the thoughts of a king without an army, he conceived hopes of keeping up, in time of peace, those forces which had been granted him during the time of danger. The Commons, however, to his great mortification, passed a vote that all the forces in the pay of England, exceeding seven thousand men, should be forthwith disbanded, and that those retained should be natural-born subjects of England. At this vote the king's indignation was kindled to such a degree, that he actually conceived a design of abandoning the government. From this, however, his ministers diverted him, and persuaded him to consent to the passing of the bill.

These altercations continued during the remainder of this reign. William considered the Commons as a body of men desirous of power for themselves, and consequently bent upon obstructing all his projects for securing the liberties of Europe; and he seemed but little attached to any particular party in the house, all of whom he found at times deserted or opposed him. He therefore inclined to Whigs and Tories indiscriminately, as interest or the immediate exigency demanded. He considered England as a place of labour, anxiety, and altercation. If he had any time for amusement or relaxation, he retired to Loo in Holland, where, among a few friends, he indulged in such festivities as he was capable of relishing. Here he planned the succession of the different princes of Europe, and laboured to undermine the schemes and the power of Louis, his rival in politics and fame. But however feeble might be William's desire of other amusements, he could scarcely exist without being at variance with France. Peace had hardly been concluded with that nation when

Reign of was deep and sincere; but all private concerns were soon he began to think of resources for carrying on a new war, Reign of William merged in the greatness of his apprehensions for the band Mary. France. Several arts were used for inducing the people to second his aims; and the whole nation seemed at last to join in desiring a French war. He had been in Holland concerting with his allies operations for a new campaign; and he had entered into a negociation with the Prince of Hesse, who assured him that if he would besiege and take Cadiz, the admiral of Castile and several other grandees of Spain would declare for the house of Austria. The Elector of Hanover had concurred in the same measures; the king of the Romans, and Prince Louis of Baden, undertook to invest Landau; and the emperor promised to send a powerful reinforcement into Italy. But death unexpectedly put a period to the projects and ambition of this prince, who, with all his defects, was, in many particulars, a truly great man.

William was naturally of a very feeble constitution; and by this time it had become almost quite exhausted by a series of continual disquietude and action. He had endeavoured to repair his strength, or at least to conceal its decay, by exercise on horseback. But on the 21st of February 1702, whilst riding to Hampton Court from Kensington, his horse fell under him, and he was thrown with such violence that his collar-bone was fractured. His attendants conveyed him to the palace at Hampton Court, where the fracture was reduced; and in the evening he returned to Kensington in his coach. But the jolting of the carriage disunited the fracture; and although the bones were again replaced by Bidloo his physician, this accident proved ultimately fatal. For some time indeed he ap-peared to be in a fair way of recovery; but falling asleep in his couch, he was seized with a shivering, which terminated in a fever and diarrhoea, that resisted all remedial means employed to abate them. Perceiving his end approaching, he exhibited another example of the ruling passion strong in death. The objects of his former care lay nearest his heart; and the fate of Europe seemed to render him insensible to his own. The Earl of Albemarle arriving from Holland, he conferred with him in private on the posture of affairs abroad; and having received the sacrament from Archbishop Tennison, he expired on Sunday the 8th of March, having lived fifty-two years, and reigned thirteen. William was in his person of the middle stature; his body was slender and his constitution delicate. He had an aquiline nose, sparkling eyes, a large forehead, and a grave solemn aspect. He left behind him the character of a great politician, though he had never been popular; and of an able general, though he had seldom been victorious. His deportment was grave, phlegmatic, and sullen; nor did he ever show any fire or animation except in the day of battle. On such occasions he was all life, gaiety, energy, and alacrity. At the last moment, when his mind was otherwise oppressed, he retained a just sense of religion, and seemed impressed with anxiety for the welfare of his subjects. He lay quietly and composed, with his eyes fixed upon heaven; and when his speech failed him, he appeared so resigned that no man could die either better prepared or with greater constancy and piety, than this prince, whose memory will ever be respected by the lovers of rational liberty.

# CHAP. IX.

# REIGN OF QUEEN ANNE.

Accession of Anne.-State of parties.-War declared against France.—Duke of Marlborough appointed general.—His success in his first Campaign.—Losses sustained at sea.—Gallantry and death of Admiral Benbow.—Continental army increased.— Reign of Queen Anne. 1702

Further successes of Marlborough.-French defeated at Blen- he was sure to promote it; and thus all the upper ranks Reign of heim.—Gibraltar taken.—French defeated at sea.—Ineffectual attempt of the Spaniards to recover Gibraltar.—Charles declared king of Spain.-War of the Succession.-Barcelona taken.-French defeated at Ramillies .- The King of France sues for peace.-Change in the councils of Queen Anne.-English de-The articles violently Union between Scotland and England.—The articles violently opposed in Scotland.—Effects of this measure.—Dissolution of the Scottish Privy Council.-French defeated at Oudenarde. Battle of Malplaquet—Last Campaign of Marlborough.—Forces Villars to quit his lines without striking a blow.—Capture of Bouchain.—Marlborough dismissed from all his employments.—Peace of Utrecht.—Attempt to dissolve the Union.— Intrigues of the Whigs and Tories.—Death of Queen Anne.

William was succeeded by the Princess Anne, who had married George, Prince of Denmark. She ascended the throne in the thirty-eighth year of her age, to the general satisfaction of all parties. William had died on the eve of a war with France; and the present queen, who was generally guided by the advice of her ministry on every important occasion, was now urged by opposite councils, one part of the ministry being inclined for war and another for peace. At the head of those who opposed a war with France was the Earl of Rochester, lord lieutenant of Ireland, first cousin to the queen, and the chief of the Tory faction; whilst the opposite party was led by the Earl, afterwards Duke, of Marlborough, and subsequently so much and justly renowned for his victories over the French. After both parties had given their opinions, that of Marlborough preponderated. The queen resolved to declare war; and having communicated her intentions to the House of Commons, by whom it was approved, war was proclaimed accordingly. In this declaration Louis was taxed with having taken possession of a great part of the Spanish dominions; with a design to invade the liberties of Europe, and to obstruct the freedom of navigation and commerce; with having offered an unpardonable insult to the queen and her throne, by acknowledging the title of the pretender; and with attempting to unite Spain to his own dominions, by placing his grandson upon the throne of that kingdom, and thus endeavouring to destroy the balance of power that subsisted among the states of Europe. This declaration of war on the part of England was seconded by similar manifestoes by the Dutch and Germans.

Louis XIV., whose power had been greatly circumscribed by William, expected, on the death of the latter, to enter on a field open for new conquests and fame. At the news of the English monarch's death, therefore, he could not suppress his satisfaction; whilst the people of Paris, and indeed throughout the whole kingdom, testified their joy in the most public manner. The French monarch was filled with indignation at seeing such a combination against him; but his resentment fell chiefly on the Dutch, and he declared with great emotion, that as for those gentlemen pedlars, they should one day repent their insolence and presumption in declaring war against him, whose power they had formerly felt and dreaded. By these threats, however, the affairs of the allies were no way influenced. Marlborough was appointed general of the British forces, and by the Dutch he was chosen generalissimo of the allied army; and indeed his subsequent conduct showed that no person could possibly have been chosen with greater propriety. He had learned the rudiments of war under Turenne, having served as a volunteer in his army; and that celebrated commander had prognosticated his future greatness.

The first attempt which Marlborough made to deviate from the general practice of the army was to advance the subaltern officers, whose merits had hitherto been neglected. Regardless of seniority, wherever he found ability

of command were filled with men rather remarkable for their skill and talents than for their age and experience. In his first campaign, in the beginning of July 1702, he repaired to the camp at Nimeguen, where he found himself at the head of sixty thousand men, well provided with all necessaries, and long disciplined by the best officers of the age. He was opposed on the part of France by the Duke of Burgundy, a youth of very little experience in the art of war; but the real acting general was Marshal Boufflers, the second in command, an officer of courage and activity. But wherever Marlborough advanced, the French were obliged to retire before him, leaving all Spanish Guelderland at his discretion. The Duke of Burgundy, finding himself obliged to retreat before the allied army, rather than expose himself longer to such a mortifying indignity, returned to Versailles, leaving Boufflers to command alone. The latter then retired to Brabant; and Marlborough ended the campaign by taking the city of Liege, in which he found an immense sum of money and

a great number of prisoners.

This good fortune seemed to console the nation for some unsuccessful expeditions at sea. Sir John Munden having permitted a French squadron of fourteen ships to escape him by taking shelter in the harbour of Corunna was dismissed the service. An attempt was made upor Cadiz by sea and land, Sir George Rooke commanding the navy, and the Duke of Ormond the land forces; but this also miscarried. At Vigo, however, the British arms were attended with better success; and the French fleet which had taken refuge there were burned in order to prevent their falling into the hands of the English, whilst ten ships of war were taken, together with eleven galleons, and above a million of money in silver. In the West Indies, Admiral Benbow, who had been stationed with ten ships to distress the enemy's trade, having received information that Du Casse the French admiral was in those seas with a force equal to his own, resolved to attack him; and having discovered the enemy's squadron near St Martha steering along the shore, he quickly gave the necessary orders to his captains, and forming the line of battle, began the action. But the rest of the fleet having taken some causeless disgust at his conduct, permitted the admiral to sustain, almost alone, the whole fire of the enemy. Nevertheless, the engagement continued till night, and he determined to renew it next morning; but he had the mortification to perceive that all the rest of his ships had fallen back except one, who joined him in urging the pursuit of the enemy. During four days this intrepid seaman, assisted by only one ship, pursued and fought the enemy, whilst his dastardly officers remained at a secure distance. In the last day's battle, which was more furious than any of the preceding conflicts, the admiral's leg was shattered by a cannon-ball, and he himself died soon after of his wounds. Two of his associates were shot on their arrival in England; one died on his passage home; and the remainder were justly disgraced.

The next parliament, which was convened by the queen, evinced great satisfaction at the success of the British arms on the Continent. The House of Commons, composed chiefly of Tories, voted forty thousand seamen, and the like number of land forces, to act in conjunction with those of the allies. But soon afterwards the queen informed her parliament that she was pressed by the allies to augment her forces; and upon this it was resolved that ten thousand more men should be added to the continental army; on condition, however, that the Dutch should immediately break off all commerce with France and Spain.

In the beginning of April 1703 the Duke of Marlborough crossed the sea, and assembling the allied army,

Anne. 1702.

Reign of opened the campaign with the siege of Bonn, the residence nications intercepted by another strong detachment. In Reign of of the Elector of Cologne, which held out but a short time. He next retook Huy, the garrison of which, after a vigorous defence, surrendered prisoners of war. Limburg was then besieged, and surrendered in two days; and the campaign concluded by securing the country of Liege, the electorate of Cologne, and the Lower Rhine, against the de-

signs of the enemy. In the campaign of 1704, the Duke of Marlborough, having informed the Dutch of his intention to march to the relief of the empire, which had been for some time oppressed by the French forces, the states gave him full powers to act as he thought proper, with assurances of assistance in all his efforts. The French king, finding Boufflers no longer capable of opposing Marlborough, appointed the Marshal de Villeroi to command in his room. But Marlborough, having no great fears from Villeroi, immediately marched to the assistance of the emperor. Taking with him about thirteen thousand British troops, he advanced by rapid marches to the banks of the Danube, de- from which it did not soon recover. Having finished the feated a body of French and Bavarians stationed at Donawerth to oppose him, and, passing the river, laid under contribution the electorate of Bavaria, which had taken part with the enemy. Villeroi, who at first had attempted to follow his motions, soon lost sight of him; nor was the French commander apprised of his route till informed of his successes. But, in the mean time, Marshal Tallard prepared by another line to obstruct Marlborough's retreat, with an army of thirty thousand men; and being soon after joined by the forces of the Elector of Bavaria, the French army in that part of the Continent amounted to sixty thousand by land. The town of Gibraltar was taken by the Prince veterans, commanded by two generals then reputed the best in France. To oppose this powerful force the Duke of Marlborough formed a junction with a body of thirty thousand men under the celebrated Prince Eugene; so that, with this reinforcement, the allied army amounted to about fifty-two thousand combatants. After various marches and countermarches, the two armies met at Blenheim. The French, under Tallard, were posted upon a hill near the town of Hochstet, having their right covered by the Danube and the village of Blenheim, their left by the village of Lutzengen, and their front by a rivulet, the sides of which were steep and the bottom marshy; and in this strong position they seemed to bid defiance to their adversaries. But Marlborough and Eugene, having carefully examined the ground, resolved to attack them, and accordingly advanced upon the plain in front of their position. The battle began by a cannonade on both sides, which lasted from nine in the morning until half an hour after mid-day. At this moment Marlborough, who had completed all his dispositions, crossed the rivulet at the head of the English, and attacked the cavalry of Tallard on the right, while that officer was engaged in reviewing his troops on the left. An hour elapsed, however, before Prince Eugene could bring up his forces to attack the other wing of the enemy commanded by the Elector of Bavaria; but, during this time, Marlborough's attack had been completely successful; and when Tallard repaired to the scene of action he found that the French cavalry had been thrice repulsed. He then attempted to lead to the charge a large body of troops which he had posted in the village; but these being furiously assailed by a strong detachment of English troops, were scarcely able to maintain their ground, while the French, taken in flank and in reverse, were totally defeated. This success led to a movement which proved completely decisive. Penetrating between the two wings of the French army, through the space left open by the defeat of the cavalry, the English troops effected a total separation between them, whilst the large force imprudently posted in the village of Blenheim had its commu-

this situation Tallard flew to rally some of his squadrons; Queen but, being short-sighted, he mistook a Hessian for a French, corps, and was made prisoner. On the left Prince Eugene had encountered a vigorous resistance and been thrice repulsed; but, having received some reinforcements from Marlborough, he at last succeeded in dislodging the enemy opposed to him. The battle was now won. The French fled in the utmost confusion, whilst the corps of thirteen thousand men which occupied Blenheim were surrounded and made prisoners. About twelve thousand French and Bavarians were killed on the field or drowned in the Danube; whilst one hundred colours, two hundred standards, three thousand tents, all the baggage, and the military chest of the French army, formed the trophies of this gloriou, day. Of the allies not less than thirteen thousand were killed, wounded, or missing; but the conquerors by the victory gained a territory of a hundred leagues in extent, and inflicted a blow on the power of France campaign, the duke repaired to Berlin, where he procured a reinforcement of eight thousand Prussians to serve under Prince Eugene in Italy, and then proceeded to nego-

ciate for succours at the court of Hanover; after which he

returned to England, and was received with every possible

demonstration of joy. The manor of Woodstock was conferred upon him; and the lord-keeper, in the name of the Peers, honoured him with the praises which his talents and conduct had so well merited. Nor were the arms of Britain less fortunate by sea than of Hesse and Sir George Rooke; but so little was the value of the conquest at that time understood, that it was for some time debated whether the admiral should be thanked for making it, and at last it was considered as unworthy of public gratitude. Soon after, the British fleet, to the number of fifty-three ships of the line, came up with that of France, consisting of fifty-two men of war, commanded by the Count de Toulouse, off the coast of Malaga. The battle began at ten in the forenoon, and continued with great fury for six hours, when the van of the French began to give way. The British admiral for two days attempted to renew the engagement; but this was cautiously declined by the French, who at last disappeared totally. Both sides claimed the victory, although the result showed that it was in favour of the British. Meanwhile the Spaniards, alarmed at the capture of Gibraltar, sent the Marquis of Villadurias with a large army to retake it. France also dispatched a fleet of thirteen ships of the line; but some of them parted company in a gale, and others were taken by the British. Nor was the land force more successful. The siege continued for four months, during which time the Spaniards repeatedly attempted in vain to scale the rock; and at last, losing all

their men and abandon the enterprise. Whilst the British were thus victorious by land and sea, a new scene of contention was opened on the side of Spain. Philip V. grandson of Louis XIV. had been raised to the throne of that kingdom, having been nominated as successor to the crown by the late king of Spain's will. But in a former treaty among the powers of Europe, Charles, son of the emperor of Germany, was appointed heir to that crown; and this treaty had been guaranteed by France herself, although she now resolved to recal that consent in favour of a descendant of the house of Bour-Charles was still further led to urge his pretensions to the crown of Spain by the invitation of the Catalonians, who declared in his favour, and promised, with the assistance of the British and Portuguese, to arm in his cause.

hopes of taking the place, they were contented to draw off

1704.

Queen 1705.

Reign of On his way to his new dominions, he landed in England, they began to meditate schemes of opposition to the Duke Reign of Earl of Peterborough, a man of romantic bravery and high military genius. The first attempt of this general was on the city of Barcelona, at that time defended by a garrison of five thousand men. The fort of Monjuic, situated on a hill which commanded the city, was attacked; and the outworks being taken by storm, as well as the pate the conquering mania which had seized the nation, powder-magazine blown up, the fort surrendered, and in a short time afterwards the city capitulated. The conquest of all Valencia succeeded the capture of Barcelona; Charles became master of Aragon, Carthagena, Grenada, and Madrid; and the British general having entered the capital in triumph, there proclaimed Charles king of Spain, without opposition.

These successes, however, were soon eclipsed by the victories of the Duke of Marlborough, which alone engrossed public attention. In 1706 he opened the campaign with an army of eighty thousand men. The army of Villeroi, in the vicinity of Tirlemont, was of nearly equal strength, and he had orders to attack the allies before the Danish and Prussian contingents could join. But, whilst it was his intention to become the assailant, Villeroi was himself attacked, in a position which prevented his developing the whole of his force. He had the river Mehaigne on his flank, and his centre occupied the village of Ramillies, while a marsh covered his left. Marlborough skilfully availed himself of the disposition made by his antagonist; and knowing that Villeroi's left was paralysed by reason of the marsh in front, which effectually prevented its acting on the offensive, he directed his principal attack upon the centre, which formed the key of the position. The issue of the conflict was never for a not deserve. moment doubtful; the village was carried in the most gallant style, and both wings being at once separated and turned, a complete rout ensued. About six thousand French were made prisoners, and upwards of eight thousand killed or wounded. The whole of Brabant became the reward of the victors. The French troops were now dispirited; the city of Paris was in confusion; and Louis, who had long been flattered with conquest, was humbled to such a degree as almost to excite the compassion even of his enemies. He sued for peace, but in vain; the allies carried all before them; and his capital began to dread the approach of the conquerors. But what neither his armies nor his politics could effect, was brought about by the intrigues of a party in England. The dissensions between the Whigs and Tories saved France, which now seemed tottering on the very brink of ruin.

The councils of the queen had hitherto been governed by a Whig ministry; for though the Duke of Marlborough began his career in the interest of the opposite party, he soon joined the Whigs, whom he found most sincere in the design of humbling France. The people, however, were now in fact beginning to change their sentiments, and to imbibe the slavish spirit of Toryism. The queen's personal virtues, her successes, her deference for the clergy, and their great veneration for her, all contributed to give her great influence with the nation. Persons of every rank were not ashamed to defend the most servile tenets, when these tended to flatter or increase the power of the sovereign, and to argue in favour of strict hereditary succession, divine right, and non-resistance to the regal power. The Tories, though joining in vigorous measures against France, were never very ardent enemies of that country; but they secretly hated the Dutch, and longed for an op-

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where, on his arrival, he was received by the Dukes of of Marlborough, whom they represented as an interested Somerset and Marlborough; kindly greeted by the queen; man, who sacrificed the real interests of the nation, in and furnished with two hundred transports, thirty ships of protracting a ruinous war, for his own private emolument war, and nine thousand men, under the command of the and glory; and as the country was oppressed with a load of taxes, which a continuance of the war would inevitably increase, discontent began to spread, and the Tories wanted only a few determined leaders to assist them in removing the present ministry.

In the meanwhile, a succession of losses began to dissiand to incline them to wish for peace. The Earl of Galway, who commanded the English army in Spain, was completely defeated at Almanza by the Duke of Berwick; and in consequence of this victory all Spain, except the province of Catalonia, returned to their duty to Philip as their lawful sovereign. An attempt was made upon Toulon by the Duke of Savoy and Prince Eugene by land, and an English fleet by sea; but to no purpose. The fleet under Sir Cloudesley Shovel, having set sail for England, was driven by a violent storm on the rocks of Scilly, where his own ship was lost, and every person on board perished; while three more ships met with the same fate, and four others were saved with the utmost difficulty. In Germany, Marshal Villars carried all before him, and was upon the point of restoring the Elector of Bavaria. The only hopes of the people lay in the activity and conduct of the Duke of Marlborough, who opened the campaign of 1707, about the middle of May; but even here they were disappointed. The duke declined an engagement; and, after a variety of marches and countermarches, both armies retired into winter quarters about the end of October. The French made vigorous preparations for the next campaign; and the duke returned to England to meet with a reception which he did not at all expect, and which he certainly did

The most remarkable transaction of this year, and indeed of this whole reign, was the union between the two kingdoms of Scotland and England. Though governed by one sovereign since the time of James I. of England, yet each nation had continued to be ruled by its respective parliament, and often professed to pursue interests opposite to those of its neighbour. The union had often been unsuccessfully attempted before, and had indeed been the cause of the bloody wars in the times of Edward I. and Edward III. of England. In all the former proposals on that head, both nations were supposed to remain free and independent; each kingdom having its own parliament, and being subject only to such taxes and other commercial regulations as those parliaments judged expedient for the benefit of their respective states. But after the destruction of the Darien colony in the manner already related, King William had endeavoured to allay the national ferment by resuming the affair of a union with as much assiduity as his warlike occupations would allow. The terms proposed were the same with those formerly tendered; namely, a federal union, somewhat like that of the states of Holland. With this view the Scots were prevailed on to send twenty commissioners to London, who, with twenty-three on the part of England, assembled at White-hall in the month of October 1702. Here they were honoured with a visit from the queen, in order to enliven their proceedings and stimulate them to the more speedy dispatch of business; but the treaty was entirely broken off at this time by the Scottish commissioners insisting that the rights and privileges of their countrymen trading to Africa and the Indies should be preserved and maintained. It was, however, resumed in the year 1706, when the commissioners again assembled on the 16th of April, in the portunity of breaking with that people. With this view council chamber of Whitehall. The Scottish commissioners

1706.

mined on an incorporation, which should not afterwards route to Edinburgh and dissolve the parliament. be dissolved by a Scottish parliament. Nothing but this, they said, could settle a perfect and lasting friendship betwixt the two nations. The commissioners from Scotland, however, continued to resist the article which subjected their country to the same customs, excises, and regulations of trade as England; but the queen being persuaded to pay two visits in person to the commissioners, exerted herself so vigorously, that a majority was at last gained over; and all the rest yielded, though with reluctance, excepting Lockhart of Carnwath, who could not by any means be persuaded either to sign or seal the treaty.

The articles being fully prepared on the 22d of July, were presented next day to her majesty by the lord-keeper in the name of the English commissioners; and at the same time a scaled copy of the instrument was delivered by the lord chancellor of Scotland. The articles were most graciously received; and the same day the queen dictated an order of council, threatening with prosecution such as should be concerned in any discourse or libel, or in laying wagers, with regard to the union. But notwithstanding all this harmony the treaty was received with the nians and the Cavaliers, by demonstrating the absurdity, utmost disapprobation in Scotland. The terms had been sinfulness, and danger, of such a proceeding. The India carefully concealed, so that nothing transpired till the whole was at once laid before parliament. The ferment then became general; and all ranks of people, however divided in other respects, united against this detested treaty. The nobility and gentry were exasperated at the annihilation of parliament, and the consequent loss of their influence and credit. The body of the people cried out, that the independence of the nation was sacrificed to treachery and corruption; and insisted, that the obligations laid on their members to stay so long at London, in their attendance on the British parliament, would drain the country of its money, impoverish the members themselves, and subject them to the temptation of being corrupted. Nor was the commercial part of the people better satisfied. The dissolution of the India Company; the taxes laid on the necessaries of life; and the vast number of duties, customs, and restrictions, laid upon trade, were all of them matter of complaint. Before this time Scotland had traded freely to the Levant, the Baltic, France, Spain, Portugal, Holland, and the Dutch plantations; and it seemed difficult to conceive how the commerce of the country could be advanced by laying restrictions upon it in regard to these places, especially as the compensation allowed, namely, the privilege of trading to the English plantations in America, formed a very trifling advantage, seeing that the amount of the whole exports to these places did not by any means equal the expense of defending them. The most violent disputes took place in the parliament. Lord Belhaven delivered a most pathetic speech, in which, enumerating the miseries that would attend this treaty, he drew tears from the audience, and uttered many prognostications, which to this day are reckoned prophetic by many of the Scottish nation. Almost every article of the treaty was the subject of a protest; and addresses against it were presented to parliament by the convention of royal burghs, the commissioners of the general assembly, and the company trading to Africa and the knowledge. Hence they were overmatched by the for-Indies, as well as from shires, stewartries, burghs, towns, mer in the great objects which are more immediately conand parishes, without distinction of Whig, Tory, Presbyterian, or Episcopalian. Nor was the resentment of the common people without doors less violent than that of the members within. A coalition was formed between the Presbyterians and Cavaliers; and to such a height did the resentment of the people rise, that they actually chose officers, formed themselves into regiments, provided horses

Reign of still proposed a federal union; but the English were deter- conduct by a public declaration, and resolved to take the Reign of

In the mean time the privy council issued a proclamation against riots, commanding all persons to retire from the streets whenever the drum was beat; ordering the guards to fire on those who disobeyed this command; and indemnifying them from all prosecution for maining or slaying the lieges. But even these precautions were insufficient. The Duke of Queensberry, the chief promoter of the union, though guarded by double lines of horse and foot, was obliged to pass through the streets at full gallop, amidst the curses and imprecations of the populace, who pelted his guards, and even wounded some of the persons who attended him in the coach. In opposition to all this fury, the friends of the measure magnified the advantages that would accrue to the kingdom from the union; they abated the resentment of the clergy, by promoting the insertion in the treaty of an act by which the Presbyterian discipline was declared to be the only government of the church of Scotland, unalterable in all succeeding times, and a fundamental article of the union. Emissaries were also employed to disunite the Camero-Company was flattered with the prospect of an indemnification for the losses they had sustained, and individuals by sharing an equivalent. And the last manœuvre consisted in bringing over a party in the Scottish parliament, nicknamed the Squadrone Volante, from their fluctuating between the ministry and the opposition, without attaching themselves to any party till the critical moment,

Scotland ceased to be a separate independent kingdom. On the conclusion of the treaty, the queen informed both houses of parliament that the treaty of union, with some additions and alterations, was ratified by an act of the parliament of Scotland; that she had ordered it to be laid before them, hoping it would meet their approbation; that they had now an opportunity of putting the last hand to a happy union of the two kingdoms; and that she would look upon it as a particular happiness if this great work, so often attempted before without success, could be brought to perfection in her reign. Objections, however, were started by the Tory party; but they were at that time too weak to be heard with any attention; and all their arguments were answered with such success by the opposite party, that the union was unalterably completed on the first of May 1707, and the island took the name of The United Kingdom of Great Britain.

which was either to cement both kingdoms by a firm

union, or involve them in the calamities of war. By this

unexpected stroke, the ministry obtained a decisive vic-

tory, and all opposition was henceforth vain. The articles

of treaty were ratified by parliament, with some trifling

variations, on the 25th of March 1707; when the Duke of

Queensberry finally dissolved that ancient assembly, and

In this treaty it must be observed, that the commissioners on the part of England were not only able statesmen, but, for the most part, well skilled in trade; which gave them an evident advantage over those of Scotland, who consisted of lords and gentlemen who had no commercial nected with national prosperity; though they were very careful to preserve all their heritable offices, superiorities, jurisdictions, and other privileges and trappings of the feudal aristocracy. Had the English commissioners made a liberal use of the advantages afforded them at this time, it would have been in their power to have greatly enriched themselves as well as the inhabitants of Scotland; but and ammunition, burnt the articles of union, justified their instead of this they were influenced by the narrow and

Queen 1707.

Queen Anne.

1708.

Reign of short-sighted principle of commercial monopoly; and the had commanded the French in the battle of Malplaquet; Reign of consequences were such as might, with a small degree of but he contrived his measures so, that, by marching and reflection, have been foreseen.

In 1708 there was a warm debate in a grand committee of the House of Lords, occasioned by a bill passed by the Commons for rendering the union of the two kingdoms more entire and complete, by which it was enacted, that, from the first of May 1708, there should be but one privy council in the kingdom of Britain. The arguments for the dissolution of the privy council of Scotland were, its enormous stretches of power and acts of cruelty, and the circumstance that it could now be of no other use in Scotland except to enable the court to govern every thing at them. He frequently gained possession of the enemy's pleasure, and procure such members of parliament as it thought proper. The dissolution, however, was carried by fifty against forty, after which the nation, deprived of this last fragment of its ancient government, was thrown into a ferment by the opponents of the union; but after an ineffectual attempt in favour of the pretender, animosities began to subside.

We must now return to the Duke of Marlborough, who had gone over to Flanders to open the campaign. Peace had been more than once offered, and treaties entered upon, but as often frustrated. After the battle of Ramillies, the king of France had employed the Elector of Bavaria to write letters in his name to the Duke of Marlborough, containing proposals for opening a congress, and offering to renounce either Spain and its dominions, or the kingdoms of Naples and Sicily, to Charles of Austria, and to concede a barrier to the Dutch in the Netherlands. But these terms were rejected; and the two armies once more met in nearly equal numbers at Oudenarde, on the Scheldt, where an engagement ensued, in which the French were defeated with immense loss; and Lisle, the strongest town in Flanders, with Ghent, Bruges, and all the other towns in that country, soon after fell into the hands of the victors. In this battle the electoral prince of Hanover, afterwards George II. of Britain, greatly distinguished himself, and had the merit of conducting the first attack. His horse was killed under him, and Colonel Luschki was slain close by his side. The campaign ended with fixing a barrier to the Dutch provinces, and it now only remained to force a way into the provinces of the enemy.

The French king, being now in a manner reduced to despair, again sued for peace; but the demands of the allies were so high, that he was obliged to reject them, and prepare for another campaign, in the year 1709. The first attempt of the allies was against the city of Tournay, garrisoned by twelve thousand men, and exceedingly strong both by nature and art. After a terrible siege of twentyone days, the town capitulated; and a month afterwards the citadel, which was still stronger than the town, surrendered. Next followed the bloody battle of Malplaquet, where the allied army, consisting of a hundred and ten thousand men, attacked the French, consisting of a hundred and twenty thousand, strongly posted, and fortified in such a manner behind the woods of La Merte and Tanières, with triple entrenchments, that their position seemed quite impregnable. Nothing, however, could resist the energy of Marlborough and the bravery of his troops. The French were driven from all their positions, and totally defeated. But the victory cost the allies very dear; for twenty thousand of their best troops lay dead or wounded on the field of battle. The consequence of this victory was the surrender of the city of Mons, which ended the campaign.

The last campaign of the Duke of Marlborough, which happened in the year 1711, probably excelled all his former exploits. He was opposed by Marshal Villars, who

countermarching, he, without striking a blow, forced the enemy to quit a strong line of entrenchments, which he afterwards took possession of. This enterprise was followed by the taking of Bouchain, which was the last military achievement of this great general. By a continuation of conduct and success almost unparalleled, he had gained to the allies a prodigious tract of country. From the beginning of the war, which had now continued nine years, he had perpetually advanced, and never retreated before his enemies, nor lost an advantage he had obtained over posts without fighting; and where he was obliged to attack, no fortifications were able to resist him. He had never besieged a city which he did not take, nor fought a battle which he did not win. Thus the allies had reduced under their command Spanish Guelderland, Limburg, Brabant, Flanders, and Hainault; they were masters of the Scarpe; the capture of Bouchain had opened for them a way into the very heart of France; and another campaign might have made them masters of Paris. But on the duke's return from this campaign, he was accused of having taken a bribe of six thousand pounds a year from a Jew who had contracted to supply the army with bread; and the queen thought proper to dismiss him from all his employments.

On the removal of this great general, the command of the British forces was conferred on the Duke of Ormond. The transactions which followed are by no means creditable to the character of the British nation. The people at large, blinded by a headstrong and furious clergy, wished to revive the ceremonies of the Romish religion, and to unite the English and Gallican churches; the general of the army acted a most insidious part, by giving the enemy intelligence of the designs of the allies before he had declared that he was not to act in concert with them; and the queen herself commanded him to pursue this shameful course, nay even acted in a similar manner herself. Prince Eugene complained much of the inactivity of the English general, though apparently unacquainted with his treachery; whilst the whole army loaded him with execrations, calling him a stupid tool, and a general of straw. All this, however, was in vain; the duke continued to prefer the commands of his sovereign to every other consideration, and Ormond lost what Marlborough had gained.

The disgrace of the Duke of Marlborough had been owing to the prevalence of the Tory party, who had now got the Whig ministry turned out; and the consequence was, that notwithstanding all the remonstrances and entreaties of the allies, the British army in Flanders was ordered not to act offensively. Hence the operations languished, a considerable body of the allies was cut off at Denain, and the French retook several towns. A peace, however, was at last concluded in 1713 between France and Britain. In this treaty it was stipulated that Philip, now acknowledged as king of Spain, should renounce all right to the crown of France, the union of two such powerful kingdoms being thought dangerous to the liberties of Europe. It was agreed that the Duke de Berri, Philip's brother, and next after him in succession, should also renounce his right to the crown of Spain in case he became king of France. And it was stipulated that the Duke of Savoy should possess the island of Sicily with the title of king, together with Fenestrelles, and other places on the Continent; and this increase of dominion was in some measure provided out of the spoils of the French monarchy. The Dutch had the barrier granted them which they so much desired; and if the crown of France was deprived of some dominions to enrich the Duke of Savoy, the house of Austria was also taxed to supply the wants of the Hollander,

Anne.

ders. The fortifications of Dunkirk were demolished. Spain gave up Gibraltar and the island of Minorca. France resigned her pretensions to Hudson's Bay, Nova Scotia, and Newfoundland, but was left in possession of Cape Breton, with the liberty of drying fish upon the shore. Among the articles creditable to the British nation, their setting free the French Protestants confined in the prisons and galleys for their religion was not the least meritorious. In behalf of the emperor, it was stipulated that he should possess the kingdom of Naples, the duchy of Milan, and the Spanish Netherlands; and the king of Prussia was to have Upper Guelderland. A period was fixed for the emperor's acceding to these articles, as he had for some time obstinately refused to assist at the negociation. This famous treaty was signed at Utrecht on the last day of March 1713.

The same year was also remarkable for an attempt of the Scottish Peers and Commons to dissolve the union, which, as already stated, had proved exceedingly disagreeable and distressful to the nation. During the debates on this subject the Earl of Peterborough endeavoured to prove the impossibility of dissolving the treaty; but the Duke of Argyll, who had originally promoted the union, now declared against it, and said, that unless it were dissolved he did not long expect to have either property in Scotland or liberty in England. By some other Peers it was alleged, that the union had not produced its intended effect; that it had been designed to promote friendship between the two nations; that, so far from answering this purpose, the animosities between them were never so great as then; and that if separated again they would be better friends than in a state of nominal union and real dissension. This motion was however overruled; but the discontent of the people still continued; addresses were prepared throughout the kingdom; and matters were in danger of coming to the worst extremities, when the attempt of the pretender in 1715 so divided the minds of the people that no unanimous effort could ever afterwards be made for the repeal of the union.

The history of the latter portion of this reign consists entirely of the intrigues of the Whigs and Tories against each other, which, as they are now of no importance whatever. it is needless to take up time in relating, further than that the Tory influence continued to prevail. Whether the ministry at this time wished to alter the succession from the Hanoverian line, cannot now be clearly ascertained; but it is certain that the Whigs firmly believed it, and the Tories but faintly denied the charge. The suspicions of the former became every day stronger, particularly when they saw a total removal of the Whigs from all places of trust and confidence throughout the kingdom, and their employments bestowed on professed Tories, supposed to be devoted to the cause of unbroken hereditary succession.

The violent dissensions between these parties, with their cabals and tumults, made the queen's situation very disagreeable; her health visibly declined. On the 28th of July 1714 she fell into a lethargic insensibility; and, notwithstanding all the medicines prescribed by the physicians, the distemper gained ground so fast, that next day her life was despaired of. The members of the privy council were now summoned from the different parts of the his numerous alliances, and the general tranquillity of Eukingdom, and began to provide for the security of the constitution. A letter was sent to the Elector of Hanover, informing him of the queen's desperate condition, and desiring him to repair to Holland, where a British squadron would attend to convey him to England; and instructions were at the same time dispatched to the Earl of Strafford ar the Hague, to require the states-general to be prepared

Reign of who were put in possession of the strongest towns in Flan- also taken to secure all the sea-ports; and the command Reign of of the fleet was bestowed upon the Earl of Berkeley, a pro- George L fessed Whig. These measures answered a double purpose, as they argued the alacrity of the Whigs in the cause of their new sovereign, and seemed to imply that the state was in danger from the disaffection of the opposite party On the 30th of July the queen seemed somewhat relieved by the medicines which had been administered; and having risen from her bed about eight in the morning, she walked a little; but she was soon afterwards seized with an apoplectic fit; and although she recovered somewhat by the assistance of Dr Mead, she continued all night in a state of stupefaction, and expired the following morning, at seven, having lived forty-nine years, and reigned upwards of twelve. This princess was remarkable neither for learning nor capacity. Like all the rest of her family, she seemed rather fitted for the duties of private life than those of a public station, being a pattern of conjugal fidelity, a good mother, a warm friend, and an indulgent mistress; and to her honour it should be recorded, that during her reign none suffered for treason on the scaffold. In her ended the line of the Stuarts, a family who neither rewarded their friends nor punished their enemies, and whose misconduct and misfortunes are scarcely to be paralleled in history.

## CHAP. X.

### REIGN OF GEORGE I.

Accession of George I.—His arrival in England.—Favour shown by him to the Whigs.—National Discontents.—Dissolution of Parliament.—New one assembled.—Its violent proceedings.— Rebellion in Scotland.—Battle of Sheriffmuir.—Proceedings of the Jacobites in England.—Expedition of the Earl of Derwentwater.—Jacobites forced to surrender at Preston.—Ridiculous schemes of the Pretender.—He lands in Scotland without means, and quits it without necessity.—Cruel treatment of the rebels. Execution of Derwentwater and Kenmuir.—Escape of others by various means.—Duration of Parliaments extended.—Britain threatened with invasion by Charles XII. of Sweden.—Quadruple Alliance.—War with Spain.—Intended invasion by the Spaniards defeated.—Irish Parliament made dependent on that of Britain.—South Sea Scheme.—Origin and nature of this delusion.—The Directors punished.—Expedition of Admiral Hosier .- Death of George I.

The queen had no sooner resigned her breath than the privy council met, and three instruments were produced, by which the Elector of Hanover appointed several of his adherents to be added as lords justices to the great officers of the kingdom. Orders were also issued out for proclaiming George, son of Ernest Augustus, Elector of Brunswick, and of Sophia, grand-daughter of James I., king of England, Scotland, and Ireland; and the regency appointed the Earl of Dorset to carry to him the intimation of his accession to the crown, and to attend him in his journey to England.

The king landed at Greenwich, and walked to his house in the park, accompanied by a great number of the nobility and other persons of distinction. George I. was fifty-four years of age when he ascended the British throne; and his mature age, his experience and sagacity, rope, all contributed to establish his interests, and promise him a peaceable and happy reign. His virtues, though not shining, were solid; and he was of a very different disposition from the Stuart family whom he succeeded; for, soon after his arrival in England, he was heard to say, "My maxim is, never to abandon my friends, to do justice to all the world, and to fear no man." To these qualities to guarantee the Protestant succession. Precautions were of resolution and perseverance he joined great application

Reign of to business; but, unfortunately for England, he studied where to other grievances was added that of the union, Reign of George I. the interests of the territory he had left more than those

of the kingdom he came to govern.

The new king early discovered a natural enough inclination to support those who had raised him to the throne, or, in other words, the Whig party. Immediately after his landing, he sent for such of the nobility as had distinguished themselves by their zeal for his succession. He expressed the greatest regard for the Duke of Marl-borough, who had just then arrived from the Continent, whither he had been driven by the violence of the Tories; and he professed the same friendship for the other leaders of the Whigs, while the Tories found themselves excluded from the royal favour. The king did not seem sensible that the monarch of a faction rules but one half of his subjects; and it was his misfortune to be surrounded by men who, whilst they pretended to secure the crown for the king, used all their arts to confirm their own interests, extend their connections, and give laws to their sovereign. In consequence of these partialities, the greatest discontent was excited throughout the whole kingdom. The Tories or Jacobites raised terrible outcries; and had the pretender been a man of judgment or ability, a fair opportunity now offered him of striking a decisive blow. Instead of this, he remained a calm spectator on the Continent, and only sent over his emissaries to disperse ineffectual manifestoes and delude the unwary. time the Catholic religion was much hated in England; but the principles of the Dissenters were little, if at all, more agreeable to the generality. The Tories affirmed that, under a Whig administration, heresy and impiety were daily gaining ground; whilst the lower orders of the clergy joined in these complaints, and pointed out several tracts published in favour of Arianism and Socinianism. The ministry, however, not only refused to punish the delinquents, but silenced the clergy themselves, and forbade their future disputations on these topics.

The parliament having been dissolved, another was now called by a very extraordinary proclamation, in which the king complained of the evil designs of men disaffected to his succession, and of their misrepresentations of his conduct and principles; expressed his hopes that his subjects would send up to parliament the fittest persons to redress the present disorders; and entreated that they would elect such in particular as had expressed a firm attachment to the Protestant succession. In the election of this important parliament, uncommon vigour was exerted on both sides; but by dint of the monied interest which prevailed in corporations, and the activity of the ministry, a great majority of Whigs was returned both in England and Scotland. Upon the assembling of the new parliament the most violent measures were resolved on against the late ministry. A committee was appointed to inspect all the papers relative to the recent treaty, and to select such of them as might furnish grounds of accusation against the former ministry; and the Earl of Oxford was impeached of high treason, and sent to the Tower. Nor was the violence of the Commons answered with less vehemence without doors. Tumults became every day more frequent, and each new ebullition served only to increase the severity of the legislature, which at length passed an act, declaring, that if any persons to the number of twelve, unlawfully assembled, should continue together one hour after being required to disperse by a justice of peace or other officer, and after hearing the act against riots read in public, they should be deemed guilty of felony without benefit of clergy. These proceedings

which all considered as an oppression. The malcontents of George 1. that country had all along maintained a correspondence ' with their friends in England, and some of the Tory party who were attached to the Protestant religion, and of moderate principles in government, began to associate with the Jacobites, and to wish in earnest for a revolution.

Scotland first showed them the example. The Earl of Mar, assembling three hundred of his vassals in the Highlands, proclaimed the pretender at Castleton, and setting up his standard at Braemar, assumed the title of Lieuten-ant-general of his Majesty's Forces. To second these attempts, two vessels arrived from France with arms, ammunition, and a number of officers, together with assurances, that the pretender himself would shortly come over to head his own forces. In consequence of this promise, the earl soon found himself at the head of ten thousand men well armed and provided; and having secured the pass of Tay at Perth, where his head-quarters were established, he made himself master of the province of Fife, and the whole sea-coast on that side of the Frith of Forth. He then marched to Dumblane, as if with the intention of crossing the Forth at Stirling Bridge; but there he was informed that the Duke of Argyll, who had been appointed commander-in-chief of all the forces in North Britain, was advancing against him from Stirling with his own clan, assisted by some troops from Ireland. Upon this he at first judged it proper to retreat; but being soon afterwards joined by reinforcements under the Earl of Seaforth, and General Gordon, an experienced officer, who had signalised himself in the Russian service, he resolved to face the enemy, and directed his march towards the south. The Duke of Argyll, apprised of his intentions, and anxious to prove his attachment to the present government, resolved to give him battle in the neighbourhood of Dumblane, though his forces did not amount to half the number of the enemy. Accordingly, in the morning he drew up his army, which did not exceed four thousand men, in order of battle; but he soon found himself greatly outflanked by the insurgents. The duke, therefore, perceiving the earl making attempts to surround him, was forced to alter his dispositions; but, from the scarcity of general officers, this was not done so expeditiously as to be completed before the insurgents began the attack. The left wing of the duke's army received the centre of the enemy, and supporting the first charge without shrinking, seemed for a time victorious. The chief of Clanronald was killed; but Glengarry, who was second in command, waving his bonnet and crying out "Revenge!" animated the rebel troops to such a degree, that they followed him close to the points of the enemy's bayonets, and got within their guard, when a total rout ensued of that wing of the royal army. General Witham, their commander, fled full speed to Stirling, and gave out that the rebels were completely victorious. But Argyll, who commanded in person on the right, having in the meanwhile attacked the left of the enemy, drove them before him for two miles, notwithstanding they often faced about and attempted to rally; and having entirely broken and driven them over the river Allan, he returned to the field of battle. Here, however, to his great mortification, he found the enemy victorious, and patiently waiting the attack. But instead of renewing the engagement, both armies continued to observe each other, neither caring to recommence the contest; and towards evening each drew off. Both sides of course claimed the victory; but all the advantages of success belonged to Argyll. He had arrested the progress of the enemy; excited the indignation of the people, who perceived that and, in their circumstances, delay was defeat. In fact, the the avenues of royal favour were closed against all but a Earl of Mar soon found his losses and disapointments infaction; and a rebellion commenced in the sister kingdom, crease. The Castle of Inverness, of which he had obtain-

Reign of ed possession, was delivered up by Lord Lovat, who had arms, and were put under a strong guard. All the noble- Reign of George I. hitherto professed to act in the interest of the pretender; men and leaders were secured, and a few of their officers George I. the Marquis of Tullibardine also forsook the earl, in order clans, seeing no likelihood of coming to a second engage-

ment, returned quietly home.

Nor was the rebellion more successfully prosecuted in England. From the time the pretender had undertaken this wild project at Paris, in which the Duke of Ormond and Lord Bolingbroke were engaged, Lord Stair, the English ambassador there, had penetrated all his designs, and sent faithful accounts of all his measures and of all his adherents to the ministry at home. Upon the first rumour of an insurrection, therefore, several lords and gentlemen of whom they had suspicions were imprisoned; and although these precautions were insufficient to stop the insurrection in the western counties, where it had already begun, all the preparations of the insurgents were weak and ill conducted, while every measure was betrayed to government as soon as projected, and many revolts were repressed in the very outset.

to greater maturity. In the month of October 1715, the Earl of Derwentwater and Mr Forster took the field with a body of horse, and, being joined by some gentlemen from the borders of Scotland, proclaimed the pretender. Their first attempt was to seize upon Newcastle, in which they had many friends; but finding the gates shut against them, they retired to Hexham. To oppose them General Carpenter was detached by government with a body of nine affairs were desperate; yet, with his usual infatuation, he hundred men; and an engagement was hourly expected. The rebels had two courses, by pursuing which they might have conducted themselves with prudence and safety. The one was, to march directly into the western parts of Scotland, and there join General Gordon, who commanded a strong body of Highlanders; and the other was, to cross the Tweed and boldly attack General Carpenter, whose forces did not exceed their own. But, from the infatuation attendant on the measures of the Jacobite party, neither of these courses was pursued. They took the route to Jedburgh, by which they hoped to elude Carpenter, and penetrate into England by the western border. But this was the most effectual means of cutting themselves off from either assistance or retreat. A party of Highlanders, who had by this time joined, at first refused to accompany them in so desperate an incursion, and one half of their number in consequence returned to their own country. At Brampton Mr Forster opened his commission of general, which had been sent him by the Earl of Mar, and there proclaimed the pretender. The insurgents then continued their march to Penrith, where a body of the militia, assembled to oppose them, fled at their approach. From Penrith they proceeded by the way of Kendal and Lancaster to Preston, of which they took possession without any kind of resistance. But this was the last stage of their ill-fated advance; for General Wills, at the head of seven thousand men, came up to attack them, and from his activity there was no escaping. They now, therefore, raised barricades about the town, put the place in a posture of defence, and repulsed with success the first attacks of the enemy's force. But next day Wills, reinforced by Carpenter, invested the town on all sides. In this deplorable situation Forster proposed to capitulate with the general; and accordingly sent Colonel Oxburgh, who had been taken prisoner, with a trumpeter, topropose terms. Wills, however, refused to listen to such a proposition, alleging that he could not treat with rebels, and that the only favour they had to expect was to be spared from immediate slaughter. This was a hard condition; but as no better could be obtained, they laid down their

were tried for deserting from the king's army, and shot by to defend his own part of the country; and many of the order of a court-martial. The common men were imprisoned at Chester and Liverpool; whilst the noblemen and considerable officers were sent to London, and led through the streets pinioned and bound together, in order to intimidate their party in the metropolis.

But, however ill the schemes of the pretender may appear to have been conducted in Britain, they were still more so in France. Bolingbroke had been appointed his secretary at Paris, and Ormond his prime minister. But these statesmen quickly found that nothing could be done in favour of his cause. The king of France, who had ever warmly espoused the interest of the exiled family, was just dead; and the Duke of Orleans, who succeeded to the government of the kingdom, was averse to lend the pretender any assistance. His party, however, which was composed of the lowest and the most ignorant exiles from the British dominions, affected the utmost confidence, and boasted of a certainty of success. The deepest secrets of But the insurrection in the northern counties attained his cabinet, and all his intended measures, were bandied about in coffee-houses by persons of the lowest rank both in fortune and abilities; whilst subaltern officers aspired to be generals, and even prostitutes were intrusted with the management of his negociations. From such instruments and such councils nothing could be augured but folly and

> The pretender, in fact, might easily have seen that his resolved to hazard his person among his friends in Scotland, at a time when such a measure was too late to serve any rational purpose. Accordingly, travelling through France in disguise, and embarking in a small vessel at Dunkirk, he arrived, after a short voyage, on the coast of Scotland, with only six gentlemen in his train. He passed unknown through Aberdeen to Fetteresso, where he was met by the Earl of Mar, with about thirty noblemen and gentlemen of the first quality, and solemnly proclaimed; and his declaration, dated at Comercy, was printed and dispersed. He then proceeded to Dundee, where he made a public entry; and in two days more he arrived at Scone, where he intended to have the ceremony of his coronation performed. He ordered thanksgivings to be offered for his safe arrival; he enjoined the ministers to pray for him in their churches; and, without the smallest share of power, he enacted all the ceremonial of royalty, which served to throw an air of ridicule upon his pretensions. Having thus spent valuable time in useless parade, he next abandoned the enterprise with the same levity with which it was undertaken. He made a speech to his grand council, in which he informed them of his want of the money, arms, and ammunition necessary for undertaking a campaign; and deploring the necessity he was under of leaving them, he once more embarked on board a small French ship that lay in the harbour of Montrose, accompanied with several lords, his adherents, and in five days arrived at Gravelines.

The rebellion being thus ended, the law was put in force in all its rigour; and the prisons of London were crowded with deluded persons, whom the ministry seemed resolved not to pardon. The Commons, in their address to the crown, declared they would prosecute, in the most rigorous manner, the authors of the late rebellion; and their measures were as vindictive as their resolutions were speedy. The Earls of Derwentwater, Nithsdale, Carnwath, and Wintoun, the Lords Widrinton, Kenmuir, and Nairne, were impeached; and, upon pleading guilty, all except Lord Wintoun received sentence of death. No entreaties could prevail on the ministry to spare these un-

only answered, that on this, as on all other occasions, he would act in the manner which he thought most consistent Lords Derwentwater, Nithsdale, and Kenmuir, immediategood fortune to escape in woman's clothes, which were brought him by his mother on the eve of the day fixed for his execution. Derwentwater and Kenmuir were brought at the time appointed to the scaffold on Tower Hill, where both underwent the sentence of the law with calm intrepidity, and apparently less moved than those who witnessed their execution.

An act of parliament was next passed for trying the private persons in London, and not in Lancashire, where they had been taken in arms. This was considered, by some of the best lawyers, as an alteration of the ancient constitution of the kingdom, according to which it used to be held, that every prisoner should be tried in the place where the offence charged against him had been committed. In the beginning of April, commissioners for trying the rebels met in the Court of Common Pleas, when true bills were found against Forster, brigadier Mackintosh, and twenty of their associates. Forster escaped from Newgate, and reached the Continent in safety; the rest pleaded not guilty to the charge. Pitts, the keeper of Newgate, having been suspected of conniving at Forster's escape, was tried for his life, but acquitted. Mackintosh and several other prisoners subsequently broke from Newgate, having mastered the keeper and turnkey, and disarmed the sentinel. The court then proceeded to the trial of the remainder, and four or five were hanged, drawn, and quartered, at Tyburn. The judges appointed to try the rebels at Liverpool found a considerable number of them guilty of high treason; twenty-two were executed at Manchester and Preston; while about a thousand explantations.

The rebellion being thus extinguished, the danger of the state was made a pretence for continuing the parliament beyond the term fixed for its dissolution. An act was therefore passed, repealing that which provided for the triennial dissolution of parliaments, and the term of their duration was extended to seven years. This attempt in a delegated body to increase their own power by extending it, is contrary to the first principles of justice. If it was right to extend their duration to seven years, they might also perpetuate their authority, and thus cut off even the shadow of representation. The bill, however, passed both houses, and all objections to it were considered as disaffection. The people might murmur at this encroachment, but it was too late for redress.

solved upon a voyage to the Continent. He foresaw a storm gathering from Sweden. Charles XII. highly provoked at his having entered into a confederacy with the Russians and Danes during his absence at Bender, and purchased from the king of Denmark the towns of Bremen and Verden, which constituted part of his dominions, maintained a close correspondence with the dissatisfied subjects of Great Britain; and a scheme was formed for landing a considerable body of Swedish forces, with the king at their head, in some part of the island, where it was expected they would be joined by all the malcontents in the kingdom. Count Gyllenburg, the Swedish minister in London, was peculiarly active in the affair; but having been seized, with all his papers, by order of the king, the confederacy was for the time broken up. A bill to Europe.

Reign of happy men. The House of Lords even presented an ad- was, however, passed by the Commons, prohibiting all Reign of George L. dress to the throne for mercy, but without effect; the king commerce with Sweden, although the trade with that George L country was at the time of the utmost consequence to the English merchants. George having passed through Holwith the dignity of the crown and the safety of the people. land to Hanover, in order to secure his German dominions, Orders were accordingly issued for the execution of the entered into a new treaty with the Dutch and the Regent of France, by which they agreed mutually to assist each ly: the rest were respited. Nithsdale, however, had the other in case of invasion; and, for his further security, good fortune to escape in woman's clothes, which were the Commons granted him L.250,000. But the death of the Swedish monarch, who was soon afterwards killed at the siege of Fredericsthal in Norway, put an end to all disquietude from that quarter.

Among the many treaties for which this reign was remarkable, one had been concluded, called the Quadruple Alliance, in which it was agreed between the emperor, France, Holland, and Britain, that the emperor should renounce all pretensions to the crown of Spain, and exchange Sardinia for Sicily with the Duke of Savoy; and that the succession to the duchies of Tuscany, Parma, and Placentia, should be settled on the queen of Spain's eldest son, in case the present possessors should die without male issue. This treaty, however, was by no means agreeable to the king of Spain; and it became prejudicial to the English, as it had the effect of interrupting the commerce with that kingdom. A war soon afterwards commenced between Spain and the emperor, who was considered as the principal contriver of the treaty; and a numerous body of Spanish forces were sent into Italy to support Philip's pretensions in that quarter. The regent of France attempted in vain to dissuade him, and the king of Britain offered his mediation with as little success, their interposition being considered as partial and unjust. A Spanish war was then resolved on, and a squadron of twenty-two ships equipped with all expedition. The command was given to Sir George Byng, who had orders to sail for Naples, which was at that time threatened by a Spanish army. He was received with the greatest joy by the Neapolitans, who informed him that the Spaniards, to the amount of thirty perienced the king's mercy, and were transported to the thousand, had then actually landed in Sicily. In this exirency, and whilst no assistance could be afforded by land, he resolved to proceed thither by sea, fully determined to pursue the Spanish fleet, on board of which the army was embarked. Upon coming round Cape Faro, he perceived two small Spanish vessels, and pursuing them closely, came upon their main fleet, which, before noon, he discovered in line of battle, amounting in all to twenty-seven sail. The Spaniards, however, notwithstanding their superiority of number, attempted to sheer off; but finding it impossible to escape, they kept up a running fight, the commanders behaving with great courage and activity, notwithstanding which they were all taken except three, which were saved by the conduct of their vice-admiral, a native of Ireland.

The rupture with Spain was thought favourable to the Domestic concerns being thus adjusted, the king re- interest of the pretender; and it was hoped that, by the assistance of Cardinal Alberoni, a new insurrection might be excited in England. The Duke of Ormond was the person fixed upon to conduct this expedition; and he obtained from the Spanish court a fleet of ten ships of war and transports, having on board six thousand regular troops, with arms for twelve thousand more. But fortune was still as unfavourable as ever to the cause of legitimacy. Having set sail, and proceeded as far as Cape Finisterre, he encountered a violent storm, which disabled his fleet, and frustrated the expedition. This misfortune, together with the bad success of the Spanish arms in Sicily and other parts of Europe, induced Philip to agree to a cessation of arms; and at last he consented to sign the quadruple alliance, by which means peace was again restored Reign of George I.

ceeded to take measures for securing the dependence of came the part of the scheme which was big with fraud George I Annesley having appealed to the House of Peers of England from a judgment of the Irish Peers, the decree of the latter was reversed, and the British Peers ordered the Barons of Exchequer in Ireland to put Mr Annesley in possession of the lands which he had lost by the decree of the Lords in that kingdom. The Barons obeyed this order; but the Irish Peers passed a vote against them, as having attempted to diminish the just privileges of the parliament of Ireland, and at the same time ordered the barons to be taken into custody by the usher of the black rod. On the other hand, the House of Lords in England resolved that the Barons of Exchequer in Ireland had acted with courage and fidelity; and addressed the king to signify his approbation of their conduct by some marks of his favour; while, to complete their object, a bill was prepared by which the Irish House of Lords was deprived of all right of final jurisdiction. This bill was opposed in both houses, but particularly in the Commons, where it was asserted by Mr Pitt that it would only serve to increase the power of the English Peers, who were already but too formidable. Mr Hungerford also demonstrated that the Irish Lords had always exercised the power of finally deciding causes; but, in spite of all opposition, it was carried by a great majority, and soon afterwards received the royal assent.

This blow was severely felt by the Irish, but it was by no means so great as that which the English about this time received from the South Sea Scheme, which commenced in the year 1721. To understand the genesis of this delusion, it is necessary to observe, that ever since the Revolution, owing either to the insufficiency of the supplies granted by parliament, or to the time required for collecting those which were actually granted, the government was obliged to borrow money from several different companies of merchants; and among the rest from that which traded to the South Seas. In the year 1716 the government were indebted to this company upwards of nine millions sterling, for which interest at the rate of six per cent. was agreed to be paid. But as this company was not the only creditor of the government, Sir Robert Walpole formed a design of lessening the national debt, by giving the several associations which had advanced funds for the public service an alternative of either accepting a lower rate of interest, namely five per cent., or of being paid the principal. In point of fact, the different companies chose rather to accept of the reduced rate of interest than to be paid the principal; and the South Sea Company in particular, having advanced loans to the extent of ten millions, were contented to take L.500,000 annually as interest, instead of L.600,000, which they previously received. And in the same manner, the governors and company of the Bank, and other associations, consented to receive a diminished interest for their respective loans, which of course lessened considerably the burdens of the nation.

In this situation of things, one Blount, a scrivener, proposed to the ministry, in the name of the South Sea Company, to buy up all the debts of the different associations, in order that the South Sea Company might become the sole creditors of the state. The terms he offered to government were extremely advantageous. The South Sea Company was to redeem the debts of the nation out of the hands of the private individuals who were creditors to the government, upon such terms as could be agreed on; and for the interest of the money thus redeemed and taken into their own hands, they were to be allowed by government five per cent. for six years; after which the interest was to be reduced to four per cent. and to be at any time

Tranquillity being thus established, the ministry pro- ingly, a bill passed both houses of parliament. But now Reign of

the Irish parliament upon that of England. One Maurice and ruin. As the directors of the South Sea Company could not of themselves be supposed to possess money sufficient to buy up the debts of the nation, they were empowered to raise it by opening a subscription to an imaginary scheme for trading in the South Seas; and as immense advantages were promised from this supposititious commerce, and still greater expected by the rapacious credulity of the people, all the creditors of government were invited to come in and exchange their securities for that of the South Sea Company. The directors' books were accordingly no sooner opened for the first subscription, than crowds came to effect the exchange of government for South Sea stock; and the delusion was artfully propagated and continued. In a few days subscriptions or shares sold for double the price at which they had been purchased; the scheme succeeded beyond even the projector's hopes; and the whole nation was infected with a spirit of avaricious enterprise. The infatuation, in fact, became epidemic, and the stock rose to a surprising degree, even to a thousand per cent. premium on the original value or price of the shares. But after a few months the people awaked from their dream of riches, and found that all the advantages which they expected were purely visionary, whilst thousands of families were involved in utter ruin. Many of the directors, by whose arts the people had been taught to expect such benefits from a traffic to the South Seas, had indeed amassed enormous fortunes in consequence of the credulity of the public; but it was some consolation to the people, to find that the parliament, sharing in the general indignation, had resolved to strip these plunderers of their ill-gotten wealth. Accordingly, orders were first given to remove all the directors of the South Sea Company from their seats in parliament, and the places they held under government; and the principal delinquents were punished by a forfeiture of all such possessions and estates as they had acquired during the continuance of the popular frenzy. The next care of parliament was to afford some relief to the sufferers. Several just and proper resolutions were in consequence adopted, and a bill was speedily prepared for alleviating the sufferings of the people as far as the power of the legislature in such a case could possibly extend. Out of the profits arising from the South Sea scheme, the sum of seven millions was restored to the original proprietors; several additions were also made to their dividends out of what was possessed by the company in their own right; and the remaining capital stock was also divided among the former proprietors at the rate of thirty-three per cent. Petitions from all parts of the kingdom were in the meanwhile presented to the house, demanding justice; and the whole nation seemed exasperated to the highest degree. Public credit sustained a terrible shock. Some leading members of the administration were deeply implicated in these fraudulent transactions. A run was made upon the bank; and nothing was heard but the ravings of disappointment and the cries of despair.

By degrees, however, the effects of this terrible calamity wore off, and matters returned to their former condition. A new war with Spain, however, commenced in 1726. Admiral Hosier was sent to South America to intercept the Spanish galleons; but the Spaniards, apprised of his design, relanded their treasure, and thus defeated the object of the expedition. Meanwhile the greater part of the British fleet sent on this service was rendered entirely unfit for service. The seamen were cut off in vast numbers by the malignity of the climate and the length of the voyage, whilst the admiral himself died, it is said, of a broken heart. By way of retaliation the Spaniards undertook redeemable by parliament. For these purposes, accord- the siege of Gibraltar; but they soon found that this at-

Reign of tempt was hopeless; and France offering her mediation, a wondered at by the country party, and it was as constant. Reign of George II temporary peace ensued, although both sides only watched an opportunity for renewing hostilities with the pro-

spect of success.

Soon after the dissolution of the parliament in the year 1727, the king, resolving to visit his electoral dominions of Hanover, appointed a regency to govern in his absence, and, embarking for Holland, landed at a little town called Voet. Next day he proceeded on his journey; and in two days more, betwixt ten and eleven at night, he arrived at Delden, to all appearance in perfect health. He supped there very heartily, and continued his journey early the next morning; but betwixt eight and nine he ordered his coach to stop; and it being perceived that one of his hands lay motionless, Fabrice, who had formerly been servant to the king of Sweden, and now attended King George in the same capacity, attempted to quicken the circulation by chafing the royal hand between his own. As this had no effect, however, the surgeon who followed on horseback was called, and rubbed it with spirits. But the friction was unavailing; the king's tongue began to swell, and he had just strength enough to bid them hasten to Osnaburgh; after which he fell insensible into Fabrice's arms. He never recovered; but expired about eleven o'clock the next morning, in the sixty-eighth year of his age and thirteenth of his reign. His body was conveyed to Hanover, and interred among his electoral ancestors.

### CHAP. XI.

#### REIGN OF GEORGE II.

Accession of George II.—Court and Country Parties.—Charitable Corporation.—Excise Scheme rejected.—Parliament dissolved.—War with Spain.—Capture of Puerto Bello.—Anson's Expedition.—Unsuccessful attempt on Carthagena.—Retirement of Sir Robert Walpole.—Army sent into Flanders.— Origin of the Continental War.—Desperate situation of the Queen of Hungary.—Relieved by the British forces.—Battle of Dettingen.—Intended invasion of Britain by France.—Battle of Fontenoy —Capture of Louisbourg —Landing of the Pre-tender in Scotland —Battle of Gladsmuir —Advance into England.—Consternation in London.—Retreat of the Highland army from Derby.—Siege of Stirling Castle.—Battle of Falkirk.-Advance of the Duke of Cumberland, and retreat of the Rebels.—Battle of Culloden.—Cruelty of Cumberland.—Subsequent adventures and escape of Prince Charles Edward. Execution of Rebels.—Policy of the Government in regard to the Highlands of Scotland.—Allies defeated in Flanders.— Losses sustained by the French in other parts.—Peace of Aix-la-Chapelle.—Death of the Prince of Wales.—Hostilities rela-Chapelle.—Death of the Frince of Madeiral Byng.—newed.—Minorca invaded.—Execution of Admiral Byng.—New Treaty with Russia.—Opposition of the King of Prussia. Combination of the European powers.—Unsuccessful expedition against France.—Accession of Mr Pitt to office.—Success of the British arms in both hemispheres.—Quebec taken and Canada reduced.—Misconduct of Cumberland in Germany. Capitulation of Closter Seven.—French defeated at Minden. German war continued with various success.—Death of George

On the accession of George II. who succeeded to his father in the forty-fourth year of his age, the two great parties into which the nation had so long been divided again changed their names, and were now called the Court and Country Parties. Throughout the greatest part of this reign there seem to have been two objects of controversy, which rose up in debate every session, and tried the strength of the opponents; namely, the national debt, and the number of forces to be kept in pay. The government, on the present king's accession, owed more than continuance of profound peace, yet this sum went on constantly increasing. How this could happen was much

ly the business of the court to give plausible reasons for George II the increase. Hence demands for new supplies were made every session of parliament, for the purpose of securing friends upon the Continent, of guarding the kingdom from internal conspiracies, or of enabling the ministry to act vigorously in conjunction with the powers in alliance abroad. It was vainly alleged that these expences were incurred without foresight or necessity; and that the increase of the national debt, by multiplying and increasing taxes, would at last become an intolerable burden to the poor. These arguments were offered, canvassed, rejected; the court party was constantly victorious, and every demand was granted with equal cheerfulness and profusion.

The next thing worthy of notice in the reign of George II. is the Charitable Corporation. A society of men had united themselves into a company under this name, with the professed intention of lending money at legal interest to the poor upon small pledges, and to persons of higher rank upon proper security. Their capital was at first limited to thirty thousand pounds; but they afterwards increased it to six hundred thousand. This money was supplied by subscription, and the care of conducting the capital was intrusted to a proper number of directors. The company having continued in existence for more than twenty years, the cashier, George Robinson, member for Marlow, and the warehouse-keeper, John Thomson, disappeared in one day; and five hundred thousand pounds of capital were found to be sunk or embezzled by means which the proprietors could not discover. In a petition to the House, therefore, they represented the manner in which they had been defrauded, and the distress to which many of them had in consequence been reduced; and a secret committee having been appointed to examine into this grievance, a most iniquitous scene of fraud was discovered, which had been carried on by Thompson and Robinson, in concert with some of the directors, for embezzling the capital and cheating the proprietors. Many persons of rank and quality were concerned in this infamous confederacy; and even some of the first characters in the nation did not escape censure. No less than six members of parliament were expelled for the most sordid acts of knavery; Sir Robert Sutton, Sir Archibald Grant, and George Robinson, for their frauds in the management of the Charitable Corporation scheme; Dennis Bond and Serjeant Burch, for a fraudulent sale of the unfortunate Earl of Derwentwater's estate; and John Ward of Hackney, for the crime of forgery. It was at this time asserted in the House of Lords that not one shilling of the forfeited estates had ever been applied to the service of the public, but had become the reward of fraud, venality, and profligacy.

This happened in the year 1731. In 1732 a scheme was formed by Sir Robert Walpole of fixing a general excise; and he introduced it by enumerating the frauds practised by the factors in London employed in selling the American tobacco. To prevent these frauds, he proposed, that instead of having the customs levied in the usual manner, all the tobacco to be hereafter imported should be lodged in warehouses appointed for that purpose by the officers of the crown; and should from thence be sold, upon paying the duty of fourpence a pound, whenever the proprietor found a purchaser. This proposal raised a violent ferment, both within and without doors; and at last the fury of the people was worked up to such a pitch, that the parliament-house was surrounded by multitudes, who intimidated the ministry, and compelled them to abandon thirty millions of money; and although there was a long the scheme. The miscarriage of the bill was celebrated with public rejoicings in London and Westminster, and the minister was burned in effigy by the populace of London.

Reign of On this occasion an attempt was made to repeal the sep- he set sail for China; and returning by the same route, he Reign of George II. tennial bill; and bring back triennial parliaments, as settled at last discovered the galleon, which he engaged and took; George II. at the Revolution. But notwithstanding the warmth of the opposition, the ministry, exerting all their strength, proved victorious, and the motion was defeated. However, as on this occasion the country party seemed to have gained strength, it was thought proper to dissolve the parliament, and to summon another by the same pro-

former parliament. New subjects of controversy offered every day, and both sides were eager to seize them. A convention agreed on by the ministry with Spain became an object of warm altercation. By this the court of Spain had agreed to pay ninety-five thousand pounds to the English, as a satisfaction for all demands, and to discharge the whole in four months from the day of ratification; but this stipulation was considered as not containing an equivalent for the damages which had been sustained, and which were said to amount to three hundred and forty thousand pounds. A violent discussion ensued, in the course of which the minister was provoked into unusual vehemence, and branded the opposite party with the appellation of traitors. But he was, as usual, victorious; and the country party finding themselves out-numbered and out-voted in every debate, resolved to withdraw for ever; while Walpole, thus left without opposition, took the opportunity of passing several useful laws in their absence, in order to render his opponents odious or contemptible to

In 1739 a new war commenced with Spain. Ever since the treaty of Utrecht, the Spaniards in America had insulted and distressed the commerce of Great Britain; whilst the British merchants, on the other hand, had endeavoured to carry on an illicit trade with their dominions. As a right of cutting logwood in the Bay of Campeachy, claimed by the British, gave them frequent opportunities of introducing contraband commodities into the continent, the Spaniards resolved to put a stop to the evil by refusing liberty to cut logwood in that place. The guarda-costas exercised great severities, and many British subjects were sent to the mines of Potosi. One remonstrance followed another to the court of Madrid; but the only answers given were promises of inquiry, which produced no reformation. Accordingly, in 1739 war was declared with all proper solemnity; and soon after Admiral Vernon, with only six ships, destroyed all the fortifications of Puerto Bello, and came away victorious, with scarcely the loss of a man.

As the war was thus successfully begun, supplies were cheerfully granted to prosecute it with all imaginable vigour. Commodore Anson was sent with a squadron of ships to distress the enemy in the South Seas, and to co-operate occasionally with Admiral Vernon across the Isthmus of Darien. This squadron was designed to act a part subordinate to a formidable armament which was to be sent against Mexico or New Spain; but through the mismanagement of the ministry both these schemes were frustrated. Anson was detained till too late in the season, when he set out with five ships of the line, a frigate, two store-ships, and about fourteen hundred men. But having entered the South Sea at the most unfavourable period of the year, he encountered terrible storms; his fleet was dispersed, and his crew deplorably afflicted with scurvy, so that with the utmost difficulty he reached the island of Juan Fernandez. Here, however, he was joined by one ship and a frigate of seventeen guns, and sailing from thence along the coast of rich galleons which traded from the Philippine Islands to

and with this prize, valued at upwards of three hundred thousand pounds, together with other captures to the value of about as much more, he returned home, after a voyage of three years. By this expedition the public sustained the loss of a fine squadron of ships, but a few individuals became possessed of immense fortunes.

Another expedition which was fitted out ended still But the same disputes were carried on in this as in the more unfortunately. The armament consisted of twentynine sail of the line, and an almost equal number of frigates, furnished with all kinds of warlike stores, near fifteen thousand seamen, and as many land forces. The most sanguine hopes of success were entertained; but the ministry detained the fleet without any visible reason till the season for action in America was nearly past. At last, however, the squadron arrived before Carthagena, and soon captured the strong forts which defended the harbour. But though by this means they were enabled to approach nearer the town, they still found great difficulties before them. From an erroneous belief that the ships could not get near enough to batter the town, and that therefore the remaining forts must be attempted by escalade, this dangerous experiment was tried; but the guides were slain by the enemy's fire, and the forces, mistaking their way, instead of attempting the weakest part of the fort, attacked the strongest, where they were exposed to the fire of the whole town. Their scaling ladders were also too short; and at last, after sustaining a dreadful fire with great resolution for some hours, they retreated, leaving six hundred men dead on the spot. The ravages of the climate now began to prove more dreadful than the casualties of war; and the rainy season commenced with such violence, that it was found impossible for the troops to continue in their encampment. And, as if to aggravate these calamities, dissension arose between the commanders of the sea and land forces, who blamed each other, and at last could only be brought to agree in one mortifying measure, namely, the re-embarkation of the troops.

The miscarriage of this enterprise produced the greatest discontents, more especially as other causes of complaint occurred at the same time. Sir John Norris had twice sailed to the coast of Spain at the head of a powerful squadron, without effecting any thing of consequence. commerce of Britain was greatly annoyed by the Spanish privateers, who had taken upwards of four hundred ships since the commencement of the war; whilst the British fleets remained quite inactive, and suffered one loss after another, without endeavouring in the least to make proper reprisals. These discontents burst out all at once against Sir Robert Walpole; a majority was formed in the House of Commons in opposition to the ministry of which he was the head; he was created Earl of Orford; and the parliament having adjourned for a few days on purpose, he re-

signed all his employments.

The removal of this minister gave universal satisfaction. His antagonists entertained great hopes of seeing him punished; but he had laid his schemes too well to be under any apprehensions on that account; and, in fact, the new ministry had no sooner got into office than they trode in the footsteps of those whom they had so much exclaimed against. The nation had now become disgusted with naval operations. The people desired a renewal of their victories in Flanders, and the king ardently joined in the same wish. An army of sixteen thousand men was therefore shipped and sent to Flanders, to take part in the quar-Chili, he plundered and burnt the town of Paita. He next, rels that were then beginning to break out on the Contitraversed the Pacific, in hopes of meeting with one of the nent. Immense triumphs were expected from this undertaking; but it was somehow forgotten that the army was Mexico. Having refreshed his men at the island of Tinian, not now commanded by John Duke of Marlborough.

In order to give some notion of the origin of these conti- receive pay from Britain for defending their own cause Reign of George II. nental disputes, it is necessary to go back for several years. After the Duke of Orleans, regent of France, died, Cardinal Fleury undertook to settle the confusion in which the kingdom was then involved; and under him France repaired her losses, and enriched herself by means of commerce. During the long interval of peace which this minister's counsels had procured for Europe, two powers, hitherto disregarded, began to attract the notice and the jealousy of the neighbouring nations. These were Russia and Prussia, both of which had been gradually rising into power and consequence. The other states were but little prepared to renew the war. The empire remained under the government of Charles VI. who had been placed on the throne by the treaty of Utrecht; Sweden continued to languish, from the destructive projects of Charles XII.; Denmark was powerful enough, but inclined to peace; and part of Italy still remained subject to those princes who had been imposed upon it in consequence of foreign treaties. All these states, however, continued to enjoy profound peace, until the death of Augustus king of Poland; an event by which a general flame was once more kindled in Europe. The emperor, assisted by the arms of Russia, declared for the elector of Saxony, the son of the deceased king; whilst France, on the other hand, espoused the cause of Stanislaus, who had long ago been nominated king of the Poles by Charles of Sweden, and whose daughter the king of France had since married. Stanislaus was gladly received at Dantzic, and acknowledged as king of Poland; but having been besieged there by ten thousand Russians, the city was taken, and he himself with difficulty made his escape. France, however, still resolved to assist him, as the most effectual method of distressing the house of Austria; and her views were seconded by Spain and Sardinia, both of which hoped to be enriched by the spoils of Austria. A French army, therefore, overran the empire, under the conduct of the old Marshal Villars; whilst the Duke of Montemar, the Spanish general, was equally victorious in the kingdom of Naples. The emperor was soon obliged to sue for peace, which was granted; but Stanislaus was neglected in the treaty, it having been stipulated that he should renounce all claim to the kingdom of Poland; while the emperor gratified France with the duchy of Lorraine, and other valuable territories, as an indemnification.

the opportunity favourable for their ambition, and, regardless of treaties, particularly that called the Pragmatic Sanction, by which the late emperor's dominions were settled upon his daughter, caused the Elector of Bavaria to be crowned emperor. Thus the queen of Hungary, daughter of Charles VI. was at once stripped of her inheritance, and left for a whole year without any hopes of succour; and at the same time she lost the province of Silesia by an irruption of the young king of Prussia, who took the opportunity of her defenceless condition to renew his pretensions to that province. France, Saxony, and Bavaria, attacked the rest of her dominions; and Britain was the only ally who seemed willing to assist her; but Sardinia, Holland, and Russia, soon afterwards concurred in the same views. It must be owned that the only reason which Britain had for interfering in these disputes was, that the security of the electorate depended upon nicely balancing the different interests of the empire; but the ministry were nevertheless willing to gratify the king by engaging the country in a war. His majesty informed the parliament that he had sent a body of British forces into the Netherlands, which he had augmented by sixteen thousand Hanoverians, to operate a diversion on the side of France, in fayour of the queen of Hungary. But when the supplies by

came to be considered, violent parliamentary debates en-George 1L sued; and although the ministry carried their point by the strength of numbers, they had but little reason to boast of 1743. their victory.

Yet, however prejudicial these continental measures might be to the true interests of Great Britain, they effectually retrieved the queen of Hungary's affairs, and soon turned the scale of victory in her favour. The French were driven out of Bohemia; while her general, Prince Charles of Lorraine, at the head of a large army, invaded the dominions of Bavaria. Her rival, the nominal emperor, was obliged to fly before her; and, abandoned by his allies, as well as stripped of his hereditary dominions, he retired to Frankfort, where he lived in obscurity. Meanwhile the British and Hanoverian army advanced in order to effect a junction with that under Prince Charles, by which they would have outnumbered their enemies; and to prevent this the French opposed an army of sixty thousand men, upon the Maine, under the command of Marshal de Noailles, who posted his troops on the eastern side of that river. The British army was commanded by the Earl of Stair, who, although he had learned the art of war under Eugene and Marlborough, suffered himself to be inclosed by the enemy on every side, near a village called Dettingen; and in this situation the whole army, with the king himself, who had by this time arrived in the camp, must have been taken prisoners, had the French behaved with ordinary prudence. But their impetuosity saved the combined force from destruction. They passed a defile which they ought to have contented themselves with guarding, and, under the conduct of the Duke de Grammont, their horse charged the British foot with great fury; but they were received with unshaken firmness, and at last obliged to repass the Maine with precipitation, and the loss of about five thousand men. The British monarch, who was present in the battle, displayed equal courage and conduct, and in some measure atoned for an error which might otherwise have proved fatal.

But though the British were victorious in this engagement, the French were very little disconcerted by it. They opposed Prince Charles, and interrupted his attempts to pass the Rhine; and in Italy they also gained some advantages; but their chief hopes were placed on an in-The emperor dying in the year 1740, the French thought tended invasion of England. From the violence of parliamentary disputes in England, France had been persuaded that the country was ripe for a revolution, and only wanted the presence of the pretender to bring about a change. An invasion was therefore projected; the troops destined for the expedition amounted to fifteen thousand; and preparations were made for embarking them at Dunkirk and some of the ports nearest to England, under the eye of the young pretender. The Duke de Roquefeuille, with twenty ships of the line, was to see them safely landed on the opposite shore; and the famous Count Saxe was to command them when disembarked. But the whole project was disconcerted by the appearance of Sir John Norris, with a superior fleet, which obliged the French squadron to put back; while a severe gale of wind damaged their transports, and thus entirely frustrated the scheme of a sudden descent. But the national joy for Sir John Norris's success was soon damped by the miscarriage of Admirals Mathews and Lestock, who, through a misunderstanding, suffered a French fleet of thirty-four sail to escape them near Toulon.

In the Netherlands the British arms were also attended with ill success. The French had there assembled an army of a hundred and twenty thousand men, commanded by Count Saxe, natural son of the late king of Poland, which this additional number of Hanoverian troops was to and an officer of great experience. The English were under

Reign of the Duke of Cumberland, whose army was much inferior Perth, where he performed the ceremony of proclaiming Reign of George II. in number to that of the enemy, whilst in point of know-

ledge of war the disparity between him and the French general was still greater. Count Saxe, therefore, carried all before him. In the year 1743 he besieged Fribourg, and in the beginning of the campaign of 1744 he invested the strong city of Tournay. To save the place, if possible, the allies resolved to hazard an engagement; and this brought on the memorable battle of Fontenoy. The French were posted behind the town of that name, on some eminences which completely commanded the defile which formed the only approach to the position. At two in the morning the assailants quitted their camp, and about nine the British infantry, formed in a kind of grand square, attacked the centre of the enemy's line, which was drawn up in a sort of avenue to receive them. But from the confined nature of the ground, the obstinacy of the resistance in front, and the flanking fire kept up from some woody heights which domineered over the defile, this fine body of troops was never able to develope its attack nor to clear the defile; yet, in spite of every effort of the enemy, it maintained its ground till three in the afternoon, preserving its formation unbroken, notwithstanding the plunging fire of the French artillery, and the concentrated musketry of their infantry, to which it was without intermission exposed; and at last it retired in perfect order, facing round at intervals, and checking the pursuit of the The loss of the allies amounted to twelve thousand men, and that of the French was even greater; but the victory nevertheless gave them the superiority during the rest of the campaign, as well as during the remainder of the war. The capture of Tournay was the first fruit of this dear-bought success; and though the Elector of Bavaria, whom they had proclaimed emperor, was now dead, the French were too much elated by success to relax in their operations against the allies.

To balance the defeat at Fontenoy, however, Admirals Rowley and Warren retrieved the honour of the British flag, and made several rich captures at sea. The fortress of Louisbourg, a place of great consequence to the British commerce, surrendered to General Pepperel; and a short time afterwards two French East India ships, and a Spanish ship from Peru laden with treasure, put into the harbour, supposing it still their own, and were taken.

During this gleam of returning success, Charles Edward, the son of the old pretender to the British crown, resolved to make an attempt to recover what he called his right. Being furnished with some money from France, he embarked for Scotland on board of a small frigate, accompanied by the Marquis of Tullibardine, Sir Thomas Sheridan, and some others; and for the conquest of the whole British empire, he only brought with him seven officers, and arms for two thousand men. Fortune, however, seemed nowise more favourable to this attempt than to others similar to it. His convoy, a ship of sixty guns, was so disabled in an engagement with an English man of war, that it was obliged to return to Brest, whilst he continued his course to the western parts of Scotland. On the 27th of July 1745 he landed on the coast of Lochaber, and was in a little time joined by the Highlanders to the number of fifteen hundred men. The ministry at first could scarcely be induced to credit the story of his arrival; but when it could no longer be doubted, they sent Sir John Cope with a small body of forces to oppose his progress. A favourable opportunity offered for striking a blow at Corryarrick; but Cope, who seems to have been equally devoid of conduct and of energy, withdrew to Inverness, thus uncovering the road to the low country.

The young adventurer, availing himself of this blun-

his father king of Great Britain. He then proceeded to-George II wards Edinburgh, and, his forces continually increasing, entered the capital without opposition; but he was unable, from want of cannon, to reduce the castle. Here he again proclaimed his father; and promised to dissolve the union, which was still considered as one of the national grievances. In the mean time Sir John Cope, having arrived from Inverness, and been reinforced by two regiments of dragoons, resolved to give battle to the enemy. The insurgents, however, attacked him at Gladsmuir, near Prestonpans, and in a few minutes put him and his troops to flight, with the loss of five hundred men. This victory gave the insurgents great hopes, from the impression it produced; and had the pretender marched directly to England, the result might perhaps have been fatal to the House of Hanover. But he was amused by the promise of succours which in fact never arrived, and thus induced to remain in Edinburgh till the season for action was lost. He was joined, however, by the Earl of Kilmarnock, Lord Balmerino, Lords Cromarty, Elcho, Ogilvy, Pitsligo, and the eldest son of Lord Lovat, who with their vassals considerably increased his army; and Lord Lovat himself, so remarkable for his treachery, was favourably disposed towards the pretender, although unwilling to act openly for fear of the government. But whilst Charles was thus trifling away his time at Edinburgh, the British ministry were taking most effectual methods to oppose him. Six thousand Dutch troops, which had come over to assist the government, were dispatched northward under the command of General Wade; but this force was then in some measure incapable of acting, being prisoners of France upon parole, and under engagements not to oppose that power for a year. Be this as it may, however, the Duke of Cumberland arrived soon afterwards from Flanders, and was followed by a detachment of dragoons and infantry, well disciplined and inured to action; whilst volunteers offered their services in every part of the kingdom.

At last Charles resolved upon an irruption into England. He entered that country by the western border, and took the town of Carlisle; after which he continued his march southwards, having received assurances that a considerable body of forces would be landed on the southern coasts to create a diversion in his favour. He established his head-quarters at Manchester, where he was joined by between two and three hundred English formed into a regiment under the command of Colonel Townley; and thence he pursued his march to Derby, intending to go by the way of Chester into Wales, where he hoped to be joined by a great number of malcontents; but in this he was pre-

vented by the factions among his followers.

Having now advanced within a hundred miles of London, that capital was thrown into the utmost consternation; and had he proceeded with the same expedition which he had hitherto used, he might perhaps have made himself master of it. But he was prevented from pursuing this or any other rational plan by the discontents which began to prevail in his army. The young pretender was in fact but the nominal leader of his forces; and his generals, the Highland chiefs, were equally averse to subordination and ignorant of command. They now, however, became unanimous in their resolution to return to their own country; and Charles was forced to comply. Accordingly they retreated to Carlisle without sustaining any loss; and thence crossing the Eden and Solway, entered Scotland. They next marched to Glasgow, which was laid under severe contributions; and thence proceeding to Stirling, they were joined by Lord Lewis Gordon at the head of some forces which had been assembled in his absence. Other der, immediately marched to the south, and arrived at clans likewise came in; while some supplies of money re-

Reign of ceived from Spain, and some skirmishes with the royalists, line; and in this state he was carried off the field by his Reign of Garge II. in which he was victorious, caused the pretender's affairs to assume a much more promising aspect. Being joined by Lord Drummond, he invested the castle of Stirling, in the siege of which much valuable time was consumed to no purpose. General Hawley, who commanded a considerable body of forces near Edinburgh, undertook to raise the siege, and with this view advanced as far as Falkirk in order to give battle to the Highland army. After some time spent in mutual observation, an engagement ensued on the 17th January 1746, in which the king's troops were entirely defeated. The Highlanders advanced to the attack with their usual impetuosity, threw in a volley or two, and then drawing their claymores, rushed forward, sword in hand, to close with the enemy. The onset proved irresistible; infantry and cavalry were intermingled in one common rout; and the whole artillery and tents of the royal army fell into the hands of the conquerors.

But the victory of Falkirk was the last of the triumphs of the rebel army. The Duke of Cumberland having arrived, put himself at the head of the troops at Edinburgh, amounting to about fourteen thousand men; and with these he marched to Aberdeen, where he was joined by several of the nobility attached to the house of Hanover, the enemy in the mean time retreating before him. He next advanced to the banks of the Spey, a deep and rapid river, where the Highlanders might have successfully disputed his passage; but their mutual contentions had now risen to such a height that they could scarce agree in any thing. At last, however, they resolved to make a stand, and for this purpose selected Drummossie Muir, near Culloden, nine miles distant from Inverness; the only ground in the whole country where cavalry and artillery, the two arms which they had most reason to dread, could act with effect against them. Their numbers amounted to about eight thousand; and after an abortive attempt to surprise the royal army at Nairn, they returned to their position and drew out to receive the attack. At one in the afternoon of the 15th of April 1746, the cannonading commenced; and whilst the artillery of the rebels, from being miserably served, did little or no execution, that of the royal army, at every discharge, made frightful gaps in the Highland ranks. During the continuance of the cannonade, Cumberland observing that the right of the Highlanders was covered by a wall, ordered a body of men to advance and pull it down. The Campbells, to whom this service was committed, promptly obeyed the order; and the right wing of the Highlanders being thus uncovered, they became exposed to a flanking fire as well as to that in front, which was now kept up with the greatest vivacity. In this trying situation a body, chiefly Atholemen, about nineteen hundred strong, unable any longer to sustain the galling fire which was poured in on their ranks, and conscious that their real strength lay in close combat, advanced to the attack sword in hand; broke through Burrell's and Monro's regiments in an instant; and pressed on, with diminished numbers but dauntless resolution, against the second line of the royal army, amidst a concentrated and terrible fire from every gun that could be brought to bear upon them. The second line steadily awaited the onset of this forlorn hope, reserving their fire till it came quite close, when a destructive volley was thrown in, while Wolfe's regiment, formed en potence, opened at the same instant a flanking fire. The force of the charge was thus completely broken; a few and but a few of the assailants escaped; and the bravest, who did not fall by the murderous fire, perished in a desperate conflict with the English bayonets. Lochiel, advancing at the head of a small band, who had survived the encounter with the first line, was wounded in both ancles by a grape-shot while in the act of charging the second

two brothers, between whom he had advanced. Mac-George IL donald of Keppoch was also rushing on in like manner to the attack, when, receiving a wound which brought him to the ground, he was conjured by a friend not to throw away his life, but to retire and rejoin the main body; but desiring his friend to provide for his own safety, Macdonald got upon his legs, and, whilst preparing again to advance. received another shot, by which he fell to rise no more. Most of the chiefs who commanded the body that advanced to the charge, and almost every man in the front ranks, were killed. Unfortunately the Highland regiments on the left did not advance to close combat, or support the gallant attack which has just been described: had they done so, the issue might have been very different. After exchanging a volley or two with the right wing of the duke's army, and answering the fire of some dragoons who hovered near, they retreated, and separating into small parties, were cut up in detail, losing more men in proportion than the brave band who had made so gallant and vigorous an effort to retrieve the fortune of the day. In less than thirty minutes the battle was lost, and with it a final period was put to all the hopes of the young adventurer. The conquerors behaved with the greatest cruelty, refusing quarter to the wounded, the unarmed, and the defenceless; and some were slain who had only been spectators of the combat; whilst soldiers were seen to anticipate the base employment of the executioner. The duke, immediately after the action, ordered thirty-six deserters to be executed; the conquerors spread terror wherever they went; and in a short time the whole country around became one dreadful scene of plunder, slaughter, and desolation.

Immediately after the battle, the pretender fied with a captain of Fitzjames's cavalry; and when their horses were fatigued, they both alighted, and separately sought for safety. There is a striking resemblance between the adventures of Charles II. after the battle of Worcester, and those of the pretender after the battle of Culloden. For several days he wandered through the country; sometimes he found refuge in caves and cottages, without any attendants at all; sometimes he lay in forests with one or two companions of his distress, continually pursued by the troops, there being a reward of L.30,000 offered for taking him either dead or alive. In the course of his adventures he had occasion to trust his life to the fidelity of above fifty individuals, not one of whom could be prevailed on, even by so great a reward as that which was offered, to betray him whom they looked upon as the son of their king. For six months the unfortunate Charles continued to wander in the mountains of Glengarry, often hemmed round by his pursuers, but still rescued, by some providential accident, from the impending danger. At length a privateer of St Maloes, hired by his adherents, having arrived in Lochranach, he embarked on board that vessel for France. At this time he was reduced to a state of inexpressible wretchedness, being clad in a short coat of black frize, threadbare, over which was a common Highland plaid girt round him by a belt, from which hung a pistol and dagger. He had not been shifted for many weeks; his eyes were hollow, his visage was wan, and his constitution greatly impaired by famine and fatigue. Accompanied by Sullivan and Sheridan, two Irish adherents, who had sharedall his calamities, together with Cameron of Lochiel, his brother, and a few other exiles, he set sail for France, and, after having been chased by two English men of war, arrived in safety at a place called Roseau, near Morlaix, in

While the pretender was thus pursued, the scaffolds and gibbets were preparing for his brave adherents. Seventeen officers were hanged, drawn, and quartered, at KenningReign of ton Common, in the neighbourhood of London; nine were George II. executed in the same manner at Carlisle, and eleven at York. A few obtained pardons, and a considerable number of the common men were transported to America. The Earls of Kilmarnock and Cromarty, and Lord Balmerino, were tried and found guilty of high treason. Cromarty was pardoned, but Kilmarnock and Balmerino were executed; as was also Mr Radcliffe, brother to the Earl of Derwentwater, who received sentence upon a former conviction. Lord Lovat was tried, and suffered some time tually given up, and all conquests restored; that the duchies Reign of Parma, Placentia, and Guastalla, should be ceded to George II. Don Philip, heir-apparent to the Spanish crown, and after him return to the house of Austria; that the fortifications of Dunkirk towards the sea should be demolished; that the British ship annually sent with slaves to the coast of New Spain should have this privilege continued for four years; that the king of Prussia should be confirmed in the possession of Silesia; and that the queen of Hungary should be secured in the possession of her patrimonial

Immediately after the suppression of the rebellion, the legislature undertook to establish regulations in Scotland, conducive to the happiness of the people and the tran-quillity of the united kingdoms. The Highlanders had till that time continued to wear the military dress of their ancestors, and never went without arms; in consequence of which they considered themselves as a body of people distinct from the rest of the nation, and were ready upon the shortest notice to second the projects of their chiefs. Their habits were now reformed by an act of legislature, and they were compelled to wear clothes of the common fashion. But what contributed still more to destroy the spirit of clanship was the abolition of the hereditary jurisdictions which their chieftains exercised over them. The power of the chiefs was totally destroyed, and every subject in that part of the kingdom was liberated from the state of vassalage in which they had formerly lived.

Soon after the battle of Culloden the Duke of Cumberland proceeded to Flanders, where he resumed the command of the army, to which he was by no means equal. The French carried every thing before them, and reduced under their dominion all the strong places which had been taken by the Duke of Marlborough, and formed a barrier to the united provinces. They gained a considerable victory near Rocoux, though at a great sacrifice of men, which, however, they could easily spare, as they were much more numerous than their adversaries; and another victory which they obtained at Lafeldt served to depress still further the spirit of the allied army. But the taking of Bergen-op-Zoom, the strongest fortification of Brabant, was the event which naturally reduced the Dutch to the greatest alarm and distress.

These victories and successes in Flanders, however, were counterbalanced by almost equal disappointments. In Italy, the brother of Marshal Belleisle, attempting to penetrate into Piedmont at the head of thirty-four thousand men, was defeated and killed. A fleet had been fitted out for the recovery of Cape Breton, but without success; and two others were equipped, the one to make a descent upon the British colonies in America, and the other to carry on the operations in the East Indies; but these were attacked by Anson and Warren, and nine of their ships taken. Soon after this, Commodore Fox, with six ships of war, took above forty French ships richly laden from St Domingo; and about the same time the French fleet was defeated by Admiral Hawke, who took seven ships of the line and several frigates.

For a long time Louis had been desirous of peace, and this desire he even expressed to Sir John Ligonier, who had been taken prisoner at the battle of Lafeldt. But now the bad success of his admirals at sea, and his armies in Italy, the frequent bankruptcies of his merchants at home, and the election of a stadtholder in Holland, who gave spirit to the opposition;—all these contributed to make him weary of the war, and to propose terms of accommodation. This was what the allies had long wished for, but had been ashamed to demand. A congress was therefore held at Aix-la-Chapelle, and a treaty concluded, by which it was provided that all prisoners on each side should be mu-

Don Philip, heir-apparent to the Spanish crown, and after him return to the house of Austria; that the fortifications of Dunkirk towards the sea should be demolished; that the British ship annually sent with slaves to the coast of New Spain should have this privilege continued for four years; that the king of Prussia should be confirmed in the possession of Silesia; and that the queen of Hungary should be secured in the possession of her patrimonial dominions. But the most mortifying clause was, that the king of Great Britain should, immediately after the ratification of this treaty, send two persons of rank to France as hostages, until restitution should be made of Cape Breton and all other British conquests during the war. No mention whatever was made of the searching of British vessels in the American seas, though this was the original cause of the quarrel; the limits of their respective possessions in North America were not ascertained; nor did they receive any equivalent for those forts which they had restored to the enemy.

In the year 1751 Frederick prince of Wales died of a pleurisy, which was not thought at first to be in any way dangerous. He was much regretted, for his good-nature had rendered him popular, and those who opposed the present administration had grounded their hopes of redress upon his accession to the throne.

Some time before this, in the year 1749, a scheme had been entered upon, from which the nation in general anticipated great advantages; namely, encouraging those who had been discharged from the army or navy to become settlers in Nova Scotia, a country cold, barren, and almost incapable of cultivation. Nevertheless, on account of this barren spot, the English and French actually renewed the war. The possession of this country was reckoned necessary for the defence of the English colonies to the north, and for preserving their superiority in the fisheries in that part of the world. The French, however, who had been long settled in the back parts, resolved to use every method to dispossess the new comers, and spirited up the Indians to begin hostilities. Another source of dispute also sprung up in the same part of the world. The French, pretending to have first discovered the mouth of the river Mississippi, claimed the whole adjacent country towards New Mexico on the east, and to the Apalachian Mountains on the west; and, in order to assert their claims, as they found several English who had settled beyond these mountains, they dispossessed them of their new settlements, and built such forts as were calculated to command the whole country round about. Negociations and mutual accusations were followed by hostilities; and in 1756 four operations were undertaken by the British in America at once. Colonel Monkton had orders to drive the French from the province of Nova Scotia; General Johnson was sent against Crown Point; General Shirley against Niagara, to secure the forts on the river; and General Braddock against Fort du Quesne. In these expeditions Monkton was successful; Johnson was also victorious, though he failed in taking the fort against which he was sent; Shirley was thought to have lost the season of operation by delay; and Braddock was defeated and killed.

But, in return for this failure of success, the British made reprisals at sea; and here they were so successful that the French navy was unable to recover itself during the continuance of the war. The first measure of the French was to threaten an invasion. Several bodies of their troops were sent down to the coasts opposite Britain, and these were instructed in the manner of embarking and relanding from flat-bottomed boats, which were made in great numbers for the purpose. The number of men amounted

George II. to the undertaking. The ministry were greatly alarmed, and applied to the Dutch for six thousand men, which

they were by treaty obliged to furnish in case of invasion. But this supply was refused, the Dutch alleging that their treaty was to send the troops in case of an actual, and not of a threatened, invasion. The king, therefore, finding he could not reckon upon the Dutch forces till their assistance would be too late, desisted entirely from his demand; and the Dutch with great cordiality returned him thanks for withdrawing his request. Upon this ten thousand Hessians and Hanoverians were brought over; a proceeding which occasioned great discontent. The ministry were reviled for such disgraceful conduct, as if the nation was unable to defend itself; whereas the people only demanded a vigorous exertion of their own internal strength, and then feared no force that could be led to invade them.

The threatened invasion, however, never took place. But a French army landed in Minorca, and invested the citadel of St Philips, which was reckoned the strongest in Europe, but the garrison was nevertheless weak, and nowise fitted to stand a vigorous siege. To raise this siege, Admiral Byng was dispatched with a squadron of ten men of war, with orders to relieve Minorca, or at any rate to throw a body of troops into the garrison. But this last he reckoned too hazardous an undertaking, nor did he even attempt it; and soon afterwards a French fleet appeared nearly equal in force to his own, when he resolved to act only on the defensive. The French advanced, and a slight engagement ensued with part of the English fleet; after which the enemy slowly withdrew, and no other opportunity occurred of coming to a close engagement. Upon this it was resolved in a council of war to return to Gibraltar to refit, and agreed that the relief of Minorca was impracticable. For such pusillanimous, if not treacherous conduct, Byng was brought home under arrest, tried, condemned to death, and shot. He suffered with the greatest resolution, after delivering a paper filled with protestations of his innocence as to any treacherous intention.

After the conquest of Minorca, the French declared that they would revenge all injuries which they might sustain in their colonies on the king of Britain's dominions in Germany. Upon this the court of London, eager to preserve Hanover, entered into a treaty with the court of Russia, by which it was stipulated that a body of fifty thousand Russians should be ready to act in the British service, in case Hanover should be invaded by the French; for which the Czarina was to receive L.100,000 annually, to be paid in advance. But the treaty was opposed by the king of Prussia, who had long considered himself as guardian of the interests of Germany, and was therefore alarmed at a treaty which threatened to deluge the empire with an army of barbarians. Besides, he was already apprised of an agreement between the Austrians and Russians, by which the latter were to enter the empire and strip him of his late conquest of Silesia. He therefore declared that he would not suffer any foreign forces to enter the empire, either as auxiliaries or principals; so that the king of Britain found himself obliged to drop his Russian connection, and conclude a treaty with the king of Prussia. As both monarchs wished only to prevent the invasion of Germany, they soon came to an agreement to assist each other mutually; and from this alliance a new combination took place among the European powers, quite opposite to the former one. Britain opposed France in America, Asia, and on the ocean. France attacked Hanover, which the king of Prussia undertook to protect; whilst Britain promised of Saxony into the same designs; and in these views the his arrival at the forts of Crown Point and Ticonderago, Ge-

Reign of to fifty thousand, but all discovered the utmost reluctance Austrians were seconded by France, Sweden, and Russia, Reign of who had hopes of acquiring a settlement in the west of George II. 1759.

Thus the king of Prussia launched into the tumult of war, having only the king of Britain for his ally; whilst the most powerful states of Europe were his antagonists. He now performed a series of exploits which, taken as a whole, are not surpassed in the annals of modern times, and of which a particular account will be given in the article Prussia. The British ministry, in order to create a diversion in his favour, planned an enterprise against the coast of France; but the destination of the fleet equipped for this purpose was kept a profound secret. At last, however, it appeared before Rochefort, where the commanders, having trifled away their time in deliberating how to proceed, took the little island of Aix, an easy and useless conquest, and soon afterwards returned home without attempting any thing else. By this miscarriage the ministry were so discouraged that they had thoughts of abandoning the king of Prussia to his fate; and the king was actually meditating a negociation of this nature, when he was prevented by the expostulations of his distressed ally. From motives of generosity, therefore, more than of interest, it was resolved to continue to assist him; and success, which had long fled from the British arms, once more began to

return with double splendour. It was in the East Indies where this return of good

fortune first manifested itself; but the British conquests in the western part of the world speedily eclipsed those in the eastern. These successes must, in part at least, be ascribed to the vigorous administration of Mr William Pitt, who about this time came into power. An expedition was set on foot against Cape Breton, under General Amherst and Admiral Boscawen; another under General Abercrombie, against Crown Point and Ticonderago; and a third under Brigadier-General Forbes, against Fort du Quesne. The fortress of Louisbourg, which defended the island of Cape Breton, was strong both by nature and art; the garrison was numerous, the commander vigilant, and every precaution had been taken to prevent a landing; but the activity of the British surmounted every obstacle; and the place having been surrendered by capitulation, its fortifications were demolished. The expedition against Fort du Quesne was equally successful; but that against Crown Point once more miscarried. General Abercrombie attacked the French in their intrenchments, but was repulsed with great slaughter, and obliged to retire to his camp at Lake George. But though in this respect the British arms were unsuccessful, yet, upon the whole, the campaign of 1758 ended greatly in their favour. The taking of Fort du Quesne served to remove from their colonies the terror of the incursions of the Indians, whilst it interrupted the communication along a chain of forts with which the French had environed the British settlements in America; and the succeeding campaign promised still greater success.

In 1759 it was resolved to attack the French in several parts of their territory at once. General Amherst, with a body of twelve thousand men, was commanded to attack Crown Point; General Wolfe was to undertake the siege of Quebec; whilst General Prideaux and Sir William Johnson were to attempt a French fort near the cataracts of Niagara. This last expedition was the first that succeed-The siege was begun with vigour, and promised an easy conquest; but General Prideaux being killed in the trenches by the bursting of a mortar, the command devolved on General Johnson. A body of French troops, sensible of the importance of the place, attempted to rehim troops and money to assist his operations. Austria lieve it, but were utterly defeated and dispersed; and soon having aims on the dominions of Prussia, drew the Elector afterwards the garrison surrendered prisoners of war. On

Reign of neral Amherst found them deserted and destroyed. There George Sackville. A misunderstanding, however, arose Reign of George II now remained, therefore, but one decisive blow to be between him and Prince Ferdinand, the effects of which George III. struck in order to reduce the whole of North America under the British dominion; namely, by the capture of Quebec, the capital of Canada. This expedition was commanded by Admiral Saunders and General Wolfe. The enterprise was attended with difficulties which appeared insurmountable; but all these were overcome by the admirable conduct of the general, and the great bravery of his men. He engaged and put to flight the French under Montcalm; but, to the great regret of the British, he was killed in the action nearly at the same instant that his adversary also fell. The surrender of Quebec was the consequence of this victory, and it was soon followed by the cession of all Canada. The next season, indeed, the French made a vigorous effort to recover the city; but by

vince was soon after reduced by the prudence and activity of General Amherst, who obliged the French army to capitulate; and it has ever since remained as a dependency of the British empire. About the same time also the island of Guadaloupe was reduced by a force under Commodore

the resolution of Governor Murray, and the appearance of a British fleet under the command of Lord Colvile, they

were obliged to abandon the enterprise. The whole pro-

More and General Hopson.

At the beginning of the war the British affairs in Germany had worn a very unfavourable aspect. The Hanoverians were commanded by the Duke of Cumberland, who, greatly outnumbered by the enemy, was obliged to retire beyond the Weser. The passage of this river by the enemy might have been disputed with success; but the French were suffered to effect it unmolested. The Hanoverians were then driven from one part of the country to another, till at length they made a stand near a village called Hastenbach, where it was hoped the numbers of the enemy would not avail them in a general engagement. The Hanoverians, however, left the field of battle to the French, after a feeble resistance. The latter pursued, and the duke retired towards Stade; by which means he marched into a country where he could neither procure provisions nor attack the enemy with any prospect of success. And here, being unable either to escape or advance, he was compelled to sign a capitulation, by which the whole army laid down their arms, and were afterwards dispersed into different cantonments. By this disgraceful surrender, which was called the capitulation of Closter Seven, Hanover was obliged to submit quietly to the French, and the latter were thus left at full liberty to turn their arms against the king of Prussia.

Soon after this capitulation, both sides began to complain that the treaty had not been strictly observed. The Hanoverians exclaimed against the rapacity of the French general and the brutality of his soldiers. The French retorted the charge, accusing the Hanoverians of insolence and insurrection; and being sensible of their own superiority, resolved to bind them strictly to their terms of agreement. The Hanoverians, however, only wished for a pretence to take arms, and for a general to head them; and neither was long wanting. The oppressions of the taxgatherers whom the French had appointed were considered as so severe, that the army rose to vindicate the freedom of their country; and Prince Ferdinand of Brunswick put himself at its head. As soon as this became known in Britain, large supplies were granted, both for the service of the king of Prussia, and for enabling the Hanoverian army to act vigorously in conjunction with him. A small body of British forces was sent over to join Prince Ferdinand under the Duke of Marlborough; but after some inconsiderable successes at Crevelt, the Duke of Marlborough died, and the command of the British forces devolved on Lord

appeared at the battle of Minden, that was fought shortly after. Lord George, who commanded the British cavalry, pretended that he could not understand the orders sent him by the prince, and of consequence did not obey them. The allies gained the victory, but it would have been more decisive had the British commander obeyed his orders. He was soon after recalled, tried by a court-martial, found guilty of disobedience, and declared incapable of serving in any military command for the future. After this victory it was generally imagined that one reinforcement more of British troops would terminate the war in favour of the allies; and that reinforcement was accordingly sent. The British army in Germany was augmented to upwards of thirty thousand men, and sanguine hopes of conquest were generally entertained. But these hopes proved to be ill founded. The allies were defeated at Corbach, but retrieved the honour of their arms at Exdorf. A victory at Warbourg followed shortly after, and this was succeeded by another at Zierenberg. But they suffered a reverse at Compen; after which both sides retired into winter quarters.

1760.

On the 25th of October 1760 died George II. He had risen at his usual hour, and observed to his attendants, that as the weather was fine, he would take a walk into the garden of Kensington, where he then resided. But in a few minutes after his return, being left alone, he was heard to fall heavily on the floor; and the noise bringing his attendants into the room, they lifted him into bed, when he desired in a faint voice that the Princess Amelia might be sent for; but before she could reach the apartment his majesty expired, in the seventy-seventh year of his age and thirty-third of his reign. An attempt was made to bleed him, but without effect; and afterwards the surgeons, upon opening him, discovered that the right ventricle of the heart had been ruptured, and a great quantity of blood discharged through the aperture.

## CHAP. XII.

## REIGN OF GEORGE III.

Accession of George III.—Success of the British arms.—Proposals of peace.—A war with Spain proposed by Mr Pitt.—His resignation.—Created Earl of Chatham.—War with Spain.— France and Spain declare war on Portugal.—Invasion of that country.—Spaniards defeated.—Taking of Havana.—Philipping Islands and Islands a pine Islands reduced.—Extent of the conquests of Britain.— Peace of 1763.—Discontents.—Cyder tax.—Resignation of Lord Bute.—New ministry.—Supposed influence of Lord Bute.—Proceedings against John Wilkes.—Licentiousness of the time.—Expedients resorted to in order to increase the revenue.— Renewal of the Charter of the Bank.—Taxation of America. Act against illicit trade with the Spaniards.—Stamp Act. Violent resistance of the Americans.—Conduct of Administration.—Disturbances in London.—Illness of the King, and Regency Bill.—Change of Ministry.—Death of the Duke of Cumberland.—Stamp Act repealed.—Consequences.—Return of Wilkes.—Differences with Spain about the Falkland Islands. -Negociations.-The affair terminated, and the settlement abandoned.—Proceedings of the corporation of London.—Speech of Mr Beckford, the Lord Mayor.—His death.—Ex-officio Informations.—Law of Libel.—Debates concerning the conduct of the Judges.—Tumult in the House of Lords.—Case of New Shoreham and its Christian Club.—Licentiousness of the Press. Proceedings of the House of Commons against some printers. Ridiculous expedient resorted to in order to avoid a contest with Wilkes.—East India Affairs.—Discouragement of the popular party.—Meeting of Parliament.—Augmentation of the number of Seamen.—Subscription of the thirty-nine Articles.—Royal Marriage Bill.—Bill for the relief of the Dissenters rejected.—East India Affairs.—Exportation of tea, and its consequences.—Regulation Bill.—Reports of the Select and Secret Committees.—Lord Clive accused.—His acquittal.—American

1762.

Reign of George III. 1760.

affairs.—Boston Port Bill.—Repeal of the Tea-duty refused.—Administration of Justice Bill.—Quebec Bill.—Lord Chatham's motion for the recal of the troops.—Petitions of various kinds, and debates thereon.—Chatham's Scheme of Conciliation rejected.—Address on the American papers.—Violent debates.
—New England Restraining Bill —The American fisheries.—

King George III. ascended the throne amidst the greatest successes both by sea and land. At this time, indeed, the efforts of Britain in every quarter of the globe were truly astonishing. The king of Prussia had received a subsidy; a large body of English forces commanded the extensive peninsula of India; another army of twenty thousand men confirmed the conquests in North America, while thirty thousand were employed in Germany; and a great many more were dispersed in garrisons in different parts of the world. But all this was surpassed by the naval force, which carried every thing before it, and totally annihilated the French maritime power. The courage and conduct of the English admirals excelled every thing that had been heard of before; neither superior force, nor numbers, nor even the terrors of the tempest, could intimidate them. Admiral Hawke gained a complete victory over an equal number of French ships in Quiberon Bay on the coast of Bretagne, in the midst of a storm, during the darkness of night, and, what a seaman fears still more, in the neighbourhood of a rocky shore.

When his majesty had met his parliament, which was on the 18th November 1760, he confirmed the hopes of his allies, and gave assurances of his intention to prosecute the war with vigour. By this time, however, the people were weary of conquests, especially those in Germany; and the general current of popular opinion seemed adverse to the German war. But for some time no change took place in the method of carrying it on. In 1761, however, proposals of peace were interchanged among the belligerent powers of Europe; but the French, designing to draw Spain into a confederacy with them, were not sincere in their intentions; and in this way the treaty came to nothing. An enterprise was projected against Belleisle, on the coast of France, which was conducted by Commodore Keppel and General Hodgson, and terminated in the capture of the island, with the loss of eighteen hundred men killed and wounded on the part of the British; and however unimportant such a conquest might be, the rejoicings on account of it were great. In Germany, however, the towards Miranda, which he entered on the 9th of May, campaign was unsuccessful on the part of the allies. At through the breaches made by the accidental explosion of first, indeed, they drove the French out of the territory of a powder magazine. From Miranda the invaders marched Hesse, and laid siege to the city of Cassel; but being defeated at Stangerod, they were forced to raise the siege, retire behind the Dymel, and again abandon Hesse to the enemy, after which they were followed and attacked by the French; and though the latter were defeated, they could with difficulty be prevented from making themselves masters of Munster and Brunswick.

During all this time appearances of negociation were kept up; but at length M. Bussy, on the part of France, delivered to Mr Pitt a private memorial, signifying, that, in order to establish peace on a lasting foundation, the King of Spain might be induced to guarantee the treaty; and to prevent the differences which then subsisted between Britain and Spain from producing a fresh war in Europe, it was proposed, that in this negociation the three points which had been disputed between the crown of lingland and Spain might be finally settled. These were, first, the restitution of some captures made upon the Spanish flag; secondly, a recognition of the privilege of the Spanish nation to fish upon the banks of Newfoundland; and, thirdly, the demolition of the English settlements in the Bay of Honduras. But this memorial was Alentejo; and if this body of troops had been joined to returned as wholly inadmissible. Mr Pitt declared that the others, they would probably, in spite of all opposition,

it would be looked upon as an affront to the dignity of his Reign of master, and incompatible with the sincerity of the negocia- George III tion, to make any further mention of such a circumstance. Being now convinced of the sinister designs of Spain, this minister also proposed immediately to declare war against that country. But the proposal being rejected, he resigned his employment of secretary of state; upon which he was created Earl of Chatham, and had a pension of L.3000 per annum settled upon him for three lives.

The new administration, however, soon found that Mr Pitt was in the right; and war was accordingly declared against Spain. As Portugal was the ally of Britain, the French and Spaniards resolved to attack that kingdom, which was then in no condition to defend itself. The Portuguese monarch was haughtily commanded to accede to the confederacy against Britain, and threatened with the vengeance of France and Spain in the event of refusal. It was in vain that he promised to observe a strict neutrality, and urged the obligations he was under to the king of Britain. This moderate and reasonable representation only led to more haughty and insulting demands. His Portuguese majesty, however, continued to reject their proposals in the most resolute manner; and concluded his last declaration by stating, that it would affect him less to be reduced to the last extremity, than to sacrifice the honour of his crown, and all that Portugal held most dear, by submitting to become an unheard-of example to all pacific powers, which would no longer be able to enjoy the benefit of neutrality, whenever a war should be kindled between other powers with which the former were connected by defensive treaties. This declaration was issued on the 27th of April 1762; and soon afterwards France and Spain jointly declared war against Portugal.

As the design of the courts of France and Spain in making war with Portugal was professedly to deprive Great Britain of the military and commercial use of the harbours of that kingdom, their principal endeavours were directed against the two great ports of Oporto and Lisbon. With this view, three inroads were to be made; one to the north; another more to the south; and the third in the intermediate provinces, in order to sustain the other two bodies, and preserve a communication between them. The first body of troops was commanded by the Marquis of Savria, and entering by the north-east of Portugal, marched to Braganza, which speedily surrendered; and Moncorvo was in like manner taken. They became masters of nearly the whole of the extensive province of Tras os Montes; and every thing being clear before them to the banks of the Dourg. Oporto was given up for lost, and the admiralty prepared transports to carry off the effects of the British merchants. But on the Douro the career of this body was stopped by the peasants, who, animated and guided by some British officers, seized a difficult pass, and drove the enemy back to Moncorvo. The second body of Spaniards entered the province of Beira, and being joined by strong detachments, immediately laid siege to Almeida, which surrendered on the 25th of August. The Spaniards then pushed forward to Castello Branco, and marching to the southward, approached the banks of the Tagus. During the whole of their progress, and indeed throughout the whole campaign, Great Britain and Portugal had nothing that deserved the name of an army in the field; and all that could be done was by the defence of passes, by skirmishes, and by surprises. The third Spanish army had assembled on the frontiers of Estremadura, with the design of invading the province of

Reign of

George III. separately, it might have so distracted the defenders of the country as to enable the other invading forces to penetrate to that city. The Count of La Lippe Buckeburg, therefore, having arrived in Portugal, resolved if possible to prevent their entrance into that kingdom; and with this view he dispatched Brigadier-general Burgoyne to attack an advanced body of Spaniards which lay on the frontier in the town of Valentia de Alcantara. On the 27th of August the town was surprised, and the general who was to have commanded the invading force taken, together with one colonel, two captains, and seventeen subaltern officers, whilst one of the best regiments in the Spanish service was also entirely destroyed, and the enemy thus prevented from entering Alcotojo. That part of the Spanish army which acted in the neighbourhood of Castello Branco having made themselves masters of several important passes, the combined army of British and Portuguese pretended to retire before them, in order to draw them into the mountainous tracts. They attacked the rear of the allies, but were repulsed with loss; yet they still continued masters of the country, and nothing remained but the passage of the Tagus to enable them to take up their quarters in the province of Alentejo. But this the count designed to prevent; and accordingly he employed General Burgoyne, who having formed a design of surprising them, committed the execution of it to Coonel Lee. In the night of the 6th of October this officer :ell upon their rear, dispersed the whole body with considerable slaughter, destroyed their magazines, and returned with scarcely any loss. The season was now far advanced; immense quantities of rain fell; the roads were destroyed; and the Spaniards having obtained possession of no advanced post where they could maintain themselves, and being unprovided with magazines, fell back to the fronners of their own country.

> Nor were the British arms less successful in America and the East Indies. From the French were taken the islands of Martinico, St Lucia, St Vincent, and Grenada; from the Spaniards the strong fortress called Havana, in the island of Cuba. The conquest of the latter cost a number of brave men, more of whom were destroyed by the climate than by the enemy. But it was at this place that the fleets from the several parts of the Spanish West Indies, called the galleons and flota, assembled before they finally set out on their voyage for Europe; and the acquisition of it, therefore, united all the advantages which can be acquired in war. Nine of the enemy's men of war, with four frigates, were taken; three of their best ships had been sunk in the harbour at the beginning of the siege; and two more in great forwardness on the stocks were destroyed. In money and valuable merchandises the spoil did not fall short of three millions sterling. To this success in the western world may be added the capture of the Spanish register-ship called the Hermione, by the Active and Favourite king's ships. This happened on the 21st of May 1762, just as the Hermione was entering one of the ports of Old Spain; and the prize was valued at little short of a million sterling. In the East Islands, was committed to Colonel Draper, who arrived on this service at Madras in the latter end of June 1762. The seventy-ninth regiment was the only regular corps that could be spared for the expedition; but every thing was conducted with the greatest celerity and judgment. The British forces landed at Manilla on the 24th of September; on the 6th of October the governor was obliged to surrender at discretion; and soon after, the galleon bound from Manilla to Acapulco, laden with rich merchandise to the value of more than half a million, was taken by the voured the views of those who delighted in turbulence and

have forced their way to Lisbon itself; whilst by acting frigates Argo and Panther. By the conquest of Manilla Reign of there fell into the hands of the British fourteen consider- George III. able islands, which, from their extent, fertility, and convenience for commerce, were of the greatest importance. By this acquisition, joined to the successes in the western hemisphere. Britain secured every avenue of the Spanish trade, and interrupted all communication between the different parts of the vast but unconnected empire of Spain.

1762.

During this time the war in Germany had continued with the utmost violence; but although the allies under Prince Ferdinand had given the highest proofs of valour, no decisive advantage had been obtained over the French. It was, however, no longer the interest of Britain to continue a destructive contest. There never had been a period so fortunate or glorious for this island. In the course of the war she had conquered a tract of continent of immense extent. Her American territory approached to the borders of Asia, and the frontiers of the Russian and Chinese dominions. She had conquered twenty-five islands, all of them distinguishable for their magnitude, their riches, or the importance of their situation; by sea and land she had gained twelve battles, and reduced nine fortified cities, and about forty castles or forts; she had taken or destroyed above a hundred ships of war from her enemies, and acquired at least ten millions in plunder. Conquests so extensive and ruinous to the French and Spaniards naturally rendered them desirous of a peace, which was at length concluded at Paris on the 10th of February 1763. The terms granted, and which many thought too favourable, were, in substance, that the French king should relinquish all claims to Nova Scotia; that he should likewise give up the whole country of Canada; and that for the future the boundary betwixt the British and French dominions in America should be fixed by a line drawn along the middle of the river Mississippi from its source to the river Ibberville, and thence by a line along the middle of this river, and the Lakes Maurepas and Pontchartrain, to the sea. The islands of St Pierre, Miquelon, Martinico, Guadaloupe, Marigalante, Desirade, St Lucia, and Belleisle, were restored to France; whilst Minorca, Grenada, and the Grenadines, St Vincent, Dominica, and Tobago, were ceded to Great Britain. In Africa, the island of Goree was restored to France; and the river Senegal, with all its forts and dependencies, ceded to Great Britain. In the East Indies, all the forts and factories taken from the French were restored. In Europe, the fortifications of Dunkirk were to be destroyed; and all the countries, fortresses, and posts, belonging to the Electorate of Hanover, the Duke of Brunswick, and the Count of La Lippe Buckeburg, restored. In regard to Spain, the British fortifications on the Bay of Honduras were to be demolished; and the Spaniards were to desist from their claim of right to fish on the Newfoundland bank. The Havana was restored, in consequence of which Florida, St Augustine, and the Bay of Pensacola, were ceded to Britain; the Spaniards were to make peace with Portugal; and all other countries not particularly mentioned were to be restored to their respective owners at the beginning of the war.

The conclusion of the war did not by any means tend Indies an expedition, undertaken against the Philippine to heal those divisions which had arisen on the resignation of Mr Pitt; on the contrary, it furnished abundant matter of complaint for the discontented party, whose views at that time seem to have been the embarrassment and disturbance of an administration which they were unable to subvert. When the treaty was under consideration, however, only some faint attempts were made to oppose it; but it soon appeared, that though this opposition had proved so feeble, the spirit of the party was far from being exhausted. The actual state of affairs indeed fa-

Reign of in faction. A long and expensive war had drained the succeeded the Earl of Bute in the treasury, was a man of Reign of George III. national treasure, and greatly increased the public debt; whilst heavy taxes had already been imposed, and it was still as necessary to keep them up, and even to impose new ones, as though the war had not ended. Thus the bulk of the nation, who imagined that conquest and riches ought to go hand in hand, were easily induced to believe the administration arbitrary and oppressive, seeing it continued to load them with fresh taxes after such great successes as had for some years past attended the British arms. And indeed it must be owned, that the new administration appear not to have been sufficiently wary in this respect. Amongst various methods of raising the supplies for 1763, they had recourse to a duty of four shillings per hogshead upon cyder, payable by the maker, and to be collected in the same manner as the rest of the excise duties. The other articles of supply, as well as the duty in question, furnished matter of declamation for the members in opposition; but this inflamed the popular fury to a great degree, and made the people readily receive as truth whatever was said by the minority in the parliamentary debates. Besides the usual declamations, the smallness of the sum to be raised by it was particularly urged. This, it was said, showed that the supplying of the wants of government could not be the sole motive for imposing such a duty; and it was further urged, that now the houses of all orders of people, noblemen of the first rank not excepted, were liable to be entered and searched at the pleasure of excisemen, a proceeding which was denominated a badge of slavery. the language held throughout all the cyder counties, by the city of London, and by most of the incorporations throughout the kingdom; and in short the whole nation was thrown into a violent ferment. The friends of administration, indeed, urged plausible arguments in favour of their scheme; but the utmost force of reason will go only a very little way in quieting popular clamour; and whilst opposition was railing against ministry within doors, every method was taken to excite the fury of the people with-Virulent libels, the audacity of which far exceeded any thing known in former times, now made their appearance; and such was the general intemperance in this respect, that it would be difficult to determine which side paid least regard to any kind of decency or decorum.

In the midst of this general ferment, the Earl of Bute unexpectedly resigned his office of first lord of the treasury; and his resignation immediately became an object of general speculation. By some he was highly censured for leaving his friends at a time when a little perseverance might have defeated all the designs of his enemies, and established his own power on the most solid foundation. Such conduct, it was said, must discourage the friends of government, and at the same time give proportional encouragement to its adversaries to insult it. Others contended that the earl was very little, if at all, influenced by popular opinion. He had demonstrated his firmness by taking a lead in the difficult but necessary affair of concluding peace; and this being accomplished, he had fully obtained his end, and performed the service to his country which was required of him. The event, however, showed that the former reasoning was nearest the The popular resentment was not in the least abated by the resignation of his lordship, who, though now withdrawn from the ostensible administration of affairs, was still considered as principal director of the cabinet; and this opinion gained the more ground that none of the popular leaders were called into office, nor any apparent change made in the conduct of the new admi-

No reasonable objection could now be taken to those who filled the great offices of state. Mr Grenville, who was not mentioned in it, and likewise to the lateness of the

approved integrity, understanding, and experience. Lord George III Holland was universally considered as a very able man in office, and had already filled many high employments with a great degree of reputation. The other secretary, Lord Egremont, though he had not been long in office, was in every respect of an unexceptionable character. The rest of the departments were filled in a similar manner; yet the discontents and public clamours were not diminished. It was now alleged that the new ministers were not chosen on account of any superior gifts of nature or fortune, but merely because they had the art of insinuating themselves into favour at court; that the sole reason of their appointment was, that they might act as the passive instruments of the late minister, who, though he had thought proper to retire from office, had not yet abandoned his ambitious projects, but continued to direct every thing as if he had still been in power; that opposition to the new ministers was therefore opposition to him; and that it became those who understood the true interest of their country, and had a real regard to it, not to suffer such a scheme of clandestine administration.

Whether the party who made these assertions really believed them or not cannot be known; but the effect was exactly the same as if they had. The great object of both parties was power; but their different situations required that they should profess different political principles. The friends of Lord Bute, and of the succeeding administration, were for preserving to the crown the full exercise of the power of choosing its own servants. Their opponents, without denying this power, contended that, according to the spirit of the constitution, the crown should be directed in its exercise by motives of national utility, and not by private friendship. In appointing the officers of state, therefore, they insisted that respect should be paid to those who, possessing great talents, had done eminent services to the nation, who enjoyed the confidence of the nobility, and had influence amongst the landed and mercantile interests. The observance of this rule, they contended, was the only proper counterpoise against the enormous influence of the crown arising from the possession of so much patronage; nor could the nation be reconciled to such a power by any other means than a very popular use of it. Men might indeed be appointed according to the strict letter of the law; but unless these were persons in whom the majority of the nation already put confidence, they never would be satisfied, nor think themselves secure against attempts on the constitution of the kingdom.

In the mean time the disposition to libel and invective seemed to proceed beyond all bounds. The peace, the Scots, and the administration supposed to be directed by Scottish influence, afforded such subjects of abuse to the pretended patriots, that ministry resolved at last to make an example of one of them by way of deterring the rest from such licentiousness. For this purpose they made choice of the paper called the North Briton, which, in language somewhat superior to most other political productions of the time, had abused the king, the ministry, and the Scots, in an extravagant manner. One particular paper (No. xlv.) was deemed by those in power to be actionable; and John Wilkes, member for Aylesbury, was supposed to be the author of it. A warrant was therefore granted for apprehending the author, printer, and publishers, of this performance, but without mentioning Wilkes's name; nevertheless three messengers entered the house of that person on the night between the 29th and 30th of April 1763, with an intention to seize him. He objected, however, to the legality of the warrant, because his name

Reign of hour; and on being threatened with violence, the messenturn, a message was sent to the Commons, informing them Reign of George III. gers thought proper to retire for the night. Next morning he was apprehended without making any resistance, though some violence was necessary to get him into a hackneycoach, which carried him before the secretaries of state for examination. On the first intimation of Wilkes's being in custody, application was made for a habeas corpus; but as this could not be sued out till four in the afternoon, several of his friends desired admittance to him, which was, however, refused on pretence of an order from the secretaries of state. But the order, though repeatedly demanded, could not be produced, or at least was not so; and on this account the gentlemen, conceiving that they were not obliged to pay any regard to messengers acting only by a verbal commission, entered the place where he was without further hesitation.

This illegal step was followed by several others in rapid succession. Wilkes's house was searched, and his papers seized in his absence; and though it was certain that a habeas corpus had now been obtained, he was nevertheless committed to the Tower. Here not only his friends, but in the North Briton, he was challenged by that gentleseveral noblemen and gentlemen of the first distinction, were denied access to him; nor was his brother even allowed to see him. On the third of May he was brought before the Court of Common Pleas, where he made a speech, setting forth the great love he had for his majesty, the bad conduct of ministry, and especially his own grievances, alleging that he had been treated worse than a Scotch lawyers, he was remanded to the Tower for three days; after which he was ordered to be brought up, that the affair might be finally settled. Next day Lord Temple received a letter from Secretary Egremont, informing him that the king judged it improper that Wilkes should continue any longer a colonel of the Buckinghamshire militia; and soon afterwards Temple himself was removed from the office of lord-lieutenant of that county. Meanwhile the judges decided that the warrant of a secretary of state was in no respect superior to that of a common justice of peace; that Wilkes's commitment was illegal; that his privilege as a member of parliament had been infringed; that this could not be forfeited except by treason, felony, or breach of the peace, none of which was imputed to him; and that a libel, even though it had been proved, had only a tendency to disturb the peace, without amounting to any actual breach of it. It was therefore resolved to discharge him; and the prisoner was accordingly set at liberty.

Wilkes having thus regained his freedom, resolved to make all the advantage he could of the errors committed by the ministry, and to excite as general a ferment as possible. For this purpose he wrote an impudent letter to the Earls of Egremont and Halifax, informing them that his house had been robbed, affirming that the "stolen goods" were in the possession of one or both of their lordships, and insisting upon immediate restitution. This letter was printed, and many thousand copies of it were dispersed; and soon afterwards an answer by the two noblemen was published in the newspapers, stating the real cause of the seizure of Wilkes's papers. The North Briton now again made its appearance, and the popular party were elated beyond measure with their success; whilst those who had suffered by general warrants sought redress at law, and commonly obtained damages far beyond their most sanguine expectations. During the whole summer, the minds of the people were kept in continual agitation by political pamphlets and libels of various kinds, whilst the affair of general warrants engrossed the general attention.

On the meeting of parliament his majesty mentioned in his speech the attempts which had been made to divide the people; and before the addresses could be moved in re-

of the supposed offence of Wilkes, and of the proceed-George III ings against him, while the exceptionable paper was also laid before the house. After warm debates, the North Briton was voted a false, scandalous, and seditious libel, tending to excite traitorous insurrections; and this was followed by a declaration that the privilege of parliament does not extend to the writing and publishing of seditious libels. The paper in question was therefore condemned and ordered to be burnt by the hangman; but this was not done

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without great opposition from the mob. Wilkes, now determined to make the best use of the victory he had gained, commenced a prosecution in the Court of Common Pleas against the under secretary of state, for seizing his papers; and the cause being determined in his favour, the defendant was subjected in L.1000 damages, with full costs of suit. The prosecution with which Wilkes had been threatened was now carried on with great vigour; but in the mean time, having grossly affronted Mr Martin, member for Camelford, by his abusive language man, and dangerously wounded in the belly. Whilst he lay ill of his wound, the House of Commons put off his trial from time to time; but beginning at last to suspect that there was some collusion betwixt him and his physician, they ordered Dr Heberden, and Mr Hawkins, an eminent surgeon, to attend him, and report. Wilkes, however, did not think proper to admit these gentlemen; and rebel. His case having been argued by several eminent soon afterwards took a journey to France. The Commons being informed that he had refused to admit the physician and surgeon sent by them, now lost all patience; and proceeding against him in absence, he was expelled the house. A prosecution was also commenced against him before the House of Lords, on account of an obscene and blasphemous attack on a spiritual peer; and failing to appear and answer the charges against him, he was outlawed. But the severity shown to Wilkes did not at all extinguish the spirit of the party. A general infatuation in favour of licentious and abusive writings seemed to have taken place. At the very time that Wilkes was found guilty of publishing the infamous pamphlet above mentioned, the common council of London presented their thanks to the city representatives for their zealous and spirited endeavours to assert the rights and liberties of the subject; and in gratitude to Lord Chief Justice Pratt for his decision in Wilkes's affair, they presented him with the freedom of the city, and desired him to sit for his picture, which was to be placed in Guildhall.

But these clamours did not prevent administration from paying attention to the exigencies of the nation. The practice of franking blank letters had risen to an incredible height, and greatly prejudiced the revenue. hands of members of parliament were counterfeited, and the covers publicly sold without the least scruple; and besides, the clerks of the post office claimed a privilege of franking, which extended even further than that of the members of the house. An act was accordingly passed for remedying the evil, by restricting the practice within reasonable limits. At this time it was proved that the annual postage of letters sent free amounted to L.70,000, and that the profits accruing to the clerks of the post office amounted to between L.800 and L.1700 each. Among the other plans for augmenting the revenue, were those for settling the island of St John, and for the sale of the lately acquired American islands. The former was proposed by the Earl of Egremont, who presented a memorial to his majesty on the subject. The sale of the conquered lands, consisting of the islands of Grenada, the Grenadines, Dominica, St Vincent, and Tobago, took place in March 1764. Sixpence an acre was to be paid as a quit-rent for cleared

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Reign of lands, and a penny a foot for ground-rent of tenements in four millions sterling; and so ready had the latter been Reign of George III. towns, and sixpence an acre for fields; but no person was to give them credit, that some of the American legisla- George IIL to purchase more than three hundred acres in Dominica, or five hundred in the other islands. Amongst the most remarkable transactions of this year was the renewal of the charter of the bank, for which the latter paid the sum of L.1,100,000 into the exchequer as a present to the public. besides advancing a million of money to government upon

the security of exchequer bills. But by far the most momentous affair which, at this time, occupied the attention of government, was the consideration of a project for raising a revenue from the American colonies. This had formerly been proposed to Sir Robert Walpole; but that prudent minister wisely declined to enter into such a dangerous scheme; observing, that he would leave the taxation of the colonies to those who came after him in office. The reason given for such a proceeding was the necessity of defraying the charge of defending them; and this, though extremely reasonable in itself, was effected in such a manner as raised a flame which could only be extinguished by the total overthrow of the authority of the parent state. Before this time. indeed, hints had been thrown out that it was not impossible for the colonists to withdraw their dependence on Britain; and some disputes had taken place betwixt the different provinces, which, although quieted by terror of the French, seemed to augur no good. But now, when the colonies were not only secured but extended, it was thought proper to make the experiment whether they would be obedient or not. They already contained more than two millions of people, and it was deemed absolutely necessary to raise a revenue from so numerous a body. Some thought it might be dangerous to provoke them; but to this it was replied by administration, that the danger must increase by forbearance, and that, as taxation was indispensable, the sooner the experiment was tried the better. The fatal trial being thus determined on, an act was accordingly passed for the prevention of smuggling, in order that the duties laid on the American trade might come into the hands of government. At this time there was carried on betwixt the British and Spanish colonies an illicit traffic, which seemed to bid defiance to all law and regulation, and which was no less obnoxious to the Spanish than to the British government. In some respects, however, the suppression of this commerce was very inconvenient to the colonists; for as the balance of trade with Britain was against them, they found it impossible to procure any specie except by trading with the Spaniards, who paid for their goods in gold and silver. This, with another act requiring them to pay certain duties in cash, was probably the cause of the resentment shown by the Americans to government, and their refusal to submit to the stamp act, which was also passed in the course of this year, hav-

ing been carried through the Commons by a great majority.

The disposition to augment the revenue by all possible methods seems to have served to keep alive the general opinion as to the oppressive and arbitrary measures pursued by government. The ill humour of the British patriots still continued; and the stamp bills were received in America with the utmost indignation. The arguments for and against American taxation are at present of little importance, excepting in as far as concerns the constitutional question evolved by them, and now almost universally admitted, that taxation without representation is tyranny; and the particulars of the opposition of the colonists will be related under another head. We may however observe here, that the resistance of the colonists proved very distressing to the mother country, on account of the immense sums due by the former. To the merchants of London alone they were indebted to the extent of people. These changes, however, did not give general

tures passed acts against incurring such debts for the future. A petition on the subject was also presented to the House of Commons; but as it denied the parliamentary right of taxation, it was not allowed to be read. It was then proposed, on the part of administration, that the agents should join in a petition to the house that they might be heard by counsel in behalf of their respective colonies against the tax; but the agents not thinking themselves empowered to prefer such a petition, the negociation was broken off, and matters went on in America as we have elsewhere related.

In other respects, the ministry took such steps as they judged necessary for supporting the honour and dignity of the nation. Some encroachments having been made by the French and Spaniards, remonstrances were made to their respective courts, and satisfaction obtained; and though every trifle was sufficient to set on the popular party, they were as yet unable to find any just cause of complaint. Nevertheless, the disposition to tumult and insurrection seems to have become general. The silk-weavers residing in Spitalfields being distressed for want of employment, arising, it was thought, from the clandestine importation of French silks, laid their case before his majesty in the year 1764, and the sufferers were relieved by the bounty of the public; but this seemed to render matters worse, by confirming them in habits of indolence and idleness. At the same time a bill, which was believed to be calculated to conduce to their benefit, having been thrown out, they began to assemble in great numbers, and several disorders were committed; nor was it without the assistance of the soldiery, and the utmost vigilance of the magistrates, that the riot could be suppressed. During this disturbance the ferment between the court and popular parties continued unabated, and ministers were still reviled in numberless publications, as mere dependents and tools of the Earl of Bute.

An event which now occurred, however, produced a considerable revolution at court, though it had but little effect in calming the minds of the people. This was the illness which seized the king in the beginning of the year; and whilst it filled the public mind with apprehensions, produced a bill for settling the affairs of the kingdom in case of the crown devolving on a minor. In adjusting this bill, ministers were said to have acted with but little respect to the Princess-dowager of Wales, in excluding her from a share of the government; and this proceeding was thought to have in a great measure alienated the confidence of his majesty, with whom the ministry had hitherto been in great favour. Nor did their subsequent conduct prove that they were at all desirous of regaining the ground which they had lost. For having contrived to get the Earl of Bute's brother turned out of a lucrative office he enjoyed in Scotland, they offended his majesty, without recommending themselves to the popular party in England, who manifested a perfect indifference as to all that passed in Scotland. On this occasion Lord Chatham is said to have been solicited to accept the office which he had formerly filled so much to the satisfaction of the nation, and to have declined it. A new ministry, however, was soon formed, on the recommendation of the Duke of Cumberland. The Duke of Grafton, and Mr Conway, brother to the Earl of Hertford, were appointed secretaries of state; the Marquis of Rockingham, first lord of the treasury; and Mr Dowdeswell, chancellor and under treasurer of the exchequer. The office of lord privy seal was conferred on the Duke of Newcastle; and the other places were filled with men of known integrity, and supposed to be agreeable to the

city of London expressed their discontent on the occasion of addressing his majesty upon the birth of a third son. This could not fail to offend both king and ministry; but before the latter could show any token of resentment, they lost their friend and patron the Duke of Cumberland who died on the 31st of October 1765. He had been that evening assisting at one of the councils, then frequently held, in order to put matters in a way of being more speedily dispatched by the privy council; and being seized with a sudden disorder of which he had shown some symptoms the evening before, he fell senseless in the arms of the Earl of Albemarle, and expired almost instantaneously.

In the mean time the discontents which had inflamed the American colonies continued also to agitate the minds of the people of Great Britain; nor indeed was it reasonable to expect that they could be satisfied with their present condition, commerce being nearly annihilated, manufactures at a stand, and provisions exorbitantly high priced. The large sums due to British merchants by the Americans also severely affected the trading and manufacturing part of the country; more especially as the colonists refused to pay unless the obnoxious laws should be repealed. The administration, therefore, were under the necessity of either enforcing the stamp act by the sword, or of procuring its immediate repeal in parliament. The head of the admiralty, forwarded the scheme, and some loss of the Duke of Cumberland was now severely felt, as preparations were made for putting it in execution; but he had been accustomed to assist the ministry with his advice, and was respected by the nation for his good sense. But it seems doubtful if at this period human wisdom could have prevented the consequences which ensued. The administration endeavoured to avoid the two extremes, of rushing instantly into a civil war, or sacrificing the dignity of the crown or nation by irresolution and weakness; and suspended their decision until certain intelligence should be received from the American governors as to the state of affairs in that country. But the opposite party animadverted severely on this conduct, insisting on the most coercive methods being immediately adopted for enforcing the laws in which they themselves had had so great a share. Pacific measures, however, prevailed, and the stamp act was repealed; but at the same time another was passed, declaring the right of parliament not only to tax the colonies, but to bind them in all cases whatsoever. The repeal of the stamp act occasioned universal joy throughout Britain and America, though, as parliament insisted upon their right of taxation, which the opposite party denied, matters were still as far from any real accommodation as ever; and the ill humour of the Americans was soon afterwards increased by the duties laid upon glass, painters' home the high price of provisions, and some improper steps taken by ministry to remedy the evil, kept up the general outcry against them.

In this state of affairs administration were once more disturbed by the appearance of John Wilkes, who had returned from exile, and, on the dissolution of parliament in 1768, whilst his outlawry was still unreversed, stood candidate for the city of London. Failing, however, in his design of representing the city of London, he instantly declared himself a candidate for Middlesex. Innumerable tumults and riots immediately took place; and so great was the animosity betwixt the two parties, that a civil war seemed to be threatened. Any particular detail of these transactions would, however, be superfluous. It is sufficient to state, that on a trial the outlawry of Wilkes was reversed, and he was condemned for his offences to pay a fine of

Reign of satisfaction. The opinion that affairs were still managed by the people, however, and powerfully supported by mer- Reign of George III by the Earl of Bute continued to prevail, and was industri- chants and persons of property, he was repeatedly chosen George III. ously kept up by the political writers of the time; and the member for Middlesex, and as often rejected by the House of Commons. Tumults frequently occurred; and the interposition of the military was construed by the patriots as indicative of a design to establish ministerial authority by the most barbarous methods.

1770.

These dissensions did not pass unnoticed by the other European powers, particularly the French and Spaniards. Both had applied themselves with assiduity to the increase of their marine; and many began to prognosticate an attack from one or other or both of these nations. The Spaniards first showed an inclination to come to a rupture with Britain. The subject in dispute was a settlement formed on the Falkland Islands, near the southern extremity of the American continent. A scheme of this kind had been thought of as early as the reign of Charles II., but it was not till after Lord Anson's voyage that any serious attention had been paid to it. In the printed account of this expedition, his lordship pointed out the danger incurred by our navigators through the treachery of the Portuguese in Brazil, as well as the importance of discovering some place more to the southward, where ships might be supplied with necessaries for their voyage round Cape Horn; and, with this view, he indicated the Falkland Islands as an eligible rendezvous for vessels in these high southern latitudes. His lordship also, when at the as it met with opposition at home, and gave offence to the court of Madrid, it was laid aside till the year 1764, when it was revived by Lord Egmont. Commodore Byron being then sent out with proper necessaries, took possession of these islands in the name of his majesty, and represented them in a favourable light; but his successor, Captain Macbride, affirmed that the soil was utterly incapable of cultivation, and the climate intolerable. Be this as it may, however, the islands in question had also attracted the notice of the French; but as that nation had been greatly reduced by the late war, no project of the kind could yet be put in execution at the public expense. M. Bougainville, therefore, undertook, with the assistance of his friends, to form a settlement on the Falkland Islands at their own risk; and the scheme was put in execution in the beginning of the year 1764, and a settlement formed on the eastern part of the same island in which Commodore' Byron had established an English colony on the western side. But the French adventurers soon became weary of their new colony; and M. Bougainville, having been reimbursed for his expenses, the French gave up every claim of discovery or right of possession; while the Spaniards, landing some troops in 1766, took possession of the fort colours, and tea imported into their country; whilst at built by the French, and changed the name of the harbour to Port Solidad. In 1769, Captain Hunt of the Tamar frigate happening to be on a cruize off the Falkland Islands, fell in with a Spanish schooner which had been at Port Solidad, and charged the commander to depart from that coast, which he declared to be the property of his Britannic majesty. The schooner, however, soon returned, bringing an officer from the governor of Buenos Ayres, who gave a similar warning to Captain Hunt; and the latter, not choosing to push matters to extremities, set sail for England, where he arrived in June 1770. On the departure of Captain Hunt, two frigates were left at the Falkland Islands; but one of these was lost a short time afterwards. On the 4th of June 1770, a Spanish frigate arrived at the English settlement named Port Egmont, with a number of guns and other warlike implements for carrying on a regular siege; and in three days four other frigates L.1000 and to be imprisoned for twelve months. Idolized arrived laden in the same manner; so that the English

Reign of commander, finding all resistance vain, was obliged to ca- concealment of these papers might proceed from some mis- Reign of George III. pitulate. The English were ordered to depart within a conduct during the periods in question, over which admi-George III. and the Spanish commander declared himself answerable for whatever they might leave on the island.

So audacious an insult to the British flag seemed to render war inevitable, if suitable reparation should be refused. It was accordingly mentioned in the speech from the throne in November 1770, when an immediate demand of satisfaction for the injury was promised; and it was further intimated that the necessary preparations for war, which had been begun, should not be discontinued. The affairs of America were also noticed; and, where grounds of complaint still existed, an assurance of redress was given. But these promises, especially in regard to the Falkland Islands, were far from giving satisfaction; and a motion was now made in both houses for an inquiry into the conduct of the Spaniards, as well as for the production of all papers and letters relative thereto. But the demand was opposed by the ministry, upon the grounds that the interest of the public service precluded the idea of exposing letters or papers transmitted in confidence while the negociation was depending, and that the king of Spain had disavowed the conduct of his officer, and promised satisfaction.

Some time before this, Mr Harris, the English minister at the court of Madrid, had dispatched a letter to Lord Weymouth, informing him that a ship had arrived from Buenos Ayres, with an account of the intended expedition against Port Egmont, the number of men to be employed, and the time fixed for its departure; but Prince Maserans, the Spanish ambassador, had declared his belief that the governor of Buenos Ayres had employed force at Port Egmont without any orders, and expressed a hope that, by disavowing the proceeding, he might prevent any misunderstanding betwixt the two kingdoms. To this Lord Weymouth replied by inquiring whether the prince had any orders to disavow the proceedings of the governor; and, on his answering in the negative, his lordship demanded a formal disavowal. After some time, it was stated, on the part of Spain, that the prince was authorized to disavow any particular orders given to M. Bucarelli, the governor of Buenos Ayres; that the island should be forthwith restored; and that it was expected the king of Britain would, on his part, disavow the conduct of Captain Hunt, whose menace had induced the governor to act as he did. But this proposition did not prove satisfactory. Mr Harris was ordered to quit the court of Madrid; and the correspondence between Prince Maserans and the court of England was discontinued. About this time Lord Weymouth resigned his office, and was succeeded by the Earl of Rochford; and the affair of the Falkland Islands ceased to be spoken of.

But, on the meeting of the parliament in January 1771, it was again brought before the house, when the declaration of the Spanish ambassador, and Rochford's acceptance, were announced. Prince Maserans then disavowed, in the name of his master, the violence used at Port Egmont, the restitution of which was agreed to upon an understanding that such restitution should be considered as ample satisfaction, but not as affecting the question concerning the prior sovereignty of the islands. This produced a new demand for copies of all papers, letters, and declarations, relating to the Falkland Islands; and though it was now apparently complied with, the opposition affirmed that it was still only in part, since, besides a chasm of nearly two months, of which there was no account whatever, all copies of the claims or representations made by the court of Spain since the first settlement of the islands were kept back, and a suspicion was thus excited that the

limited time, carrying with them what stores they could; nistration were willing to draw a veil. On the part of the government it was answered, that every paper which could be found in the several offices had been presented; that if there had been any correspondence between the two courts of which no notice was taken in them, it must have been verbal; and that, at any rate, there were papers sufficient to enable the house to determine the propriety or impropriety of their conduct throughout the whole transaction. But these excuses did not satisfy the opposition, and a motion was made to address his majesty for information as to whether any such interference had taken place, and of what nature it was, or in what manner it had been conducted. The motion, however, was lost by a great majority in both houses. Nevertheless this manner of deciding the question was far from allaying the ferment which prevailed. The transaction was considered as disgraceful to the British nation; nor were all the arguments which could be used by the ministerial party sufficient to shake the general opinion. The restitution of the island was thought to be an inadequate recompense for the affront that had been offered; and the objections to it were urged on a motion for an address of thanks on account of the communication of the Spanish declaration, which was not carried without considerable difficulty, and in fact produced a protest from nineteen peers. On the part of Spain, however, every article of the agreement was ostensibly fulfilled; Port Egmont was restored, and the British once more took possession of it, though it was in a short time afterwards evacuated.

> In other respects great discontent prevailed throughout the kingdom. A fire which happened at Portsmouth in the year 1770 excited numberless jealousies, and was by some imputed to our enemies on the Continent. The affair of the Middlesex election was not forgotten; and notwithstanding many repulses, the city of London still ventured to send up new petitions to the throne. In one presented this year by Mr Beckford, the lord mayor, the petitioners lamented having incurred the royal displeasure, but renewed a request, frequently preferred before, for a dissolution of parliament. This, however, met with a very unfavourable answer. His majesty informed the lord mayor, that his sentiments on the subject continued unchanged; and that he should ill deserve the title of father of his people, were he to suffer himself to be prevailed on to make such a use of his prerogative as he could not but think inconsistent with the interest, and dangerous to the constitution, of the kingdom. Mr Beckford, far from being disheartened by this answer, demanded leave to address the king; and having obtained it, made a speech of considerable length, which he concluded by telling his majesty, that "whoever had already dared, or should hereafter endeavour, by false insinuations and suggestions, to alienate his majesty's affections from his loyal subjects in general, and the city of London in particular, was an enemy to his majesty's person and family, a violator of the public peace, and a betrayer of our happy constitution as it was established at the glorious revolution." This behaviour of Mr Beckford was censured by the court party as indecent, unprecedented, impudent, and little short of high treason; whilst, on the other hand, it raised him to the highest pinnacle of popular favour. But he did not long enjoy the applause of the people; for he died a short time afterwards, and his death was considered as an irreparable loss to the whole party. Several other petitions were presented on the subject of popular grievances; but the perpetual neglect with which they were treated at last brought that mode of application into disuse.

· A new subject of contention, however, now presented

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Reign of itself. sea; but the legality of press warrants being questioned, The new lord mayor, Crosby, refused to back the warrants, which proved a very vexatious matter to the ministry; and they were further provoked by the unbounded licentiousness of the press. But, on the other hand, the mode of proceeding against some libellers had produced many complaints regarding the powers of the attorney-general. He had filed informations and carried on prosecutions ex officio, without going through the forms observed in all other cases of the kind; and this was described as inconsistent with the nature of a free government. Examples were cited of flagrant oppression and injustice occasioned by the exercise of this very power; the laws, it was said, had become changeable at the pleasure of a judge; and the liberty of the subject was taken from him whenever he became obnoxious to his superiors. Accordingly a motion was made in the House of Commons to bring in a bill for explaining and amending an act of the 4th and 5th of William and Mary, to prevent invidious informations, and for the more easy reversal of outlawries in the Court of King's Bench. But this motion was rejected by a great majority, the ministerial party urging that the power of the attorney-general was the same as it had ever been, and founded on the common law; that the abuse of power was no argument against the legal exercise of it; that it was dangerous to overthrow established customs; and that the actions of the attorney-general were cognizable by parliament, which control must for ever prevent a licentious exercise of his powers. But these arguments did not put an end to the disputes on this head. The courts of justice were at the same time held up in a very despicable light, on account of some late decisions which had been deemed contrary to law and usual practice. By these the judges had assumed a power of determining whether a paper was a libel or not, whilst the business of the jury was confined to the determination of the fact regarding its publication; and thus it was alleged that the judges had it in their power to punish a man who had been found guilty of publishing a paper, whether it was seditious or not. Lord Chatham, in a speech on the Middlesex election, took occasion to mention these abuses; and was answered by Lord Mansfield, who looked upon himself as particularly pointed at. The former, however, was so little convinced by the answer, that he drew from it an additional confirmation of his own arguments, and moved that a day should be appointed for taking into consideration the conduct of the judges; in which proposal he was ably seconded by the ex-chancellor. A committee was accordingly moved for on the 6th December 1770, to inquire into the matter; but after much debate the motion was rejected by a very large majority. The affair, however, did not yet seem to be terminated. Lord Mansfield gave notice next day, that on an early day he would communicate to the House of Lords a matter of the utmost importance; but when that day arrived he produced nothing except a paper containing the case of Woodfall the printer, as tried in the Court of King's Bench, that whoever pleased might read or take copies of it. This was looked upon as exceedingly frivolous, and greatly disappointed the expectations of the whole house. His lordship was asked whether he meant that the paper should be entered on the journals of the house; and he answered that he had no such intention, but only that it should be left in the hands of the clerk; on which the affair would probably have been altogether overlooked, had not the ex-chancellor, who all along strongly supported the motion, accused Lord Mansfield, from the very paper to which he appealed, of

The navy was in a bad condition, and the sailors a practice repugnant to the law of England, proposed Reign of George III. everywhere avoided the service. Towards the end of to him some queries relative to the power of juries, and George III. August sixteen ships of the line were ready to be put to challenged his antagonist to a debate either at that time or afterwards. But this method of proceeding was comthe manning of them became a matter of great difficulty. plained of as too precipitate, and an excuse was likewise made for not assigning a day for the debate at any future period, so that the matter soon sunk into oblivion. It was, however, loudly talked of without doors; and the judges, who had already sunk in the estimation of the people, now became much more obnoxious.

> An accident which occurred soon afterwards contributed also to lessen in the eyes of the people the character, not only of the ministerial party, but that of both houses of parliament taken collectively; and indeed it must be owned that nothing could be more derogatory to the honour of the first assembly of the nation, or to that of the individuals composing it. On the 20th of December 1770 a motion was made by the Duke of Manchester, that an address be presented to his majesty, praying that he would be graciously pleased to give orders for quickening our preparations for defence in the West Indies and in the Mediterranean, and particularly for securing the posts of Gibraltar and Minorca. But whilst his grace was descanting on the negligence of the ministry in leaving posts of such importance in a defenceless state, he was suddenly interrupted by Lord Gower, who insisted on having the house immediately cleared of all except those who had a right to sit there. His lordship was answered by the Duke of Richmond, who complained of the interruption given to the Duke of Manchester as a proceeding both irregular and insidious. This produced a considerable degree of altercation; and the cry of "Clear the house" resounded from all quarters. Several members attempted to speak, but found it impossible; and, piqued at this shameful behaviour, eighteen or nineteen peers left the house in a body. The members of the House of Commons then present were not only commanded to depart. but some of the lords went personally to the bar, and insisted on their leaving the house immediately. The latter alleged in excuse, that they attended with a bill, and were there in the discharge of their duty; but this availed nothing; they were peremptorily ordered to withdraw till their message should be delivered, and at length turned out of doors amidst the greatest tumult and uproar. In the mean time the lords, who had just left their own house, repaired to the lower house, where they were listening to the debates, when the commoners who had been turned out of the Lords arrived, full of indignation, and loud in their complaints of the affront they had received. This was resented by turning out indiscriminately all the spectators; amongst whom were the eighteen peers just mentioned, who were thus excluded from both houses. This affair issued in a misunderstanding between the two houses, which continued during the remainder of the session. Sixteen lords joined in a protest, and censured in the warmest terms the treatment they had met with, as well as the unprecedented behaviour of administration, who had thus attempted to suppress the freedom of debate, and rendered the conduct of the house an object of contempt and ridicule to the whole world.

> Soon after the discussion on the subject of the Falkland Islands, an extraordinary instance of corruption in the borough of New Shoreham, Sussex, was laid before parliament. The affair was brought by the returning officer, one Roberts, declaring a candidate duly elected who had only thirty-seven votes, whilst his opponent had eighty-seven suffrages; and when this man was brought to trial for so strange a proceeding, a scene of unparalleled villany was disclosed. A great number of the freemen of the borough had formed themselves into a society called the Christian

1771.

Reign of Club, which, instead of sustaining the character indicated was carried before Alderman Wilkes, by whom he was dis- Reign of George III. by its denomination, was rendered instrumental in furthering the purposes of venality. A select committee of the the captors received certificates from the magistrates, in members had been appointed to sell the borough to the order to entitle them to the promised reward. Millar, highest bidder. elections themselves, but issued orders to the rest, directing them as to how they were to vote; and after the election terminated, they shared the profits among themselves. All this was clearly proved; but the returning officer was nevertheless dismissed with a reprimand from the Speaker for having trespassed upon the forms which ought to have been observed by such a functionary. A more severe punishment, however, was reserved for the borough, particularly the wretches who had assumed the name of the Christian Club. A motion for inquiry having been carried unanimously, a bill was brought in to incapacitate eightyone freemen of the borough, whose names were mentioned, from ever voting at parliamentary elections; and, for the more effectual prevention of bribery and corruption, the attorney-general was ordered to prosecute the committee belonging to the Christian Club. After some opposition the bill for incapacitation at length passed, and received the royal assent on the last day of the session.

The unbounded licentiousness of the press now attracted the notice of parliament, though the evil appeared incapable of being effectually checked. At this period neither rank nor character formed any security against calumny; and indeed it was difficult to say which side went farthest in the career of detraction and abuse. The ministry, however, provoked by a long course of opposition, made loud complaints against the freedom taken with their names; but it was retorted by the opposition, that the abuse from one quarter was as great as that from the other. Some members of the House of Commons complained that their speeches had been misrepresented in the papers, and endeavoured to put a stop to the practice of reporting them. It was at this time considered as contrary to the standing order of the house to print the speeches of the members of parliament; and a motion for calling two of the principal printers to account was carried by a considerable majority. The printers, however, did not attend the summons of the messenger; and a final order for their appearance was directed to be left at their houses, and declared to be sufficient notice when left there. The disobedience of the printers was undoubtedly occasioned by the favour which they hoped to obtain with the popular party; and indeed it was only after severe animadversion that the ministry were able to carry the motion against them. And this opposition was heightened by its being further moved that they should be taken into custody by the serjeant at arms, for contempt of the orders of the house; a proceeding which was objected to on account of the temper and disposition of the people towards the house, and he observed, that no mention had been made of his being the great impropriety of adding to their alarms by any unnecessary stretch of the executive power. But the majority urged the necessity of preserving the dignity of the house, and putting an end to those excessive freedoms which had been taken with its members. The serjeant at arms next complained, that not being able to find the printers at their houses, he had been treated with indignity by their servants; on which a royal proclamation was issued for apprehending the two obnoxious typographers, Wheble and Thomson, with a reward annexed. But in the mean time six other printers, who had rendered themselves equally obnoxious on a similar account, were ordered to attend great opposition. Some of the delinquents were reprimanded at the bar, and one who did not attend was ordered to be taken into custody for contempt. Wheble being apprehended in consequence of the proclamation,

charged; Thomson was in like manner discharged; and George IIL The committee-men never appeared at one of the six who had refused to attend, was taken into custody at his own house by the messenger of the House of Commons; but he sent for a constable, and was carried along with the messenger before the lord mayor, and Aldermen Wilkes and Oliver, at the mansion-house. The lord mayor refused to deliver up the printer and messersger at the request of the serjeant at arms; and after some disputes the messenger was committed to prison, as he had been accused by Millar of assault and false imprisonment, and the serjeant had refused to find bail; but he was immediately released upon bail being given. The lord mayor was ordered to attend the house next day, when he pleaded that he had acted in no way inconsistent with the duties of his office, since by his oath he was bound to preserve the franchises of the city; and his conduct was further warranted by the terms of the city charters, as recognised by act of parliament. It was then moved that he should be allowed counsel; but this motion was overruled, upon the ground that no counsel could be permitted to plead against the privileges of the house. It was, however, carried that the lord mayor's clerk should attend with the book of minutes; and, notwithstanding all opposition, he was obliged to expunge from it the recognisance of Whittam the messenger. This was followed by a resolution that there should be no more proceedings at law in the case; upon which a vehement altercation ensued, and several of the minority at last left the house in the utmost rage. Though it was now one o'clock in the morning, the ministerial party refused to adjourn, and proceeded to the case of Mr Oliver, who, like the lord mayor, declined to express any regret for what he had done. Some proposed to censure his conduct, others were for expulsion; but when it was proposed to send him to the Tower, the utmost confusion took place, some members declaring that they would accompany him to the place of his confinement, whilst others left the house. Meanwhile ministry used their utmost endeavours to persuade him to make some kind of apology or concession for what he had done; but finding him immovable, they at last carried the motion for his imprisonment, and he was committed accordingly. After the confusion had been in some measure dispelled, the debates concerning the lord mayor were resumed, and many arguments were urged against proceeding further in the matter; but these being disregarded, the minority left the house; and his lordship refusing the favour offered him of being committed to the custody of the serjeant at arms, was sent to the Tower. Alderman Wilkes, on being ordered to attend, wrote a letter addressed to the Speaker, in which a member; and that if his seat in parliament, to which he had been duly elected, was to be granted, he would attend and justify his conduct. Administration, however, were too wise again to encounter this demagogue; but being at the same time under no little embarrassment how to get off, they at last had recourse to the miserable shift of ordering him to attend on the 8th of April 1771, while they adjourned the house to the 9th.

The only other transaction of moment during this session related to the East India Company. It was now proposed to raise two thousand men in England for the service of the Company, by whom the officers appointed by the house, though the motion had not been carried without the king were to be paid. But it was considered as unconstitutional and dangerous to keep up an armed force in the kingdom which was not paid by government; and it was likewise urged that it would prove an obstruction to the recruiting service of our own army, on account of the

30

Reign of superior advantages of enlisting in the Company's service. of relief; and in the beginning of February a number of Reign of George III. The session terminated on the 8th of May. In the speech from the throne it was observed, that the satisfaction obtained from his Catholic majesty for the injury done this kingdom, and the proofs of the pacific disposition which the courts of France and Spain had given, by laying aside their armaments, enabled his majesty to reduce the forces

both by sea and land.

The many defeats which had been experienced by opposition during this and the preceding sessions now began to cool their ardour in the cause of patriotism. Many of them also had lost much of their popularity by taking part against the printers; and as every motion had been carried in favour of administration by nearly two to one, a general discouragement and languor ensued. The only gainers indeed by the late contentions were the city magistrates, and printers who had been punished by the House of Commons. On the rising of parliament, the lord mayor and aldermen were of course released from the Tower, and welcomed with every mark of congratulation. geance on the refractory by breaking their windows. A committee was even appointed to carry on a prosecution against the Speaker of the House of Commons; but as this did not seem likely to afford redress, they determined once more to have recourse to the throne. Accordingly, on the 10th of July 1771, another petition and remonstrance was presented, the subjects of which were the embankments on the Thames, the proceedings against the magistrates, and a request for a speedy dissolution of parliament. But this met with as unfavourable an answer as any of the preceding appeals to the sovereign.

In the speech from the throne, when the parliament assembled in January 1772, his majesty observed, that the performance of the king of Spain's engagements, and the behaviour of the other European powers, promised a continuance of peace, and that although the necessity of keepingup a respectable naval force was evident, yet no extraordinary aid for that purpose would be necessary; and he concluded with recommending a vigilant and active attention to the concerns of the country, with an assurance of the interposition of the crown to remedy abuses or supply defects. Little discussion took place on the address in answer to this speech; but an ample subject of altercation was soon furnished by a motion on the part of the government, the object of which was to recognise the necessity of raising twenty-five thousand seamen for the service of the current year. A proposition of this kind, coming immediately after the assurances of peace that had been given from the throne, seemed very like a contradiction. Accordingly it was argued that the peace establishment would thus be augmented till we were overburdened by it; that a large sum would be added to the national expenses; and that as the same augmentation might every year be made on similar pretences, the nation would in this way be obliged to submit to the hardships of war in a time of profound peace. If the assurances of peace from the throne were well founded, the force in the East Indies was already too great; if, on the contrary, a war was at hand, it would be too small, notwithstanding the proposed augmentation; and in the same way Jamaica was likely to suffer from this inferiority. But these remonstrances were by no means sufficient to put a stop to the measure; and the question in favour of the augmentation was carried without a division.

The subject which came next to be discussed was religion. This was originated by the tendency which had for some time prevailed to resist the subscription of the church standards. Meetings had been frequently held by discontented members, in order to consider of some mode George II.; that the time of nonage for the royal family

them, with several professors of law and physic, joined in George III a petition to the House of Commons, expressing their dissatisfaction with subscription to any human forms, and praying for relief. In this petition they asserted that they held certain rights and privileges from God alone, without being subject to any other authority; that they accounted it a blessing to live under a government which maintained the sufficiency of the Scriptures to instruct in all things necessary to salvation; and that they had a right from nature, as well as from the principles of the reformed religion, to judge for themselves what was or was not contained in the Scriptures. They prayed therefore to be relieved from the burden of subscription, and to be restored to their undoubted right of interpreting Scripture for themselves, without being bound by any human explanation of it, or being required to acknowledge the truth of any formulary of religious faith and doctrine whatsoever, excepting the Holy Scripture itself. This petition was presented by Sir William Meredith, who, along with the The city was illuminated; and the mob, as usual, took ven- other members favourable to the cause, enforced it by many arguments drawn from the principles of toleration, and maintained that nothing but hypocrisy and prevarication could arise from obliging men to subscribe what they did not believe; that the repeal of the laws for subscription would prevent the increase of dissenters, and incline many of them to return to the church; that the articles themselves were originally compiled in a hurry; that they contained doctrines highly controvertible; and that this restraint on the consciences of men constituted one of the greatest imaginable hardships. The majority of parliament, however, were found inimical to the petition, though some who then opposed it wished for time to consider it more deliberately, or to refer it to a committee of the clergy. At last, however, it was thrown out by a large majority.

> The rejection of the subscription bill was followed by that of a bill for guarding the possessions of his majesty's subjects against dormant claims of the church. After this the attention of parliament was called to one of the utmost importance, which had been introduced by a message from This was the famous royal marriage bill, occathe king. sioned by the marriage of the Duke of Cumberland with Mrs Horton, a widow lady, daughter of Lord Irnham, and sister to Colonel Luttrell, and that of the Duke of Gloucester with the countess-dowager of Waldegrave. By the message it was recommended to both houses to take it into their consideration, whether it might not be expedient to supply the defects of the laws then in being, and by some new regulations more effectually to prevent the descendants of his late majesty,-excepting the issue of the princesses who had married, or might hereafter marry, into foreign families,—from marrying without the consent of his majesty, his heirs and successors. In consequence of this a bill was brought in, declaring all such marriages, without the consent above mentioned, to be null and void. The descendants of his majesty, however, if above the age of twenty-five years, might marry without the royal consent, provided they gave intimation twelve months beforehand to the privy council, and no opposition to the match was made by parliament during that interval. But this bill encountered the most violent and powerful opposition. The principal arguments against it were, that the immediate tendency of the measure was to create as many prerogatives in the crown as there were matters of importance in the state, and to extend them in a manner as exceptionable as had ever been done in the most despotic period; that the enacting part of the bill had an inconvenient and impolitic latitude, in extending to all the descendants of

1772.

Reign of appeared to be improperly extended beyond the limit of have been entertained now, had not the affairs of the Com- Reign of George III twenty-one years; that the deferring their marriage to the age of twenty-six might also be attended with bad consequences, by driving them into a disorderly course of life; that the power given by this bill to a prince to marry after the age of twenty-six was totally defeated by the proviso which declared the consent of parliament to be ultimately necessary; that the right of conferring a discretionary power of prohibiting all marriages, was beyond the reach of any legislature whatsoever, being contrary to the inherent rights of human nature, which, as they are not derived from, or held under, the sanction of any civil laws, cannot in any case be taken away by them; that this bill had a natural tendency to produce a disputed title to the crown; and that it provided no security against the improper marriages of princesses into foreign families, and those of their issue, which might as materially affect the interest of this nation as the marriages of princes residing in the dominions of Great Britain. To these arguments it was answered, that the inconveniences so much talked of were merely imaginary; that if the king should make any improper use of his authority, parliament had it in their power either to prevent the consequences, or to punish the minister who advised it; that the crown was dishonoured by improper connections; that many of the greatest national calamities had proceeded from improper alliances between the royal family and subjects; and that if experience showed that any material grievances ensued from this act, it could as easily be repealed hereafter as thrown out now, and on much better grounds. The result was, that with great rapidity, and by considerable majorities, it passed through both houses.

Though the decision concerning the subscription of the thirty-nine articles did not promise much success to any proposed innovations in matters of religion, yet the case of dissenting ministers was introduced soon after the discussion of the royal marriage act; and a petition was presented by a great body of dissenters, praying to be relieved from the hardship of subscribing to the articles of a church to which they did not belong. This, however, was most violently opposed, though with very little success, in the House of Commons, where it was carried by a very great majority. In this branch of the legislature it was maintained that nothing can advance the true interest of religion so much as toleration; and that if articles of subscription are necessary, it must only be for men destitute of principle, who, in compliance with ambition or avarice, would as readily subscribe one set of articles as another. In the House of Lords, however, the bill was rejected by a majority of seventy. Here the doctrine of universal toleration was vehemently scouted, and much was said of the danger to which the Church of England would be exposed by departing from the laws which guarded its privileges. The dissenters, it was alleged, had great cause to be satisfied with the favour they enjoyed by connivance; and the laws were only kept on record as a necessary curb, lest, in the degeneracy of a declining kingdom, religion should require protection against heresy and blasphemy.

The only other business of this session was an attempt at inquiry into the affairs of the East India Company, which were then in a very critical situation. But the subject did not come under consideration till next session, which commenced in November 1772; the situation of the affairs of the Company being alleged as a reason why parliament had been called together sooner than usual. The greater part of the present session was accordingly occupied with the concerns of the Company.

It had been projected, as long ago as the year 1667, to bring them under the inspection of government; but the design did not succeed at that time, nor would it probably

pany been embarrassed by the misconduct of their ser-George IIL vants. During the preceding session a bill had been brought in for restraining the governor and council from all kinds of trade, as well as for enlarging the power of the Company over its servants; but the bill was thrown out on the second reading, and indeed had probably been introduced merely to pave the way for what followed. The debates on the subject, however, produced a general belief that the affairs of the East India Company were, owing to the behaviour of its servants, in a very bad condition; that at any rate it was insufficient for the government of such extensive possessions; and that, in consequence, there was an evident necessity for giving up the management of it to the Crown. A motion was accordingly made for a select committee to inquire into the affairs of the Company; and although many reasons were urged against the proposition, it was carried without a division, and the members were chosen by ballot. But during the recess the affairs of the Company continued to retrograde, and the treasury at home was quite exhausted; whilst bills to a vast amount drawn on Bengal were nearly due, and these, together with the Company's debt to the Bank and other public bodies, and the sum to be paid to government, reduced them almost to the verge of bankruptcy. They were therefore reduced to the necessity of asking a loan from administration; but their application was received with great indifference, and the minister desired them to apply to parliament. Meanwhile the reports of the select committee were published, and gave the public no very favourable opinion of the behaviour of the Company's servants.

On the meeting of parliament, the minister moved for a secret committee, to consist of thirteen persons, and the members of which were to be chosen by ballot, in order that no objection might apply to them which did not militate equally against the whole house. This motion encountered some opposition; but, ultimately, the committee of secrecy was carried, as the other had been, without a division; and the members, though chosen by ballot, were almost all of them devoted to administration. The select committee was likewise revived, that these bodies might act as checks upon each other, and that between them the nation might have the requisite information respecting the whole matter.

In a short time after the appointment of the secret committee, a report was given in, stating that the Company were in great distress for want of money; and that a bill ought to be brought in for restraining them from sending out supervisors to India, a scheme which they at this time meditated. The minister and his adherents enlarged greatly on the utility of this bill, which they described as not only highly expedient, but absolutely necessary, in order to prevent the Company from engaging in an expensive commission, at a time when their affairs were so much embarrassed that they had no resource but to apply to government for a loan. But notwithstanding all the arguments used by administration in favour of the bill, the Company were so far from thinking it for their advantage, that they used every endeavour to prevent its passing into a law. They petitioned, and some of their servants were examined in the House of Commons, in order to show the necessity of sending out supervisors, qualified to bring their affairs into some degree of order, and at the same time capable of curbing the excesses of which the Company's servants had too frequently been guilty. In spite of all opposition, however, the bill was carried by a large majority; and in the House of Lords it met with similar success, although the minority thought proper to enter a protest.

The select committee now gave in their second report, containing a statement of the debt, credit, and effects of

Reign of the Company in England; beginning with an account of George III. the cash in the Company's treasury on the 1st of De- the Company, who now presented a petition complaining George III. cember 1772, and containing a statement of all the debts of the injustice of demanding any further terms on acand claims against them in every part of the world. Thus count of a loan, after that loan had been discharged. But it appeared that the cash, credit, and effects of the Company, amounted to L.6,397,299. 10s. 6d., and their debts to L.2,032,306, which being deducted from the above account of their effects, left a balance in favour of the Company of L.4,364,993. 10s. 6d., without any valuation of their fortifications and buildings abroad. The statement, however, was complained of as being unfair and partial; but the members protested their innocence, and administration insisted that, until proof to the contrary was brought, the house was bound to adhere to it as just. The business was revived after the holidays by an application from the Company to government for a loan of L.1,500,000, for four years, at four per cent. interest, with liberty of repaying the same according to the ability of the Company, in instalments of not less than L.300,000; and that they should not make a dividend of more than six per cent. until the loan was reduced to L.750,000, after which they might raise their dividend to eight per cent.; and when the whole loan was discharged, the surplus of the net profits arising in England, above the said dividend, was to be appropriated to the payment of the Company's bonded debt, until it had been reduced to L.1,500,000, in which case the surplus profits were to be equally divided stock twelve months; that the stock qualification for the between the public and the Company. This request it was future should be L.1000 instead of L.500; that the mayjudged expedient to grant, and it was accordingly resolved or's court of Calcutta should henceforth be confined to that the affairs of the East India Company are in such a small mercantile causes; that, instead of this court, a new state as to require the assistance of parliament; that a loan is necessary to reinstate the Company's affairs; that the supply required be granted; and that care be taken that the Company be prevented from experiencing the like exigencies for the future. These restrictions were judged lutions was carried by a great majority. By the friends proper by administration for the security of the public; but the Company replied, that they were contrary to the proposals which had been made, and void of foundation, as being built on the erroneous reports of the secret committee. Some time was also demanded for consideration; but that being refused, the question was put and carried as ministry desired, by a considerable majority.

The next step was to deprive the Company of their territorial right to the countries which they possessed in the East Indies. This had been allowed them in the most explicit manner, as appears by some of the papers which passed between the French and English ministers during the negociations that issued in the treaty of Paris; but Lord North informed the house that it was the opinion of several great lawyers, that such territorial possessions as the subjects of any state shall acquire by conquest are virtually the property of that state, and not of those individuals who acquire them. He was of opinion, however, that it would be more beneficial for the public and the East India Company, to let the territorial acquisitions remain in the possession of the Company for a limited time; and at the same time it was moved, that no participation of profits should take place betwixt the public and the Company until after the repayment of L.1,400,000 advanced to the Company, and the reduction of the Company's bonded debt to 1.1,500,000; that, after the payment of the loan advanced to the Company, and the reduction of their bonded debts to the sums specified, three fourths of the net surplus profits of the Company at home, above the sum of eight per cent. upon their capital stock, should be paid into the exchequer for the use of the public, and the remaining fourth be set apart either for reducing the Company's bonded debt, or forming a fund for discharging any contingent expenses to which the Company might be resolutions, bearing in substance that all acquisitions made exposed.

These proceedings proved exceedingly disagreeable to Reign of no regard was paid to this petition, and the motions were carried in favour of administration. To make some kind of compensation, however, it was agreed, that as the Company had a stock of teas amounting to about seventeen millions of pounds in their warehouses, they should be allowed to export as much of it as they thought proper free of duty, and to employ the money thence arising in the advancement of their own affairs.

This concession in favour of the East India Company proved in the event the loss of the American colonies; nor indeed could these arbitrary proceedings with so considerable a body tend to impress the mind of the nation with ideas favourable to the views of administration. In other respects the minister abated nothing of the disposition he had from first to last evinced with regard to the Company. On the 3d of May 1773 certain resolutions were laid down by him as the foundation of a bill to establish certain regulations for the better management of the East India Company, as well in India as in Europe. These were, that the court of directors should in future be elected for four years; that no person should vote at the election of the directors who had not possessed his or her one should be established, consisting of a chief justice and three puisne judges, appointed by the crown; and that a superiority should be given to the presidency of Bengal over the other presidencies in India. Each of these resoof the Company, however, the bill was supposed to have a tendency to effect a total alteration of its constitution in England, as well as in the administration of all its presidencies in Asia, and to subject their affairs, both at home and abroad, to the immediate power of the crown. By cutting off the L.500 stockholders, the proprietary would become more manageable by the crown; nor was there any security that the directors would be faithful to the interests of the Company when they were no longer responsible to them for their actions. This class of proprietors presented a petition, which gave rise to a motion, bearing that the petitioners had not been guilty of any delinquency in the exercise of their chartered rights according to the several acts of parliament made in their behalf. But the motion was rejected, and the regulating bill passed both houses by large majorities.

During this time the select and secret committees were pursuing their inquiries. The affairs of the Company were investigated from the year 1756, and a report was at length presented by General Burgoyne, containing many charges of cruelty and rapacity, against several persons concerned in the management of the affairs of the Company, particularly with regard to the deposition of Surajah Dowlah in 1756, which was described as the cause of all the evils which had since happened. The report dwelt much on the treachery employed in bringing about that revolution, particularly the fictitious treaty with Omichund; and exposed the conduct of Lord Clive, who had caused Admiral Watson's name to be affixed to the treaty, after the admiral himself had refused to sign it. It concluded with moving for the restitution of all the money received in presents or otherwise in India whilst the receivers acted in public capacities; and recommended the adoption of under the influence of a military force, or by treaty with

Reign of foreign powers, belong of right to the state; that to ap- suffering in the same cause with themselves. The wanton Reign of that these resolutions were carried almost unanimously. Lord Clive defended himself by general protestations of innocence, which, however, gained but little credit; and when he entered into a particular refutation of the charges against him, he did not succeed in making many converts to his reasoning. But his friends were not of opinion that the charges were of a very atrocious nature, and wished to excuse him on the ground of policy and necessity. The treaty with Omichund was justified on the plea of necessity. Some, indeed, observed that as Omichund had the character of being the most accomplished villain in Asia, the Englishman merely wished to have a trial of skill with the Asiatic. This sarcasm, however, was a mere piece of wit, without any solid foundation; for the crime, if there was any in the transaction, lay in dethroning a sovereign prince by means of traitors, and not in cheating the traitors out of their reward. And, in fact, if treachery be once admitted into transactions, whether civil or political, it is in vain to pretend any subjection to the rules of justice; for those who call in the aid of such an auxiliary are already beyond its jurisdiction. General Burgoyne, however, moved that Lord Clive had, in consequence of the powers with which he was vested in India, received at various times presents to the amount of L.234,000 sterling, to the dishonour and detriment of the state. But this being rejected, after a violent debate, it was moved that Lord Clive, in receiving such a sum, had abused the power with which he was intrusted, to the evil example of the servants of the public. This motion, however, was also rejected, and it was ultimately voted that Lord Clive, when he received the sum above mentioned, at the same time rendered great and meritorious services to his country. Thus the matter was concluded, and thus the affairs of the Company were delivered into the hands of administration.

The affairs of the East India Company, which had engrossed so much time and attention, now gave place to those of America, which by this time had assumed a very lowering aspect. The discontent occasioned by the taxes stamp act had excited among them a spirit of industry with manufactures of their own, which had not been foreseen. At the time, as well as afterwards, this was imputed to wilfulness, or to the discontent of a few, which would afterwards subside, or be suppressed by the voice of the majority, when things would revert to their former channels. But the trifling tax on tea, which had not been repealed, and the permission given to the Company to export whatever quantity they pleased, now threw matters into a ferment not to be quelled by any means whatever. Of the various proceedings in America, the tumults at Boston and elsewhere, the accidental circumstances which added fuel to the flame, and the war which ensued and ultimately terminated in the recognition of American independence, an account will be given under the article United States. It is only necessary here to give an account of the manner in which the legislature and people of Great Britain were affected by these events.

Ever since the conclusion of peace in 1763, the disposition shown by government to augment the revenue had produced in the popular party of Great Britain a spirit similar to that manifested by the Americans, though in an inferior degree; and hence the patriots of Britain affected to consider the Americans as oppressed by government, and

George III. propriate acquisitions obtained by such means is illegal; destruction of the tea at Boston and other places in Ame-George IIL and that great sums of money had been obtained by such rica, however, considerably diminished the number of ' means from the sovereign princes in India. The belief their friends, and rendered many of those who still adthat many of the Company's servants had acted in an in- hered to them much less sanguine in their cause. The famous manner, was at this time so general and so strong, matter was announced to parliament by a special message from the throne. Lord North and the other ministers described the conduct of the colonists, particularly in the town of Boston, as most atrocious, and concluded that government was now perfectly justified in resorting to any measures they might think proper to repress the turbulent spirit which had been manifested, and inflict such punishment as the enormity of the offence seemed to deserve. The opposition did not pretend to exculpate, though it still attempted to excuse, the conduct of the colonists, by ascribing all the disturbances in that country to the arbitrary and absurd measures pursued and obstinately adhered to at home. But the ministry evaded this charge by drawing the attention of the house to the more important consideration, whether the Americans were now to be dependent on, or independent of, Great Britain. The Boston port bill was then brought in, and carried, but not without considerable opposition, both within and without doors. Mr Bollan, agent for the council of Massachusetts Bay, founding on an act of Queen Elizabeth, for securing the liberty of the colonies, drew up a petition, and caused it to be presented before the bill had actually made its appearance: but so little regard was paid to it, that, during the time it lay on the table, the bill was brought in by Lord North. After the second reading, the same gentleman presented another petition, desiring to be heard in behalf of the town of Boston, and for the council of Massachusetts Bay; but this was refused, because, although Mr Bollan was agent for the colony, he was not so for the corporation of Boston, and still less for the council of Massachusetts Bay, as the body which had appointed him was now no longer in existence. This appeared very inconsistent to many of the members, and produced a new petition from the lord mayor, in the name of such natives and inhabitants of North America as at that time resided in London, in which the petitioners insisted that the bill was illegal, unprecedented, unjust; and that, after such a precedent as it went to establish, no man or body of men in America could have a moment's imposed on that country has already been noticed. The security. But as little regard was paid to this as to the former petitions, and the bill passed both houses without and economy, as well as a desire of providing themselves a division. That this obnoxious bill might not be sent to America without some mitigation, however, the minority, who had not chosen to divide formally on the first measure proposed by government for reducing the refractory colonists, proposed the repeal of the duty on tea laid on in 1767; but this was also rejected, probably from an erroneous impression that the opposition of the Americans was that of a mere tumultuous mob, and that by showing proper spirit the ministry would at last come off victorious.

The extreme pertinacity shown by ministers, in this instance, undoubtedly proved highly prejudicial to their cause, both by exasperating the Americans, and by rousing the indignation of the minority in parliament, and rendering opposition more violent and determined. This appeared in every subsequent proceeding relative to the colonies. Even the bill for regulating the government of Massachusetts Bay did not pass without a protest; and a similar result ensued on the passing of the act for the impartial administration of justice. The opposition made to the Quebec bill was even more violent, insomuch that, ere it could be carried, the ministers were obliged to lower the high and aspiring tone to which they had accustomed themselves in talking of American affairs. The minority contended, that without any necessity pleaded.

Reign of or even suggested, an arbitrary influence was extended drew up a paper, in which they denied the distinction es- Reign of George III. by act of parliament to that province; they likewise argued in favour of the method of trial by jury; and they thought that the establishment of the Roman Catholic religion in that country gave it a preference over the Protestant, which was henceforth to be exercised only by toleration.

At the conclusion of the session his majesty declared himself satisfied with what had been done, and expressed his hopes that good effects would result from the new regulations. The reception which they met with in America will be related in the proper place; in Britain the people seemed to await the event with indifference. The parliament in the mean time was dissolved by proclamation, and a very short time allowed for the election of new members; so that if opposition at that time possessed any strength, they were not allowed sufficient time to exert it.

The new parliament met on the 30th of November 1774, when his majesty informed the two houses that a most daring spirit of resistance still prevailed in America, notwithstanding the means which had been taken to prevent the mischiefs thence arising; and assured them that they might depend on his firm resolution to withstand every attempt to weaken or impair the supreme authority of the legislature over all the dominions of the crown. In answer to the speech from the throne, the minority demanded a communication of all letters, orders, and instructions, relating to American affairs; but this was overruled, and the address being carried as a matter of form, the consideration of American affairs was delayed until after the holidays.

In the beginning of 1775 the minority received a considerable accession of strength by the return of Lord Chatham, who, after a long absence, again made his appearance in parliament. He now testified in the warmest terms his disapprobation of the measures which had been pursued regarding America; he moved for addressing the king to recal the troops from Boston; he predicted, that if ministers persisted in the course they had for some time pursued, they would make the crown not worth the king's wearing; and he declared that the kingdom would be undone if measures of undue coercion were employed. But all the eloquence of this great man proved ineffectual; administration were determined upon reducing the Americans to subjection, and his motion was rejected by a very large majority. Lord North now presented the papers which had been called for by the minority; but lest the publication of particular names should prove detrimental to individuals, only such parts as administration thought proper for public inspection were laid before the house. This was complained of, but to no purpose; and the papers, in their mutilated state, were laid before a committee of the whole

In the mean time, petitions against the adoption of coercive measures against America had been received from most of the trading companies in the kingdom; and as these, though highly displeasing to administration, could not be absolutely thrown overboard, a committee was appointed to consider them; but this was not to take place until American affairs were also considered. The reason given for this method of proceeding was, that the consideration of commercial matters ought not to interfere with those of a political kind, each of them being sufficiently embarrassing without the other. The delay in hearing these petitions, however, was supposed to be in effect an absolute rejection of them; and so indeed it proved, the committee to which they were consigned being humorously styled the " Committee of Oblivion." The merchants of London, however, being determined not to give up the

tablished by ministry, and affirmed that the connection be- George IIL tween Great Britain and America was chiefly of a commercial nature, and that the manifold regulations adopted for the mutual prosperity of the colonies and of the mother country formed the great political chain which united them to one another. This remonstrance was vigorously seconded by the opposition; but the administration had already determined on the line of conduct they were to pursue, and therefore wished to hear as little as possible on the subject. War was now the word; and although no weightier reason could be given for disregarding what the merchants had to say, this was the motive which impelled ministers to refuse them a hearing, lest these should make it appear that the nation was unwisely precipitated into such a measure.

But though there is no reason to doubt that administration were now fully determined upon a war, and therefore wished to be troubled with as few objections as possible, they were by no means deficient in arguments in justification of their own conduct. They alleged that the petitions so strongly pressed on the attention of the house were principally the work of a factious party; that the advantages resulting from the trade with America arose from the dependent condition of the colonies, which now aimed at shaking off entirely the supremacy which the mother country had hitherto exercised over them without the smallest complaint; that the advantage of the merchants themselves was consulted in maintaining that supremacy; that they would be the first to feel the pernicious consequences of its being lost; that war, though no doubt a great evil, was sometimes necessary to prevent a greater; that were the government to yield in the present contest, no advocate of America could pretend to say what would be the last of its demands; that the Americans were not to be reclaimed by concessions; that the honour and character of the nation were at stake; and that Britain had often taken up arms for matters of less consequence, and should not now hesitate where honour and interest both called for the most vigorous and effective exertions.

These arguments prevailed, and the motion in favour of the merchants' petitions was rejected by a prodigious majority. This point, however, had no sooner been disposed of, than a violent debate arose concerning the petition of congress to the king, which had been referred to parliament. It was argued by administration, that no petition could be received from the continental congress, which was not a legal body; that it would be admitting their legality to receive a petition from them; and that the general assemblies and their agents were the only lawful representatives of the colonies, and could alone be recognised as such. Opposition disputed these positions, but to no purpose; for, after an ineffectual struggle, the petition was rejected by a very large majority.

In the mean time a conciliatory plan, prepared by the Earl of Chatham, was presented on the first day of February 1775. The declared object and intent of this bill was to settle the troubles in America, and at the same time to assert the supreme legislative authority and superintending power of Great Britain over her colonies. No taxes were to be levied in America, but with the free consent of their assemblies. The right of the crown to station and maintain a military force established by law in any part of its dominions was pointedly asserted; but it was also declared, that it could not be legally employed to enforce implicit and unlawful submission. A congress was also to be held, in order to recognise the supreme sovereignty of Great Britain over the colonies, and to settle an annual revenue upon the crown, disposable by point until they had exerted themselves to the utmost, parliament, and applicable to the exigencies of the nation

1775.

Reign of And on these conditions being complied with, the acts derision among them, and was imputed to imbecility and Reign of George III. complained of by congress were to be suspended with fear; they imagined themselves able to abolish the sove-George III. that time the most offensive, and supposed to be the most injurious to the interests of Britain. Lord Chatham showed no deficiency of argument in support of his favourite scheme; but his reasoning, though enforced with all the powers of his eloquence, proved unsuccessful, and the proposal was ultimately rejected.

A petition was next presented to the House of Commons by the proprietors of estates in the West India islands, representing their alarm at the association of the Americans, and the intended stoppage of trade with the British islands, the situation of which, it was alleged, immediately repealed. To the administration, however, all petitions now appeared to be the contrivance of faction; but as it was deemed necessary to inform the nation as to the ultimate views of the government respecting America, Lord North, in a long speech, enumerated the most remarkable circumstances relating to the dispute with that country. He affirmed that the ferment then prevailing in America proceeded from the unwarrantable arts and practices used to inflame the people against the ruling powers in Britain; that, notwithstanding all their complaints, the public charges borne by individuals in America were not more than as one to fifty, compared with what was paid by individuals in England; that nothing but a settled determination to quarrel with the padisobedience to the lawful injunctions laid upon them, and spirit of resistance, not discontent at oppression, animated America. For these reasons he proposed to the house to send a greater force to America; and to pass a temporary act, suspending all the foreign trade of the different colonies of New England, and particularly the Newfoundland fishery, until they consented to acknowledge the supreme authority of the British legislature. New England was singled out upon this occasion, as being accounted the most guilty. The others, it was hoped, would yield with less compulsion; but the question now was, whether this country should at once abandon all claims on the colonies, and instantly give up the advantages arising from our soveshould resort to the measures which had become indispensably necessary to insure both.

An address was now carried, which, by the showing of opposition, amounted to a declaration of war. The consequences, therefore, were pointed out with the utmost freedom, and some even denied the charge of rebellion fixed on the province of Massachusetts Bay. The people there, they said, had done nothing but what the constitution allowed; they had resisted arbitrary measures; and the examples so frequently set them at home were sufficient to justify their conduct. The address, however, was carried as usual by a large majority. But so important was the subject of it deemed by the minority, that a motion was made for recommitting it, on account of the consequences that might probably result from the prosecution of the measures recommended. A very long and violent debate ensued, in the course of which the administration contended as usual for the necessity of enforcing obedience by the sword. The Americans, they said, had become

every other measure pointed out as a grievance, and the reignty of Britain in that country, and were now resolved constitution of the different governments to remain as to do it. It was therefore incumbent on every native of settled by their charters. This bill, however, was deemed Britain in such a case to stand forth and vindicate the totally inadmissible, on account of the various concessions interest and glory of his country; and it was the duty it enacted, and particularly from its empowering the co- of parliament and ministry to call forth the whole spirit lonies to assemble in congress; a measure which was at of the nation to a contest in which every thing dear to them, both in their public and private capacities, was so deeply concerned. The views and principles of ministers were attacked in the most violent manner. They were said to be reviving the old exploded doctrines of hereditary right and passive obedience, and requiring the Americans to submit unconditionally to the will of Great Britain, for no other reason but because she was the parent state. But if no better reason could be produced, they could not be justly blamed for their disobedience. The ties between Great Britain and her colonies, however, were of a far more noble as well as more binding would be very calamitous, if the acts in question were not nature than even origin and consanguinity. These ties were the constitution transmitted from Britain, and the brotherly assistance hitherto afforded them by Englishmen, and which ought to render the name dear to them. While these ties remained unviolated, there was no room to complain of their behaviour; but they would never submit to despotic authority in Englishmen more than in any others. Such unwarrantable principles rendered it no longer a question whether the measures of administration should be considered, but whether the ministers themselves ought not to be deprived of the power which they exercised so unconstitutionally. The question was not now between Great Britain and America, but simply whether we should give up our colonies or our ministers. This kind of language excited the indignation of the ministerent state could induce the Americans to persist in their rial party, who in return charged minority in plain terms with the guilt of all that had happened. There had gone which were neither injudicious nor oppressive; and that a forth, it was said, a factious and republican spirit, by which every person who wrote or spoke on the American cause was actuated, and which had not only induced the Americans to commence a rebellion against the parent state, but had filled the house with incendiaries. The final issue of the dispute was, that the recommitment of the address was lost by a majority of more than two to one. The debates were the most violent that had ever been known in the British parliament; and so important was the subject reckoned, that not only the people of this country, but even the foreign ministers in London, watched the motions of administration with the utmost anxiety.

But all these victories were not sufficient to prevent reignty, and the commerce dependent on it, or whether it new enemies from starting up. Petitions had been preparing by the London merchants trading to America, and by those concerned in the West India trade, in order to be presented to the House of Lords. This task was undertaken by the Marquis of Rockingham; but he was prevented from executing it by a previous motion in favour of the address. A long and violent debate, however, ensued concerning the necessity and propriety of receiving them; but it was at length resolved that the petition could not be received consistently with the interest of

In the mean time matters became daily worse in New England; and it was soon perceived, either that the friends of government in that colony did not exert themselves, or that they were far from being so numerous as had been imagined. In order to render their coercive plan the more effectual, therefore, it was judged necessary to extend it so that every individual of the colony might become sensible of the punishment. This, it was supposed, would be done by a bill for restraining the four provinces of New incorrigible through forbearance; lenity was a subject of England from commerce with Great Britain, Ireland, and

Reign of the British West India islands, and prohibiting them from George III. carrying on the fishery at Newfoundland. The reasons alleged for this proceeding were in substance the same with those for the others; and indeed both parties had now so much exhausted their arguments, that very little new matter remained for either. Every step taken by ministry, and every proposal made by them, however, produced a violent debate; and though they constantly gained the victory, it was not without the mortification of hearing their principles and conduct reprobated in the most opprobrious manner. In the present instance the bill was carried by a very large majority; but a petition against it was quickly presented by the London merchants concerned in the American trade, setting forth the danger which would accrue to the fisheries of Great Britain from such a prohibition. From the evidence produced in support of this petition, it appeared that, ten years before, the American fisheries had been in such a flourishing state, that the four provinces of New England alone employed nearly forty-six thousand tons of shipping and six thousand seamen; and that the produce of the fisheries in the foreign markets had amounted, in the year 1764, to upwards of L.320,000. Since that time, however, they had greatly increased; and what rendered them particularly valuable was, that all the materials used in them, excepting only the timber for building the vessels, and the salt for curing the fish, were purchased in Britain, and the net proceeds of the trade were also remitted thither. Some other considerations were likewise urged as reasons against this bill, particularly the commercial concerns of New England with the city of London, to which alone the colony stood indebted in nearly a million sterling, and the bad consequences of it to the people of Nantucket, who, though inhabiting a barren island off the coast of New England, about fifteen miles in length and three in breadth, containing six thousand inhabitants, kept one hundred and thirty vessels constantly employed in the whale fishery, which they carried on in the north seas, to the coasts of Africa and Brazil, and even as far as the Falkland Islands. The case of Nantucket, in fact, was so strong that the administration were obliged to relax a little, and, of their own accord, afforded this industrious people the relief which they had such just reason to expect. The bill was debated with great animosity in the House of Peers, and produced a remarkable protest, in which the measures of government were spoken of with great severity.

## CHAP. XIII.

## REIGN OF GEORGE III .- AMERICAN WAR.

Force to be sent to America.-Lord North's conciliatory Bill. Ineffectual endeavours of the West India Planters.—Violence of both parties.-Resignation of Lord Effingham and others.-Conduct of London and Dublin.—Distress of the Country. Last petition of Congress rejected.—Whigs and Tories.—Th mutual recriminations. Misfortunes of the Newfoundland fleet. —Difficulty of procuring succours —France and Holland espouse the American cause.—Hessian auxiliaries.—Supplies for the garrison of Boston destroyed or taken.—Party animosities.—Debates in Parliament.—Military operations.—The cause of America believed to be desperate.—Expense of the war.—Surrender of Burgoyne at Saratoga.—Conduct of Ministers.—The French resolve to assist America.—Treaty between France and America.—Charges against administration.—Invasion threatened by the French.—Exploits of D'Estaign in the West Indies. Encounter with Admiral Byron.—State of the Contest in America and the West Indies.—Condition of the British Navy. —Keppel's engagement with the French fleet.—Subsequent dissensions, and trial of the Admiral.—His acquittal.—Board of Admiralty attacked.—Resignations of Admirals Keppel, Howe, and others.—Inquiry concerning the conduct of the American war.—General Burgoyne's affair.—Accession of Spain to the confederacy against Britain .- Measures for the defence of the

nation .- Reduction of some British settlements in Africa - Reign of Unsuccessful attempts on Jersey.—Threatened invasion of Great George III. Britain .- Appearance of the combined fleets of France and Spain in the Channel.-Unpopularity of the American war .-Ministry become obnoxious to the people. Schemes of economy rejected.—Unconstitutional influence of Ministers —Mr Burke's plan of economy.—Defeat of the Ministry on Mr Dun-ning's celebrated motion, 6th April 1780.—They recover a ma-jority in the House.—Catholic Relief Bill.—Disturbances connected with it in Scotland -Conduct of the mob in Edinburgh. The Protestant Association—Terrible riots in London— Lord George Gordon committed to the Tower—Power of the Ministry confirmed.—Important debate on the employment of military force in cases of disturbance.-Operations of the war. —Naval successes.—Armed neutrality.—Origin of the war with Holland.—Battle off the Doggerbank.—Efforts of Britain.— Events of the year 1781.—Pertinacity of Ministers.—King's Speech.—Debates on the Address.—Motions against the American war.-New plan proposed by Lord North.-Debates. Army Estimates.-Elevation of Lord George Germaine to the Peerage, and discussion consequent thereon.—Protest.—Motions for an Address against the American war rejected.—One at length carried and presented to the King .- Motion against the Ministry, who intimate their intention to resign.-Naval and Military operations of 1782.—Rodney's victory on the 12th of April.—Results of this glorious achievement.—Spanish armament destroyed before Gibraltar, and the siege raised —Change of Ministry...Rockingham Administration...Negociations for Peace...Sudden death of the Marquis of Rockingham...He is succeeded by Lord Shelburne.—Conduct of that Minister.— Provisional treaty with America.—Peace-concluded with France, Spain, and Holland .- Estimate of the results of the contest .-Narrative of less important events.

The final resolution to reduce the colonies by force being now taken, it became necessary to make proper preparations for the purpose; and in this the conduct of administration was little less censured than in other respects. As the opinion that the Americans were naturally fimid, and incapable of becoming soldiers, prevailed greatly at this time, a force of a thousand men was judged sufficient to reduce the province of New England to obedience. The project of ministers was vehemently opposed by the minority. They insisted that the force was totally inadequate, and only calculated to produce expense to no purpose. The first impression, they very justly observed, ought, if possible, to be decisive; and in order to render it so, it was necessary to send such a fleet and army as might insure the confidence of the public, and be certainly capable of surmounting all obstacles. Many of the friends of administration were of the same sentiments; and the only reason assigned for acting otherwise was founded on a hope that the Americans would, upon more mature consideration, desist from their opposition. That they might the more readily be induced to this submission, Lord North's conciliatory proposition was formed, by which it was enacted, that when the governor, council, and assembly of any of the colonies, should propose to make a provision for the common defence, and when such provision should be approved of by the king in parliament, the levying or imposing of taxes on that colony should then be forborne; those duties excepted which it might be expedient to impose for the regulation of commerce, and the net produce of which should be carried to the account of the colony where it had been raised. But this proposal, though highly extolled by the friends of administration, was no less reprobated by the minority than the others had been. Nevertheless, after a lengthened debate, the question was carried in favour of administration by a majority of more than three to one.

A similar fate attended a petition to the throne from the island of Jamaica. Instead of relaxing any thing of their severity, the ministry now included the southern colonies in the restrictions imposed on New England. Still, however, the petitioners were indefatigable in their endea-

Reign of vours to be heard. The West India merchants and plant- inclination to the service. Lord Effingham, who had dis- Reign of ened detail of circumstances relating to the British islands in that part of the world. This affair was conducted by islands themselves, their stock in trade and other property amounted to no less than sixty millions; that the exportation to Britain had of late been near two hundred thousand hogsheads and puncheons of sugar and rum, amounting to no less than four millions in value; and that the direct revenue arising from this source was seven hundred thousand pounds, besides that which accrued from the collateral branches depending upon it. These arguments, however, were urged in vain. Conciliatory proposals were made by Mr Burke and Mr Hartley, but they were rejected by great majorities, and instead of serving the cause they were meant to promote, had the very opposite effect. A dread was entertained of the consequences which might ensue from the republican opinions now so prevalent in the colonies; and all partiality towards them was looked upon in so criminal a light, that their opponents became deaf, on many occasions, to the voice of reason and humanity when urged in their behalf. On the other hand, the favourers of America, urged on by a furious zeal, if not resentment, against those whom they looked upon as the promoters of arbitrary measures, erred equally in their opposition to ministry. And this violence of party spirit appeared not only among the people at large, but broke forth with the utmost fury in parliament, where the debates often resembled the railings of Billingsgate more than the deliberations of the representative assembly of a great and powerful nation.

In this temper of mind the state of affairs was scarcely ever truly represented by either party. Government continued to enact new laws, now in vain, against the Americans; whilst their antagonists opposed them in a manner so little different from that which has been already related, that any further account of the debates would be equally tedious and unnecessary. Other petitions were also presented, and treated with neglect. The union of the colonists, and their preparations for war, were described by the ministerial party as the mere commotions of a headstrong mob, but represented by the opposition as an association of an injured and virtuous people, who were about to found a mighty empire in the west, whilst Britain was doomed to sink into utter disgrace and contempt by their secession. In the same way, the event of the skirmish at Lexington, where the first blood flowed in the contest, was magnified by the one party into a disgraceful defeat, and treated by the other as a trifling affair, to which no regard whatever ought to be paid, far less any inference drawn as to the fate of the war. The battle of Bunker's Hill, and all the transactions of the year 1775, were in like manner exaggerated by both parties, though in opposite directions; and the consequence of these misrepresentations was to fan the flame of mutual resentment.

Whilst these altercations continued to agitate the minds of the superior classes of people in Britain, the middle and lower ranks remained in a kind of indifference, or rather were opposed to the proceedings of ministry. This opposition, indeed, had no influence on the councils of the nation, but in other respects it proved exceedingly troublesome. The levies were obstructed, and the recruiting service was never known to go on so heavily; numbers of that description of persons who usually fill the ranks of the army not only refusing the usual offers, but even reprobating loudly the cause in which they were solicited to engage. Several officers of high rank also showed a dis-

George III. ers seconded their last petition by entering into a length- tinguished himself by his opposition to the ministerial mea-George IIL sures, resigned the command of his regiment rather than fight against the cause which he had so warmly espoused; Mr Glover, a gentleman celebrated for his literary talents and his example was followed by that of several other and commercial knowledge. From his investigations it officers. For this step Lord Effingham received the thanks appeared that, exclusive of the intrinsic worth of the of the cities of London and Dublin, both of which were of the cities of London and Dublin, both of which were extremely averse to hostilities with America; and the former, indeed, could scarcely restrain itself within any bounds of moderation. After the skirmish at Lexington, the city framed a remonstrance and petition, animadverting severely on the ministry and parliament; and it was not without the greatest difficulty that the more moderate party procured a counter-petition, couched in less reprehensible terms.

> In the mean time serious inconveniences, arising from the stoppage of trade, began to be felt in different parts of the nation. The suspension of the sale and purchase of negro slaves in the West Indies and in North America, and the prohibition against exporting arms and gunpowder, had seriously impeded the trade of Bristol and Liverpool with Africa; in consequence of which a great number of ships which had formerly sailed from these ports were laid up, and nearly three thousand sailors belonging to Liverpool were thrown out of employment. These distresses, however, made no impression on administration; who having once laid it down as a maxim, that the subjection of America was the greatest political good that could happen to Britain, were, in a conformity with their own principles, obliged to consider every disaster that might occur during the prosecution of this object as a temporary inconvenience, which ought not to be put in comparison with the execution of so great and necessary a design. But whatever might be the views of administration in this respect, it was far otherwise with the generality of the nation. They felt severely the present inconveniences; whilst the probable subjugation of America afforded no solid reason to hope for an equivalent or compensation. It was with the utmost satisfaction, therefore, that they received the news of Mr Penn's arrival in 1775, with another petition from the congress, to be presented to the king in the first instance, and then given to the public. But their expectations were speedily disappointed. The petition was delivered to Lord Dartmouth on the first of September, and in three days afterwards it was stated that no answer would be given to it. This laconic reply excited no small surprise, more especially as the language of the petition was respectful, and expressed a strong desire for peace and reconciliation; and hence it could only be considered as a formal and deliberate, if not insulting, renunciation of all friendly intercourse with the colonies.

The rejection of this petition served to inflame, more than ever, the mutual resentment of the adverse parties. The obsolete distinction of Whig and Tory was now revived, with such animosity, that Britain itself, as well as America, seemed in danger of becoming the theatre of war and bloodshed. The Tories were accused of promoting sanguinary addresses, misinforming the government, and circulating false representations, in order to add fuel to the flame already kindled, and produce civil war. They were also upbraided with their attachment to the Stuart family; their incessant machinations to involve the country in civil war; the dissension at home and disgrace abroad which had invariably attended their councils; and their indifference to the honour and interest of the nation, which, from the peace of Utrecht to the present time, they had ever been ready to sacrifice for the advancement of their party On the other hand, the Tories described the Whigs as the genuine descendants and representatives of the republican incendiaries who, in the last century, had overturned the

Reign of constitution and desolated the kingdom; as pretending, in-George III. deed, to uphold the liberty of Britain, but, under this mask, as desirous of engrossing all the authority to themselves, and of exercising arbitrary power under a mock semblance of freedom. The real question however was, whether the king and parliament, when united, were to be obeyed or resisted. The Tories insisted that they should be obeyed, the Whigs that they ought to be resisted; and hence there were two parties in Britain, the one of which was of opinion that the colonies, owing obedience to Great Britain in all cases whatsoever, ought, in case of refusal, to be compelled to obey; whilst the other, though it acknowledged as a general principle the existence of the same obligation, deemed it inexpedient and impolitic to enforce it.

The violence of these bickerings, however, was somewhat allayed by serious commercial misfortunes, which occurred about this time, and added greatly to the difficulties with which the government had to contend. During the last session of parliament, it had been affirmed that the bill for depriving the people of New England of the benefits of the Newfoundland fishery would redound to the interest of Great Britain, by throwing into her hands the profits which were formerly divided with the colonies. But this prediction was belied by the event. The number of ships fitted out this year was scarcely greater than usual, and the congress had prohibited them from being supplied with provisions; so that not only those on board the ships, but even the inhabitants on the island of Newfoundland itself, were in danger of perishing from want. Many of the ships, therefore, were obliged to go in quest of provisions instead of prosecuting the employment on which they had been sent; and, on the whole, instead of any increase, the profits of the fishery suffered this year a diminution of near L.500,000. Nor was this all. A storm of unprecedented violence occurred in these latitudes during the fishing season; the sea rose fully thirty feet above its ordinary level, and with such rapidity, that no time was allowed for avoiding its fury: upwards of seven hundred fishing boats perished; and several ships foundered, with their whole crews. Nor was the devastation confined to the sea; for the waters broke in upon the land and occasioned prodigious loss and destruction. By these misfortunes, the general stagnation of commerce, and the little success which had hitherto attended the British arms, the mercantile portion of the nation was plunged in despair, and petitions were poured in from all quarters.

But ministers had determined on their course; and the only question now considered was, how it might be most effectually put in execution. For this purpose, application was made to the petty states of Germany, which were wont to hire out their forces, and had frequently sent auxiliaries to Britain in former cases of exigency. But the scheme was fraught with difficulties, owing to the distance of the scene of contest, and the danger of mercenaries deserting a cause in which they had no manner of concern. The princes were also alarmed at the probability of losing for ever so many of their subjects; whilst the latter were not less startled at the prospect of being transported across the ocean into a new world, there to be exposed to all the miseries of war, with very little hope of ever again beholding their native country. Other resources were however devised, such as calling in the assistance of the Hessians, and obtaining from Holland the body of Scottish troops which had been so long in their service. But in these views administration were in a great measure disappointed. All the states of Europe looked upon Britain with an invidious eye; particularly Holland and France, the two powers who had most reason to hope for advantage from the quarrel. In Holland a very strong party contended warmly for the American interest; pamphlets were daily published at

Amsterdam in justification of the colonies, whose case was Reign of compared to that of the Netherlands in former times; and George III. the colonists were exhorted to persevere in their claims against the pretensions of Britain, which was represented as insatiably covetous of wealth and power; as domineering and intolerable, especially since her successes in the war of 1755; and as arrogating if not exercising an absolute sovereignty over the seas. But although these powers thus early expressed their hostile disposition towards Britain, it was otherwise with the Princes of Hesse and Brunswick, by whom a considerable number of troops was furnished; and, that as many British forces as possible might be employed, large draughts were made from the garrisons of Gibraltar and Minorca, which were supplied with an equal number of men from the electorate of Hanover. The garrison of Boston was liberally furnished with all sorts of necessaries; and although the expenditure already began to occasion considerable alarm, and to raise a suspicion that even the treasures of Britain would not be able to defray the charges of the war, yet some countervailing advantages were derived from this profusion; for the price of every thing was augmented, including that of shipping; and although the profits realized by contractors and their numerous friends occasioned complaints, great benefit accrued to multitudes employed in the various branches of the public service. Misfortune, however, seemed to attend every scheme in which Britain engaged, although in the present case it must, in part at least, be ascribed to mismanagement. The sailing of the transports for Boston was delayed till the proper season was lost. They remained for a long time wind-bound; and when at length they were enabled to weigh anchor, they met with such stormy weather that they were tossed about in the Channel till most of the live stock which they had on board perished. Nor did the misfortunes of the convoy end here. After clearing the coast of England, their progress was retarded by a continuance of foul weather; they were driven by the periodical winds from the coast of America; and while some made for the West Indies, others were captured by American privateers, and only a very few reached Boston, with their cargoes so much damaged as to be of little or no use whatever.

With respect to the parliamentary proceedings of this period little can be said, except that every measure of administration, whether right or wrong, was keenly opposed. The employment of foreign troops, and the admitting of them into the fortresses of Gibraltar and Minorca, were severely censured, as being contrary to the bill of rights. But the administration contended that this bill only forbade the introduction of a foreign military power into the kingdom during peace, that the times however were not peaceable, and that the introduction of the troops was evidently with a view to quell a rebellion. The force designed for the conquest of America was then declared to be inadequate to the purpose; but it was replied, on the part of ministry, that the design was to conciliate, not to conquer; that twenty-five thousand men were sufficient to strike terror; and that though this should not instantly be produced, conciliatory offers would still be held out after every blow that was struck.

In the mean time the Americans, sensible of the dangerous situation in which they stood, exerted themselves to the utmost to dislodge the British troops from Boston, which they at length accomplished in March 1776. They then proceeded to put their towns in a state of defence, and repulsed Sir Peter Parker at Charlestown; but they did not exert themselves with equal spirit in the defence of New York, where, besides losing the town, they sustained such a defeat as seemed to threaten their affairs with total ruin. This in fact was the view taken of their situation by the

Reign of generality of the people in Britain. The successful cam- sary at that time to comply, lest reprisals should be made Reign of about the interference of foreign powers; whilst the obamounted to nearly three millions, besides the extraortwo hundred thousand pounds; and though this vast provision was the subject of great complaint and animadversion, the power of ministry silenced all opposition.

But however administration might now triumph, their exultation was of short continuance. The misfortune of General Burgoyne at Saratoga threw the whole nation utmost perplexity. The great difficulty now was to contrive means for raising a sufficient number of forces to carry on the war; but from this embarrassment they extricated themselves by encouraging levies for government service by cities and private persons; and as the design was kept a profound secret before the Christmas recess, they were not disturbed by the clamours of opposition. for the scheme to take effect; and before parliament met again it was actually accomplished, so that ministers could once more face their opponents without any fear.

Another and more weighty consideration, however, now occurred. The European states in general had long beheld the grandeur of Britain with an invidious eye. The news of the disaster at Saratoga was therefore received by them with the same undisguised exultation as the intelligence of the defeat of Charles XII. at Pultowa was by the powers whom he had so long overawed. Of these the French, for obvious reasons, were the most active in supporting the insurgent Americans. Numbers of the young nobility were eager to signalize themselves in the American cause; and among the rest the Marquis de la Fayette, friends to America, where he offered his services to congress; and meeting with a most gracious reception, he was constantly been refused with an obstinacy equally uninvested with a command, in which he lost no opportuparalleled and inveterate. They now, however, saw the several other officers from France and Germany actually Burgoyne, which, if granted in time, would have prevententered the American service, and by their military talents greatly contributed to the exertions which the colonies were afterwards enabled to make. This assistance, however, would have been but trifling, had not the French court also interested itself in their behalf; and about the time when the news of General Burgoyne's disaster arrivcourt and the United States of America. Even before this time France had shown such a partiality towards the Americans, as might plainly have indicated a design of ultimately assisting them in their national capacity. The the kingdom. With this the French court found it neces- or not-

George III. paign of 1776 was looked upon as so decisive, that little by capturing their whole Newfoundland fleet then engag-George III room remained for supposing the Americans capable of ed in the fishery. But so many delays were occasioned ever retrieving their affairs. Opposition were much em- on various pretences, that not a single vessel was dismissbarrassed, being almost reduced to the single argument ed from any of their ports; and so far were the French court from entertaining any design of this kind, that in stinacy of the Americans in refusing the offers of Lord the month of July 1777 the whole body of merchants Howe, even at the moment of their greatest depression, seemed a very bad omen. The ministry, however, now became so powerful, that whatever they proposed was immediately carried. The number of seamen for 1777 was made throughout the whole kingdom of France; and, in augmented to forty-five thousand, and upwards of five fact, the most judicious politicians were of opinion that a millions were voted for the expense of the navy, and for rupture with that power would have immediately followdischarging its debt. The expenses of the land service ed the commencement of hostilities with America. But, whatever might have been the motives of the British midinaries of the former year, which exceeded one million nistry, it is certain, that in defiance alike of probability, and of the acrimonious censures of opposition, they continued to pretend ignorance of any hostile intentions upon the part of France, until that country of its own accord thought proper to announce them. This was done by a formal notification to the court of Britain in the month of March 1778, couched in the most insolent terms. In this into a kind of despair, and reduced the ministry to the declaration it was announced, not only that a treaty of friendship and commerce had been concluded betwixt France and America, but Britain was insulted by being told that America was actually in possession of independence, as if the former had already exerted her utmost efforts without being able to reduce them. A merit was also made of having entered into no commercial stipulations in favour of France exclusive of Britain. Nothing, The recess was purposely extended in order to give time therefore, could be more offensive than this notification; and though it could not decently be said, on the part of the French monarch, that he wished for war, yet his pacific intentions were conveyed in such haughty terms, that the whole could only be considered as a declaration of that hostility which he pretended a desire to avoid.

Accordingly both parties now united in opinion that a war with France was unavoidable; but they were not for that reason any further advanced towards a reconciliation. It must be owned, indeed, that the minority had received great provocation. They had from the beginning reprobated the American war, and prognosticated its bad success. In this they had been overruled, and the character of the Americans represented in such a manner as almost to preclude the notion of their being able to resist. They a young nobleman of high rank and fortune, occupied a had resisted, however, and by destroying or taking priconspicuous place. Impelled by an enthusiastic ardour in soners a whole army, had verified the predictions which favour of the American cause, he purchased a vessel, load-had so often been treated with ridicule. The same party ed her with military stores, and sailed with several of his had frequently insisted in the most earnest manner for some kind of concession towards America; but this had nity of distinguishing himself. Besides this nobleman, very concessions offered to America after the defeat of ed all the mischief that had happened. Add to this, that every inquiry into the measures of government had been frustrated; that a motion on the state of the nation, which could not be absolutely rejected, was rendered ineffectual by delays and evasion; and that the country was involved in war with a nation well provided for all emergencies, ed in Britain, a treaty was on foot between the French whilst we had supinely suffered them to go on without making the least effort to put ourselves in a proper state of defence. For these reasons opposition insisted that the present ministry ought no longer to be intrusted with the management of public affairs. An acknowledgment of the encouragement given to the American privateers in all the independence of America was now generally supposed to ports of France had produced strong remonstrances on the be the only rational step that could be taken, as it might part of Britain; and an order was at length demanded at present be done with a good grace, and we should unthat all these privateers with their prizes should depart avoidably be obliged to take it at last whether we would

attempted to excite a general panic by threatening an invasion, which was evidently impracticable, until they had first obtained the superiority at sea; yet as multitudes in the country were apt to be terrified by the bare mention of a French invasion, orders were issued to call out and embody the militia, which was then composed of men in every respect as well exercised and disciplined as any regular troops. It was complained, however, that a French squadron of twelve ships of the line had sailed from Toulon without any obstruction, under the command of the Count d'Estaing. The most grievous apprehensions were entertained from the great inferiority of Lord Howe's naval force; a circumstance which might expose his fleet to a total defeat, and the whole convoy of transports to be taken or destroyed. But whatever might have been the probabilities of the case, the fortune or conduct of this commander were such, that none of the anticipated dangers occurred. Addresses were, however, moved for recalling the fleets and armies from America, in order to station them in places where they might contribute most effectually to the defence of the kingdom; but this was opposed by administration, and even by some of the most popular members of opposition, including Lord Chatham and the Earl of Shelburne.

The operations of the French in America, with the various success of the war, will be more fully related under the head of United States. It is sufficient here to state that D'Estaing having equally failed in his attempt on the British fleet at New York, and in assisting the allies of France in their attempt on Rhode Island, sailed for the West Indies, where he attacked the island of St Lucia; but meeting with a repulse, he proceeded to Grenada, which he reduced, while a body of troops dispatched by him also took the island of St Vincent. By this time the French admiral had been powerfully reinforced, so that his fleet consisted of twenty-six sail of the line and twelve frigates. Whilst he was employed at Grenada, Admiral Byron, with the British squadron, accompanied the homeward-bound West India fleet till it was out of danger, and then sailed with a body of troops under General Grant for the recovery of St Vincent; but before reaching that island, certain intelligence was received of the descent made on Grenada. Byron then steered directly for that island, where, without hesitation, he encountered the French fleet, notwithstanding its great superiority. At this time the French squadron amounted to twenty-seven sail of the line and seven frigates; whilst that of Britain consisted only of twenty-one line-of-battle ships and one frigate. The British admirals, Byron and Barrington, endeavoured to bring the enemy to a close engagement; but this was as studiously avoided by D'Estaing; and such was the dexterity and circumspection with which he acted, that it was only during the transient movements occasioned by the wind and weather that some of the British ships could close in with their antagonists. But when these occurred, the encounter became so unequal, that the British ships were terribly shattered. For some time Captains Collingwood, Edwards, and Cornwallis, stood the fire of the whole French fleet; and Captain Fanshaw of the Monmouth, a sixty-four gun ship, singly threw himself in the way of the enemy's van to stop them. Several of the British ships forced their way to the very mouth of St George's harbour in Grenada; but finding it in the hands of the French, an end was put to the action; nor did the latter care to renew it, although the British ships had suffered much from the greatly superior force to which they had been exposed.

Notwithstanding the vehemence of these disputes, how- set sail for the continent of America, after convoying the Reign of George III. ever, great courage and steadiness were manifested by homeward-bound fleet of French merchantmen on their George III. the calm and deliberate portion of the nation. The French return from the West India islands. He made an attempt on the town of Savannah, but was repulsed with great loss; and the result was, that the fears which had been excited by the superiority of the French in the West Indian seas were effectually dissipated. The islands of Dominica, St Vincent, and Grenada, were indeed lost, the first being taken by the Marquis de Bouillé, governor of Martinico, and the last two by D'Estaing, as already stated; but these successes were balanced by the failure of the French commander in every other enterprise, by his disaster at the Savannah, and by the acquisition of St Lucia, which was taken in the year 1778 by Admiral Barrington and Generals Prescot and Meadows. In other parts of the West Indian seas also the honour of the British arms was very effectually supported by the bravery and vigilance of the commanders on that station. Admiral Hyde Parker, assisted by Admiral Rowley, kept the enemy in continual alarm, and intercepted the trade of the French islands in such a manner as greatly distressed them. Three large frigates dispatched by Count d'Estaing after his failure in America were taken, and a great part of a convoy seized or destroyed in sight of M. de la Motte-Piquet's squadron in the harbour of Fort Royal at Martinico, the admiral himself having narrowly escaped. He had sailed out of the harbour in order to favour the escape of the convoy already mentioned, and, having partly effected his object, withdrew; but he was so closely pursued, that he had scarcely time to shelter himself under the batteries on shore. These successes, which occurred in the years 1778, 1779, and beginning of 1780, kept the event of the war pretty much in a state of equipoise on the western seas and continent; but in the meanwhile the most unhappy dissensions prevailed in every department of the British government in Europe, and threatened to involve the nation in confusion and bloodshed.

Among other charges brought by the opposition against the ministry, that of neglecting the navy was one of the most considerable; nor indeed does it appear that the charge was altogether groundless. Without a fleet, however, it was now impossible to ward off the danger of an invasion. At this time, indeed, it was in a very weak condition; but the valour and experience of the officers seemed in some measure to compensate every deficiency. The chief command was conferred on Admiral Keppel, who had served with great reputation during the last war; whilst Admirals Sir Robert Harland and Sir Hugh Palliser, both officers of undoubted courage and capacity, acted under him. On arriving at Portsmouth, towards the end of March 1778, Admiral Keppel exerted himself so effectually, that, exclusive of those ships which it was found necessary to dispatch to the coast of North America under Admiral Byron, a fleet of twenty sail of the line was got in readiness by the beginning of June, and ten more in a very forward state of preparation. At the head of this fleet Admiral Keppel sailed from Portsmouth on the 13th of June, in order to protect the commercial shipping expected from all parts of the world, and at the same time to watch the motions of the French fleet at Brest.

When the British fleet arrived off the coast of France, two French frigates approached in order to make observations. These proved to be the Licorne of thirty-two, and the Belle Poule of twenty-six guns. A signal to give chase was instantly made, and the Milford frigate having come up with the Licorne towards the close of the day, requested the French captain to heave to under the British admiral's stern. The latter refused; but a ship of the line coming up, compelled him to obey. Next morning the Licorne seem-D'Estaing having now received fresh reinforcements, ing by her motions to be altering her course, a shot was

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Reign of fired across her bows as a signal to keep it, upon which George III. she discharged a broadside and a volley of small arms into the America of sixty-four guns which lay close to her, and immediately struck. The behaviour of the French captain was the more extraordinary, as Lord Longford, the captain of the America, was at that instant engaged in amicable conversation with him; but though such conduct merited severe chastisement, no return was made for this most unprovoked and wanton aggression. The Arethusa of twenty-six guns, commanded by Captain Marshall, with the Alert cutter, was meanwhile in pursuit of the Belle Poule, which was also accompanied by a schooner, and the chase was continued till both were out of sight of the fleet. On coming up, Captain Marshall informed the French captain of his orders to bring him to the admiral, and requested his compliance. The Frenchman refused to obey, upon which the Arethusa fired a shot across the Belle Poule, which the latter returned with a discharge of her broadside, and the engagement thus commenced continued upwards of two hours with the greatest fury. The Belle Poule was superior not only in numbers, but also in weight of metal; her guns being all twelve pounders, while those of the Arethusa were only six. But notwithstanding this inferiority, the latter maintained so desperate a fight, that the French frigate suffered a much greater loss of men than the British, having nearly a hundred killed and wounded, whilst the Arethusa scarcely lost half that number. During the engagement between the two frigates, Captain Fairfax in the Alert attacked the French schooner, which was of much the same force, and the contest continued two hours with great bravery on both sides, when the latter struck to the English cutter. The Arethusa received so much damage, that she became almost unmanageable; and although the captain endeavoured to put her in a condition to continue the engagement, he was unable to effect his object. Being at the same time upon the enemy's coast, and close in the shore, the danger of grounding in such a situation obliged him to act with the more caution, more especially as by this time it was midnight. Meanwhile the Belle Poule stood into a small bay surrounded with rocks, where she was protected from all attacks; and as soon as it was day-light, a number of boats came out from the shore, and towed her into a place of safety. Notwithstanding the evident superiority of force on the side of the French, this action was extolled by them as a proof of singular bravery, and the account of it received with as much triumph as if it had been a victory.

On the 18th of June, the day following the action with the Belle Poule, another frigate fell in with the British fleet, and was seized by the admiral's orders, on account of the behaviour of the Licorne. The capture of these French frigates furnished intelligence which proved of the utmost importance, at the same time that it was highly alarming. It was ascertained that the fleet at Brest consisted of thirty-two sail of the line and twelve frigates; and this proved in every respect a most fortunate discovery, as the admiral had under his orders only twenty ships of the line and three frigates. As the superiority of the enemy was so decided, and as the consequences of a defeat would have been fatal to this country, the admiral thought himself bound in prudence to return to Portsmouth for reinforcements. He reached Spithead on the 27th of June, and remained till the arrival of the ships from the Mediterranean and the Spanish and Portuguese trade; while the summer fleet from the West Indies brought him a further supply of seamen, and enabled him to put to sea again with an addition of ten ships of the line. But still there was a deficiency of frigates, owing to the great numbers on the American station, and the necessity of manning the ships of the line in preference to all others.

In the mean time the preparations at Brest being fully Reign of completed, the French fleet put to sea on the 8th of July George III. It consisted of thirty-two sail of the line, besides a large number of frigates; and Count d'Orvilliers commanded in chief, while the other principal officers were Counts Duchaffault, de Guichen, and de Grasse, M. de Rochechoart and M. de la Motte-Piquet. A prince of the blood royal had also been sent to serve on board of this fleet; we mean the Duke of Chartres, son and heir to the Duke of Orleans, and first prince of the blood royal of France in the collateral line, who commanded one of the divisions in the capacity of admiral. On the 9th day of July, the British fleet sailed out of Portsmouth in three divisions; the first commanded by Sir Robert Harland, the third by Sir Hugh Palliser, and the centre by Admiral Keppel, accompanied by Admiral Campbell, an officer of great courage and merit. The French had been informed that the British fleet was greatly inferior to their own, which was true at the time when they received the information; and being yet unapprised of the reinforcement it had received, Count d'Orvilliers sailed at first in quest of it, intending to attack it while in the weak condition represented to him.

As the British admiral was equally intent on coming to action as soon as possible, they were not long before they met. The hostile fleets came in sight on the 23d of July; but the appearance of the British ships soon convinced the French admiral of his mistake, and he immediately determined to avoid an engagement as anxiously as he had formerly sought it; and in this he was favoured by the approach of night. All that could be done by the British, therefore, was to form the line of battle, in expectation that the enemy would follow the example. During the night the wind changed, and the French getting the weather-gage, had the choice of coming to action or of declining it entirely in their own power, whilst the British admiral was deprived of the opportunity of forcing them to engage as he had proposed. During the space of four days matters continued in this state; the French cautiously avoiding a battle, and the British beating up against the wind with a resolution to attack them. But notwithstanding all his efforts, the British admiral had the mortification to see his endeavours defeated by the vigilance and precaution of the enemy. The chase lasted till the 27th of July. But between ten and eleven in the morning of that day, an alteration of wind and weather occasioned several movements in both fleets, which brought them so near each other, that it was no longer in the power of the enemy to decline an engagement. Both fleets were now on the same tack, and had they so remained, the British fleet on coming up with the French would have had an opportunity of engaging ship to ship; but as this was a mode of combating quite contrary to the wishes of the enemy, their admiral, as soon as he found an action likely to ensue, put his ships on the contrary tack, by which means a close action was avoided. As soon as the van of the British fleet, consisting of Sir Robert Harland's division, came up, they directed their fire upon it, though at too great a distance to make any impression; but the fire was not returned by the British ships till they came close enough to do execution. In this manner the hostile fleets passed close to each other on opposite tacks, keeping up a very heavy and destructive fire.

The centre division of the British line having passed the rearmost ships of the enemy, the first care of the admiral was to renew the engagement as soon as the ships of the different fleets yet in action had got clear of each other respectively. Sir Robert Harland, with some ships of his division, had already tacked, and stood towards the French; but the remaining part of the fleet had not yet tacked, and some had dropped to leeward, and were repair1778.

Reign of ing the damages which they had received in the action. commanders, proved a source of fatal animosity. The bulk Reign of the ships astern of him into disorder. As soon as it was practicable, however, the Victory wore, and steered again upon the enemy before any other ship of the centre division, not above three or four of which were able to follow the example. The other ships not having recovered their stations near enough to support each other on a renewal of the action, in order to collect them more readily for that purpose the admiral made the signal for the line of battle ahead. It was now three in the afternoon; but the ships of the British fleet had not sufficiently regained their stations to engage. The Victory lay nearest the enemy, with the four ships above mentioned, and seven more of Sir Robert Harland's division. These twelve were the only ships in any condition for immediate service; of the others belonging to the centre and to Sir Robert Harland's division, three were a great way astern, and five at a considerable distance to leeward, much disabled in their rigging. Sir Hugh Palliser, who commanded the rear division during the time of action, in which he had behaved with signal bravery, came of course last out of it, and, in consequence of the admiral's signal for forming the line of battle ahead, was to have led the van on renewing the fight; but his division was upon the contrary tack, and was entirely out of the line. The French, on the other hand, expecting to be directly re-attacked, had closed together in tacking, and were now spreading themselves into a line of battle. But on discovering the position of the British ships which had fallen to leeward, they immediately stood towards them in order to cut them off. This obliged the admiral to wear, and to steer athwart the enemy's foremost division, in order to secure them; directing, at a line astern, in order to confront the enemy till Sir Hugh Palliser should come up, and enable him to act more effectually. In moving to the protection of the leeward ships the admiral was now drawing near the enemy. As Sir Hugh Palliser still continued to windward, he made a signal for all the ships in that quarter to come into his wake, and Sir Hugh repeated this signal; but it was unluckily mistaken by the ships of his division for an order to come into his own wake, which they did accordingly; and as he in conjunction with Sir Hugh Palliser, the cause of such still remained in his position, they retained theirs of course. a declaration ought to be investigated. Admiral Keppel Sir Robert Harland was now directed to take his station ahead, and the signal was repeated for Sir Hugh Palliser's division to come into his wake; but this signal was not complied with, any more than a verbal message to that purpose, and other subsequent signals for Sir Hugh's division coming into its station in the line, before it was too late to recommence any operations against the enemy. In the in a speech of great heat and vehemence, that he had alnight, the French resolved to put it wholly out of the ready demanded and obtained a court-martial on Admiral power of the British fleet to attack them a second time; and for this purpose three of their swiftest sailing vessels were fixed in the stations occupied during the day by the three flag ships of the respective divisions, with lights at their mast heads, to deceive the British fleet into the belief that the French fleet kept its position with an intent to fight next morning. Protected by this stratagem, the remainder of the French fleet drew off unperceived during the night, and retired with all speed towards Brest, which they entered the following day. Their departure was not discovered till break of day; but it was too late to pursue them, as they were only discernible from the mast heads of the largest ships in the British fleet. The admiral then made the best of his way to Plymouth, as being the nearest port, in order to put his fleet into a proper condition to have been neither dishonourable to his country nor disreturn in quest of the enemy.

This action, whatever might have been the merit of the

George III. His own ship the Victory had suffered too much to tack of the nation had so long been accustomed to hear of great George III. about instantly; and had he done it he would have thrown and glorious victories at sea, that it was supposed a kind of impossibility for a French and British fleet to encounter without the total ruin of the former. The event of the last engagement, therefore, became an object of severe criticism; and complaints were made, that, through the bad conduct of the blue division, an opportunity had been lost of gaining a complete victory over the French fleet. These complaints were quickly introduced into the public papers; and were carried on with a warmth and vehemence which threw the whole nation into a ferment. The friends of Sir Hugh Palliser, the vice-admiral of the blue, were no less violent in the defence of his conduct than his opponents were in its condemnation; whilst those who espoused the cause of the admiral manifested equal determination in accusing him of being the real cause of the escape of the French fleet, through his disobedience of the signals and orders of his commander, and by remaining at a distance with his division, instead of coming to the assistance of the rest of the fleet. An accusation of so weighty a nature alarmed Sir Hugh Palliser, who in consequence applied to Admiral Keppel for a justification of his conduct, and required of him to sign and publish a paper relative to the engagement of the 27th of July, stating, that he did not intend by his signals on the evening of that day to renew the battle then, but only to be in readiness for the next morning. The admiral rejected this demand, on which Sir Hugh Palliser published, in one of the daily papers, a variety of details concerning the engagement, reflecting severely on the conduct of the admiral, and prefacing the whole by a letter signed with his name. An attack so public, and so detrimental to his character, induced Admiral Keppel to declare to the adthe same time, Sir Robert Harland to form his division in miralty, that unless Sir Hugh Palliser explained this matter to his satisfaction, he could not, consistently with his reputation, ever again act in conjunction with that officer.

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This altercation having occurred before the meeting of parliament, was of course noticed when it assembled. In the House of Peers an inquiry was demanded into the conduct of the commanders of the fleet on the 27th of July; and in the House of Commons it was urged, that as Admiral Keppel had expressed a public refusal to serve and Sir Hugh Palliser, who were both present in the house upon this occasion, spoke severally on the point in question; and after a keen debate, a motion was made for an address to the crown to bring Sir Hugh Palliser to a trial for his behaviour in the late engagement with the French fleet. To this motion Sir Hugh Palliser replied, Keppel, whom he now charged with having, through his misconduct, caused the failure of success in that engagement. This intelligence was received with astonishment in the house. It had been, and still continued to be, the general desire of individuals of all parties, to heal the breach between these officers at a time when the services of both were so much needed; and it was therefore with deep concern that the house learned the determination which had been taken to bring Admiral Keppel to a trial. The admiral, however, conducted himself on this occasion with remarkable temper and coolness. He acquiesced without reluctance in the orders which had been given him to prepare for a trial of his conduct; and he expressed a hope, that, upon inquiry, it would be found to creditable to himself.

But the conduct of the board of admiralty in admitting

Reign of the charges against Admiral Keppel, and appointing a was again lost by nearly the same majority as before. But Reign of that it was their duty to labour with the utmost earnestness, and exert their whole official influence, to stifle an dicial and public hearing. On the other hand, it was observed, that the admiralty could not, consistently with the impartiality which they owed to every officer of the navy, refuse to receive all matters of complaint relating to subjects in their department; that they had no right to decide on the merits of any case laid before them, but were bound to refer it to a court composed of naval in professional matters; that, in conformity with these principles, they left the decision of the present altercation to the gentlemen of the navy, whose honour and integrity in all instances of this kind had never been called in question, and by whose verdict every officer in that branch of the service must wish to stand or fall. The arguments upon this subject being urged with much heat and vehemence, generated uncommon animosity, and gave rise to a spirit of contention which diffused itself among all classes of society. Individuals of every rank and profession engaged in it with as much zeal as if they had been personally concerned in the issue; and the dissatisfaction that prevailed among the upper classes in the navy appeared in a memorial presented to the king by twelve of the oldest and most distinguished admirals, at the head of whom was Lord Hawke, condemning the conduct of Sir Hugh Palliser without reserve, and censuring that of the admiralty itself, as establishing a precedent pregnant with the most ruinous consequences to the naval service. The majority of those who subscribed this memorial were not only officers of the highest rank and importance in the navy, but unconnected with the opposition, and attached by various motives to the court and ministry; so that their conduct in this instance must have been uninfluenced by party considerations.

No business of consequence was discussed in either house of parliament during the trial, which began upon the 7th of January 1779, and lasted till the 11th of February ensuing. After a lengthened and minute investigation, the court-martial acquitted Admiral Keppel, in the most complete and honourable manner, of all the charges which had been brought against him; he was declared to have acted the part of a judicious, brave, and experienced officer; and the accusation was censured in the severest manner. Both houses of parliament then voted him their thanks for the eminent services he had performed; the city of London conferred on him every mark of honour and respect it could bestow; and the nation re-echoed with his praise; whilst the resentment against his accuser was so strong as to constrain him to retire wholly from public life, and to resign all his employments. But notwithstanding the high degree of national favour and esteem in which Admiral Keppel stood, he thought it prudent to withdraw from a situation in which he found himself not acceptable to those in power, and accordingly resigned his command.

The conduct of those who presided at the admiralty board now became an object of severe censure; and a number of facts were cited to prove, that for many years past they had acted in a manner highly reprehensible. The debates were uncommonly animated; and a resolution for censuring the conduct of the admiralty was lost by mensurate with the vast sums bestowed upon it, the point ed; and it appeared that the Americans, far from being

George III. trial, was strongly censured in the house, upon the ground however victorious they might be in divisions, the con-George III. duct of the admiralty was far from giving general satisfaction. Following the example of Admiral Keppel, Lord unhappy disagreement, the consequences of which might Howe declared his resolution to relinquish the service be highly detrimental to the public service, instead of while it continued under the present system of managepromoting the dispute, by consenting to bring it to a ju- ment; and his resignation was followed by that of Sir Robert Harland, Sir John Lindsay, and several others; nay, so general had the dislike to the service now become, that no fewer than twenty captains of the first distinction proposed to go in a body to resign their commissions at once; and they were prevented doing so only by the urgent occasion there was at that time for their services.

The same feeling which led to these resignations proofficers, who were the only proper and competent judges duced a direct attack upon Lord Sandwich, then first lord of the admiralty. But though in this as in other cases the ministry were victorious, they could not prevent an inquiry into the cause of our want of success in the American war. This was insisted upon by Lord Howe and General Howe, whose conduct had been so much reflected upon, that a vindication became absolutely necessary. The inquiry was indeed singularly disagreeable to the administration, and consequently evaded as long as possible. From the evidence of Lord Cornwallis and other officers of high rank, however, it appeared that the forces sent to America were at no time sufficient to reduce it; that the Americans were almost universally unfriendly to the British cause; and that from the nature of the country, the conquest of it would be attended with great difficulties. It was also proved, that, from its great strength, the camp of the Americans on Long Island could not have been attacked with any probability of success, after their defeat in 1776, owing to the want of artillery and other necessaries. In every instance, therefore, the general's conduct was shown to have been judicious and proper. But these facts being directly at variance with the view which the ministry wished to countenance, counter-evidence was produced, in order to invalidate the testimony of the respectable witnesses above mentioned, and Major-general Robertson, and Mr Joseph Galloway, an American gentleman, were examined. According to the evidence of Mr Galloway especially, the conduct of General Howe had not been unexceptionable; the greater part of the Americans were friendly to the cause of Britain; the country was not so full of obstructions as had been represented; the woods and forests formed no obstruction to the marching of armies in as many columns as they pleased; and soldiers might carry provisions for nineteen days on their backs. Upon such extravagant assertions, proceeding undoubtedly from ignorance, no stress whatever could be laid; yet they fully answered the purpose of ministry at this time, namely procrastination, and preventing the disagreeable truths elicited in the course of the inquiry from striking the minds of the public too forcibly.

The event of this inquiry, however, encouraged General Burgoyne to insist for an examination of his conduct, which indeed had been so unmercifully censured, that even the ministers began to think he had suffered too much, and that he ought to be allowed to vindicate himself. He was accordingly permitted to bring witnesses in his own behalf, and from the evidence produced, it appeared that he had acted the part both of a general and a soldier; that the attachment of his army to him was so great, that no dangers or difficulties could shake it; and that, even when all their patience and courage were found to be ineffectual, they were still ready to obey his coma majority of only thirty-four. Administration, however, mands, and die with arms in their hands. A great numstill kept their ground; and although a second attempt ber of other particulars relating to his expedition were was made to show that the state of the navy was incom- also cleared up; several charges against him were refut-

deign of the contemptible enemy they had been called, were intre- pedition were also named by the government. A junction Reign of George III. pid and resolute antagonists.

After the resignation of Admiral Keppel, the command of the Channel fleet was bestowed on Sir Charles Hardy, a brave and experienced officer, but now advanced in years, having retired from the service with the design of not returning to it, and being at that time governor of Greenwich hospital. The choice of an admiral to command this fleet was now of the greatest importance, on account of the accession of Spain to the general confederacy which took place during the present year. This determination was formally intimated by the Spanish minister on the 17th of June 1779, and was attended with new but ineffectual proposals for an accommodation with America, and the removal of the ministry. The imminent danger, however, to which the nation was now exposed, required vigorous exertion; and various projects for its internal defence were laid before the parliament. The spirit and magnanimity displayed on this occasion did the highest honour to the national character, and fully justified the opinion entertained of its valour and resources. All parts of the kingdom seemed actuated by a desire to concur in every measure necessary for its defence; large sums were subscribed by persons of rank and affluence; and companies were raised, and regiments formed, with an alacrity which quickly

banished all apprehensions for the safety of the country. On the other hand, the French, thinking themselves secure of victory by the accession of Spain, began to extend their schemes of conquest; and a squadron was fitted out under the command of the Marquis de Vaudreuil, destined to reinforce the fleet commanded by D'Estaing. But before proceeding to its destination, this squadron made an attack on the British settlements on the rivers Senegal and Gambia, which were easily conquered. On this occasion the French quitted their own island of Goree, which was soon afterwards taken possession of by Sir Edward Hughes, when on his way to the East Indies. But these distant conquests being insufficient to produce any serious impression, it was resolved to strike a blow nearer home, by the conquest of Jersey and Guernsey. An attempt was accordingly made on these islands, but with so little success that not a single man could be disembarked on the spot which they intended to conquer. The enterprise, however, proved indirectly serviceable to the cause of America. A fleet of four hundred merchantmen and transports was at this time on the point of sailing for New York, under the conduct of Admiral Arbuthnot; but that officer, informed of the attack on Jersey, thought it his duty to go to the assistance of that island rather than proceed on his voyage; and this delay was followed by another, occasioned by bad weather, so that the fleet, which was laden with warlike stores and necessaries, did not arrive till the end of August, and several important enterprises projected by Sir Henry Clinton were in consequence abandoned. The French, however, determined to make a second attempt on Jersey; but their squadron, being attacked by another under Sir James Wallace, was driven on shore in a small bay on the coast of Normandy, under cover of a battery, and pursued by the British commander, who silenced the battery, took a thirty-four gun frigate, with two rich prizes, and burned two other frigates and several vessels besides.

Thus disappointed in the attempt on Jersey, the court of France next projected an invasion of Great Britain itself; and the preparations for the enterprise, whether serious or not, were so formidable, as justly to excite a considerable alarm in this country. Not only were the best troops in the French service marched down to the coasts of the British Channel, but transports were provided in great numbers, and many general officers promoted; the persons who were to command this important ex-

was formed between the French and Spanish fleets, in George III. spite of the endeavours of the British to prevent it; and the combined fleets made their appearance in the British seas with upwards of sixty ships of the line, besides a vast number of frigates and other armed vessels. But all this formidable preparation ended in the capture of only a single ship, the Ardent, of sixty-four guns. The combined fleets had passed the British fleet under Sir Charles Hardy in the mouth of the Channel without observing him; and then sailing along the coast of England, they came in sight of Plymouth, where they captured the Ardent, as already mentioned; after which they returned, without making the least attempt to effect a landing. The British admiral made good his entrance into the Channel without opposition, on the enemy quitting it, which a strong easterly wind obliged them to do; and he endeavoured to entice them up the Channel in pursuit of him; but the great sickness and mortality on board their ships obliged them to retire, in order, as they alleged, to recruit the health of their crews. Thus ended the first, and indeed the greatest exploit performed by the combined fleets in the British seas. An annual parade of a similar kind was afterwards kept up, and as formally opposed on the part of the British; but no act of hostility was ever committed by either

of the Channel fleets against each other.

Though the pusillanimity manifested by the combined fleets was such that the French themselves were ashamed of it, the appearance of them in the Channel furnished opposition with abundance of matter for declamation. All ranks of men, indeed, now began to be wearied of the American war; and even those who had formerly been the most zealous in recommending coercive measures were at length convinced of their utter inutility. The calamitous effects produced by the continuation of these measures, indeed, had by this time rendered the greater part of the people exceedingly averse to the war; and the almost universal wish was, that the oppressive burden of the American contest should be cast off, and the entire national strength exerted against those whom we had been accustomed to consider as our natural enemies. Nevertheless, the national spirit continued to be exerted with unabated vigour. Large sums, subscribed in the several counties, were employed in raising volunteers, and forming them into independent companies; and associations were also entered into in the towns, where the inhabitants bestowed a considerable portion of their time in training them-selves to the use of arms. The East India Company, too, forgot their quarrels with ministry, and not only presented government with a sum sufficient for levying six thousand seamen, but at its own cost added three seventy-four gun ships to the navy.

Administration, however, not yet weary of the plans which they had originally adopted, seemed still inclined to prosecute schemes of conquest. The virulence of opposition continued unabated; and, what was worse, every part of the kingdom seemed to imbibe the sentiments of the minority in parliament. Amongst the charges now brought against ministers was that of misapplying the national force. An hundred thousand men were employed for the internal defence of the kingdom. The army of Great Britain at this time fell little short of three hundred thousand men; the navy amounted to three hundred sail, including frigates and armed vessels; twenty millions had been expended on the service of the year 1779; and yet, with all this force and treasure, the utmost boast that ministers could make was, that the enemy had hitherto been kept at bay. Nor were the other charges of a less grave description. Veteran officers had been passed over to make room for persons of inferior merit; whilst the discontents and miserable state

Reign of of Ireland, the loss of the West India islands, and other worse. The first proposition in Mr Burke's plan was to Reign of their dismission. To all this ministry replied by denying or attempting to refute every allegation, and at last, after several stormy debates, gained their point of an address without an amendment, by large majorities in both houses.

But the enormous expense incurred in carrying on the war occasioned such general alarm, that it was no longer possible to refuse complying with some scheme of economy, or at least giving it a patient hearing. The Duke of Richmond proposed that the crown should set the example, and moved for an address to this purpose; but the motion was negatived. The Earl of Shelburne next brought the subject under the consideration of parliament; and having, in a very elaborate speech, compared the expenses of former times with the present, and shown the immense disparity, he moved that the expenditure of the vast sums annually sunk in extraordinaries should be brought under some control, and that to extend the public expenses beyond the sums granted by parliament, was an invasion of its peculiar and exclusive rights. But although the Earl of Shelburne's motion was rejected, and some others of a similar tendency shared the same fate, the minds of the people were far from being conciliated to the views of ministers. On the contrary, an opinion began to prevail that they exercised an unconstitutional influence over the representatives of the nation, and that as this influence had recently been greatly augmented, nothing short of a change in the constitution of parliament could remedy the evil complained of. Accordingly, on the 30th of December 1779, a petition to this effect was framed in the city of York, where a number of the most respectable people in the county had assembled; and sixty-one gentlemen were appointed as a committee for carrying into effect the object contemplated by the petitioners. The York petition was followed by others of a similar description from twenty-seven of the principal counties and largest towns in England; while severe and even opprobrious language was used in the county meetings respecting both the ministry and the parliament.

The emissaries of America and the other enemies of Great Britain are said to have been active in fomenting these discords, which at this period rose to a height unknown for a century past. But the ministry continued firm, and, previous to taking any of the petitions into consideration, insisted on going through the business of the supplies.

At length, in the beginning of February 1780, a plan was brought forward by Mr Burke, for securing the independence of parliament, and introducing economy into the various departments of government. He proposed the abolition of the offices of treasurer, comptroller, and cofferer of the household; of treasurer of the chamber, master of the household, the board of green cloth, and several other places under the steward of the household; of the great and removing wardrobe, the jewel office, the robes, board of works, and the civil branch of the board of ordnance. Other reformations were also suggested; but though the temper of the times obliged the minister to admit the bills, and even to pretend an approbation of the plan, he had no serious intention of acquiescing in the scheme to its full extent, or indeed in any part, if he could possibly help it. When the plan, therefore, came to be considered in detail, he was provided with objections to every part of it. But the general temper of the people without doors had now affected many of the members of parliament, and caused them to desert their old standard. An economical plan proposed in the House of Lords by the Earl of Shelburne was rejected by a narrow majority, and in the lower house matters went still

George III. disasters, were all put to the account of ministers; and it abolish the office of secretary of state for the colonies; George IIL was alleged that the universal cry of the nation was for and the utmost efforts of administration could preserve this office only by a majority of seven. The board of trade, however, was abolished by a majority of nine; but this was the only defeat sustained by ministry at present, all the rest of the plan being rejected excepting only one clause, by which it was enacted that the offices of lieutenant and ensign in the yeomen of the guards should no longer be sold, but given to officers in the army and navy on half pay, and of fifteen years' standing in their respective departments of service.

But the administration were destined to sustain a still more mortifying defeat than that which they had met with in the abolition of the board of trade. The 6th of April being the day appointed for taking into consideration the numerous petitions already mentioned, the subject of these was introduced by Mr Dunning, in an elaborate speech, in which he dwelt on the numerous attempts which had been made to introduce reformation and economy into the plans of government, and which had been defeated by ministerial artifice, or overthrown by mere dint of numbers; and he concluded by moving the celebrated resolution, that " the influence of the crown has increased, is increasing, and ought to be diminished." After a long and stormy debate, this motion was carried; upon which Mr Dunning further moved, that the House of Commons was as competent to examine into and correct abuses in the expenditure of the civil list as in any other branch of the public revenue; and this was followed by a third resolution, moved by Mr Thomas Pitt, that it was the duty of the house to provide an immediate and effectual redress of the abuses complained of in the petitions. The ministry now interposed with a request that nothing further might be done at that sitting; but such was the temper of the house, that both these motions were carried without a division.

Ministry had never experienced such a complete defeat, nor been treated with so much asperity of language. The news of the proceedings of the day were received by the people at large with as much joy as if a complete victory over a foreign enemy had been announced. Opposition, however, though masters of the field at present, did not imagine that they had obtained any permanent victory, and therefore resolved to make the most of the advantages they had gained. Accordingly, at the next meeting it was moved by Mr Dunning, that to ascertain the independence of parliament, and remove all suspicion of its being under undue influence, there should, every session, seven days after the meeting of parliament, be laid before the house an account of all the sums issued out of the civil list, or any other branch of the revenue, since the last recess, in favour of any of its members; and this passed with little difficulty. But when he moved that the treasurers of the chamber and household, the cofferer, comptroller, and master of the household, with the clerks of the green cloth, and their deputies, should be excluded from having seats in the house, a warm debate ensued, and the motion was carried only by a majority of two. This was the last triumph of the popular party; their next motion, for the exclusion of revenue officers, being thrown by a majority of twenty-seven. A final effort was however made by Mr Dunning, who proposed an address to the throne against proroguing or dissolving the parliament, until measures had been taken to prevent the improper influence complained of in the petitions; but on a division the motion was lost by a very considerable majority. Ministry would gladly have screened their friends from the vengeance of opposition, alleging the lateness of the hour, it being then past midnight; but the Speaker perceiving Mr Fox about

Reign of to rise, insisted that the house should remain sitting; and showed that those who professed to be the most strenuous Reign of to hear their conduct set forth in terms such as were never perhaps applied on any other occasion to members of the British senate.

The last victory of administration confirmed the unfavourable opinion which the people had conceived of the majority of their representatives; and in the height of the ill humour which the conduct of the parliament had created in the multitude, those discontents broke out which were so near involving the kingdom in a species of civil The hardships under which individuals of the Roman Catholic persuasion laboured in this country had lately engaged the consideration of enlightened and liberal-minded men; whilst the inutility as well as absurdity of persecuting people from whom no danger was to be apprehended, and who were not suspected of disaffection to the civil constitution of this country, had induced several persons of rank and influence to undertake to procure were laid before the house by Mr Dunning. By these them relief from the disabilities under which they laboured. Meanwhile the calamities of the times had afforded the Catholics a proper occasion for manifesting their attachment to government; and accordingly they presented a loyal and dutiful address to the king, containing the strongest assurances of affection and fidelity to his person and civil government. They declared that their exclusion from many of the benefits of that constitution had not diminished their reverence for it; that they had patiently submitted to such restrictions and discouragements as the legislature thought expedient, and had thankfully received of an enlightened age and the benignity of the British government had gradually produced; that they submissively waited, without presuming to suggest either time or measure, for such other indulgence as the happy causes alluded to could not fail in their own season to effect; that their dissent from the legal establishment in matters of their duty to assure his majesty of their unreserved affection to his government, of their unalterable attachment to the cause and welfare of the country, and their detestation of the designs and views of any foreign power against the dignity of the crown and the safety and tranquillity of the people; and that, though they did not presume to point out the particular means by which they might be allowed to testify their zeal and their wishes to serve the country, they would be perfectly ready, on every occasion, to give such proofs of their fidelity, and of the purity of their intentions, as his majesty's wisdom and the sense of the nation should at any time deem expedient. This address was presented to the king on the 1st of May 1778, and was signed by the Duke of Norfolk, the Earls of Surrey and Shrewsbury, the Lords Stourton, Petre, Arundel, Dormer, Teynham, Clifford, and Linton; and by a hundred and sixty-three commoners of rank and

The only obstacle which stood in the way was the difficulty of overcoming the prejudices of the lower classes, who were disposed to disapprove of and condemn any indulgence shown to those of a persuasion which they had been taught to regard with horror and detestation. But notwithstanding the prepossessions of the vulgar, it was resolved by several individuals of generous and liberal sentiments, to espouse their cause as far as it could be done consistently with the principles of the constitution and the general temper of the times. And the circumstance of their being patronized by some of the principal leaders of opposition was greatly in their favour; for it the Church of Scotland; and a petition on behalf of the

George III. thus the deserters from the popular party were condemned friends of freedom and the constitution did not imagine George III. that these would be endangered by treating the Roman Catholics with more lenity than they had hitherto experienced. Accordingly, about the middle of May, Sir George Saville made a motion for the repeal of some of the disqualifications under which the Catholics laboured. He grounded his motion on the necessity of vindicating the honour and asserting the true principles of the Protestant religion, of which the peculiar merit consisted in an abhorrence of persecution. He represented the address above quoted as a convincing proof of the loyal disposition of the Roman Catholics, and as an unfeigned testimony of the soundness of their political principles; and, to silence the objections of those who might suspect the Catholics of duplicity, a test was proposed of so binding and solemn a nature, that no authority could annul its efficacy.

The pains and penalties of the statutes to be repealed statutes it was made felony in a foreign clergyman of the Catholic communion, and high treason in one who was a native of this kingdom, to teach the doctrines, or perform divine service according to the rites, of that church; the estates of persons educated abroad in the Catholic persuasion were forfeited to the next Protestant heir; a son, or any other nearest relation, being a Protestant, was empowered to take possession of his own father's, or nearest kinsman's estate, during their lives; and a Roman Catholic was disabled from acquiring any legal property by purchase. The mildness of the British government did such relaxation of the rigour of the laws as the mildness not indeed countenance the enforcement of the severities enacted by these statutes; but still the prospect of gain subjected every man of the Roman Catholic persuasion to the ill usage of informers; and on the evidence of such miscreants the magistrates were bound, however unwilling, to put these cruel laws in execution.

In consequence of such representations, the motion made religion was purely conscientious; that they held no in favour of the Roman Catholics was received without opinions adverse to his majesty's government, or repug- a dissentient voice; and a bill conformable thereto was nant to the duties of good citizens; that they thought it brought into and passed through both houses. The test or oath to be taken by the Catholics was conceived in the strongest terms. They were to swear allegiance to the king's person and family, and to abjure especially the pretensions to the crown assumed by the person called Charles III. They were to declare their disbelief and detestation of the doctrines, that it is lawful to put individuals to death on pretence of their being heretics; that no faith is to be kept with heretics; that princes excommunicated by the pope and council, or by the see of Rome, or any other authority, may be deposed or murdered by their subjects or by any others; and that the pope of Rome, or any other foreign prelate or sovereign, is entitled to any temporal or civil jurisdiction or pre-eminence, either directly or indirectly, in this kingdom. And they were solemnly to profess, that they made the aforesaid declarations with the utmost sincerity, and in the strictest and plainest meaning of the words and language of the test, without harbouring a secret persuasion that any dispensation from Rome, or any other authority, could acquit or absolve them from the obligations contracted by this oath, or declare it null and void.

The favour shown to the Roman Catholics in England encouraged those of the same persuasion in Scotland to hope for a similar relief; and several Scottish gentlemen of high rank and character, who had seats in the house, not only expressed their warmest wishes for the extension of the indulgence to their own country, but declared their intention to bring in a bill for the purpose the ensuing session. The design was approved of by the General Assembly of

1780.

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Reign of Roman Catholics in Scotland was in consequence prepared. the secret fears of others, who still imagined that it was Reign of But these favourable prospects were for a time obscured by a dense cloud of religious fanaticism, looming large and high in the political horizon. A pamphlet appeared, in which the doctrines and professors of the Roman Catholic religion were represented, the former as damnable, and the latter as the common foes of mankind and the disturbers of all states; and this inflammatory production being circulated among every class, raised up a great number of enemies to the intended petition. The opposition was at first chiefly conducted by persons at Edinburgh, who assumed the title of The Committee for the Protestant Interest, and under that denomination carried on a correspondence with all those who coincided in their opinions, being in fact a very large proportion of the common people in Scotland. This committee, from its residence in the capital of the kingdom, was naturally supposed to consist of persons of weight and influence; and hence it in a manner directed the motions of all the others. The persons of whom it was composed, however, acted from honest though mistaken views. They aimed only at the preservation of the Protestant religion and the liberties of their country, which they conceived to be endangered by the indulgence shown to individuals of the Roman Catholic persuasion; and, actuated by these ideas, they exerted themselves so effectually, that the principal gentlemen of the Catholic persuasion thought it requisite to convey to the ministry an intimation of their desire to desist for the present from applying for an indulgence similar to that which had been extended to their fellow-subjects of the same communion in England. They published also in the newspapers the representation which they had made to the ministry, in hopes of convincing the country that they were sincerely disposed to remove any cause of dissatisfaction on their own account, and to submit to any inconvenience rather than occasion disturbance, even in the prosecution of a lawful and praiseworthy object. But matters had now gone too far to be conciliated by any concessions.

On the 2d day of February 1779, the populace met according to appointment, in order to carry into execution the various projects which they had in contemplation. They began by an attack upon the house inhabited by the Roman Catholic bishop, and others of his persuasion, which they committed to the flames, together with the place of worship adjoining to it; and having in the same manner destroyed another house, which also contained a chapel, they proceeded to vent their resentment on several individuals of the same persuasion by burning their effects. The next objects of their vengeance were those who had patronised the Roman Catholics. They beset the houses of Dr Robertson and Mr Crosby; but the friends of these eminent persons, on hearing of the intentions of the rioters, came to their assistance in such numbers, and so well prepared to repel force by force, that the populace did not dare to commit the violence they had premeditated. This spirited conduct, which was followed by the adoption of the necessary precautions against their malevolent designs, the spirit of dissatisfaction on account of the intended inconsequence loaded with the most outrageous invectives.

Matters, however, did not stop here. The same ungo-

as powerful a degree as if the nation were actually under rowly escaped being murdered. the impending horrors of persecution. To this were added

not inconsistent with good policy to discourage a religion, George IIL from the professors of which so much danger had accrued to the constitution of this country in former times, and who, though averse to acts of violence, thought it necessary to keep alive the antipathy to the ancient faith, and by no means to show a willingness to grant any further indulgence than it had hitherto experienced. On these grounds they were of opinion, that a suspension of the laws enacted against it, although tacit and unauthorized, was sufficient to remove all complaints of harshness and oppression on the part of the Roman Catholics; and they looked upon the penal statutes as a requisite bar to confine the Catholics within the bounds of due submission to the laws of a Protestant state.

Hence a society was formed in London, under the designation of the Protestant Association, and Lord George Gordon, who had rendered himself conspicuous in Scotland by his opposition to the repeal, was elected its president; and this body now prepared to act in a decisive manner

against the resolutions of the legislature.

On the 29th of May 1780 the members of the association held a meeting in order to settle as to the manner in which they should present a petition to the House of Commons against the repeal of the penal statutes; and on this occasion a long speech was delivered by the president, who represented the Roman persuasion as gaining ground rapidly in the country, and affirmed that the only method of stopping its progress, was to go up with a spirited remonstrance to their representatives, and to tell them in plain and resolute terms that they were determined to maintain their religious freedom against all enemies, and at whatever This harangue being received with the loudest applause, Lord George next moved that the whole body of the association should meet on the second day of June, in St George's Fields, at ten in the morning, to accompany him to the House of Commons for the presentation of the petition; which was also assented to unanimously. Lord George then informed the meeting, that if he found himself attended by fewer than twenty thousand persons he would not present the petition; he directed them to form into four divisions, the first, second, and third consisting of those who belonged to the city, Westminster, and Southwark, and the fourth of the Scottish residents in London; and all were requested, by way of distinction, to wear blue cockades in their hats. Three days previous to the presentation of the petition, he gave notice of it in the ordinary form to the house, and stated the manner in which it was to be presented; but this was received with as much indifference and unconcern as all his former intimations.

On the second day of June, according to appointment, about fifty or sixty thousand persons assembled in St George's Fields; and drawing up in four divisions, as had been arranged, proceeded to the parliament house, with Lord George Gordon at their head. An immense roll of parchment was carried before them, containing the names of those who had signed the petition. On their way to the put an end to the attempts of the mob at Edinburgh. But house they behaved with propriety and decency; but immediately on their arrival disturbances commenced. The dulgence remained in full force; and ministry being held rioters began by compelling all the members of both out as harbouring a secret determination to undermine houses whom they met to put blue cockades in their hats, the Protestant religion, and to introduce popery, were in and call out "No Popery;" they forced some to take an consequence loaded with the most outrageous invectives. oath that they would vote for the repeal of the popery act, as they styled it; and they treated others with great vernable spirit was soon communicated to a part of the indignity, posting themselves in all the avenues to both English nation; the cry against popery became daily houses, the doors of which they twice endeavoured to louder among the inferior classes; and that inveteracy break open. But their rage was chiefly directed against which time appeared to have mitigated began to revive in the members of the House of Lords, several of whom nar-

During these disturbances Lord George Gordon moved

Reign of for leave to bring up the petition, which was readily grant- bers perished through intoxication. It was not until the Reign of George III. ed; but when he moved that it should be taken into immediate consideration, his proposal was strenuously opposed by almost the whole house. Enraged at this opposition, he came out several times to the people during the debate, acquainting them how averse the house appeared to grant their petition, and naming particularly those who. had spoken against it. Several members of the house expostulated with him in the warmest terms on the unjustifiableness of his conduct; and one of his relations, Colonel Gordon, threatened to run him through the moment any of the rioters should force their entrance into the house. It was some hours before the house could carry on its deliberations with any regularity, which was not done till the members were relieved by the arrival of a party of the guards. As soon as order had been restored, the business of the petition was resumed, when Lord George Gordon told the house that it had been signed by nearly a hundred and twenty thousand British Protestant subjects, and he therefore insisted that the petition should be considered without delay. But notwithstanding the dangers with which they were menaced, and the proof which the mover of the petition had given that no means would be left unemployed to compel them to grant it, the Commons continued immovable in their determination, and of two hundred members then present in the house, six only voted for taking the petition into immediate consideration.

In the mean time the mob had dispersed itself into va-Roman Catholic chapels belonging to foreign ministers, and openly vented the most terrible menaces against all persons of that persuasion. On the 4th of June they assembled in great numbers in the eastern parts of London, and attacked the chapels and houses of the Roman Cathothey threw into the street, and committed to the flames. They renewed their outrages on the following day, destroyinto parliament the bill in favour of the Roman Catholics. On the 6th both houses met as usual; but finding that no business could be done, they adjourned to the 19th.

solute masters of the metropolis and its environs. Some chapels belonging to foreign ministers having been seized and sent to Newgate, the mob collected before that priing refused, they proceeded to throw into the keeper's house firebrands and all manner of combustibles, which communicating fire to that and other parts of the building, the whole of the immense pile was soon in flames. Amidst this scene of confusion, the prisoners, amounting to about three hundred, were all released, including several who were under sentence of death. In the same manner they set fire to the King's Bench and Fleet prisons, and to a number of houses belonging to Roman Catholics. The terror occasioned by these incendiaries was such that most people hung out of their windows pieces of blue silk, on their doors and shutters the words "No Popery," by way of signifying they were friendly to their cause.

The night of the 7th of June concluded these horrors. Not less than thirty-six different conflagrations were counted at the same time. The Bank had been threatened, and was twice assailed; but being well guarded, both attempts failed. In the evening large bodies of troops arrived from all parts, happily in time to put a stop to the progress of the rioters, and falling upon them wherever they ap-

afternoon of the 8th, however, that people began to recover George III. from their consternation. During the greater part of the day, the disorders of the preceding night had created so terrible an alarm, that the shops were almost universally shut in every part of London. Nor were the melancholy effects of misguided zeal confined solely to the capital. The outrageous disposition of the populace was preparing to enact the like horrid scenes in other parts of England, and the mob actually rose in Hull, in Bristol, and in Bath; but through the timely interposition of the magistracy, these places were saved from their fury.

1780.

On the subsiding of this violent and unexpected commotion, Lord George Gordon was arrested, and committed close prisoner to the Tower after having undergone a long examination before the principal lords of the council.

On the 19th of June both houses met again pursuant to adjournment; and on this occasion a speech was read from the throne, acquainting them with the measures which had been taken in consequence of the disturbances, and assuring them of the readiness of the crown to concur in any measures that might contribute to the maintenance of the laws and liberties of the people. The speech was highly approved; but the conduct of administration was severely censured, and charged with unpardonable neglect for not calling forth the civil power, and employing the military in due time to obviate the mischiefs which had been committed. Ministry excused itself, rious parts of the metropolis, where they demolished two however, on the ground of not having sufficient strength to answer all the demands of assistance that were made during the riots, and the absolute impossibility of suppressing them till the arrival of troops from the country. The various petitions which had been presented for the repeal of the act which had occasioned the riots, were lics in that quarter, stripping them of their contents, which now taken into consideration; but the house continued in the same mind as formerly. Nevertheless it was thought proper to yield somewhat to the prejudices of the people, ing several Romish chapels, and demolished the house of by passing a bill for preventing persons of the popish per-Sir George Saville, in resentment of his having brought suasion from teaching or educating the children of Protestants; but this was afterwards thrown out by the Lords.

Nothing could have happened more opportunely for the ministry than the Protestant riots; for such were the During this and the following days the rioters were ab-alarm and terror occasioned by them, that the ardour which had been manifested in favour of popular meetings of those who had been concerned in the demolition of the and associations, as they were called, for opposing the measures of government, was in a great degree suppressed. The county meetings were also represented as havson, and demanded their immediate release; and this be- ing a tendency, like the Protestant association, to bring on insurrections and rebellions; many began to consider all popular meetings as extremely dangerous; and among the commercial and monied classes, some were so panicstruck by the late riots, that all attention to the principles of the constitution was overruled by their anxiety about the preservation of their property. Had it not been for these events, it is probable that the spirit of opposition which then prevailed in the different counties would have compelled administration to make some concessions to the people.

In the suppression of these riots, however, the interfewhich was the colour assumed by the rioters, and chalked rence of the military without the command of the civil magistrate became a matter of suspicion to the country; and in the House of Lords the Duke of Richmond expressed a desire that some of his majesty's ministers would rise and give their lordships assurances, that the measures taken in order to suppress the riots, which were defensible only upon the ground of necessity, would be so stated, and that what had been illegally done, on the ground of necessity, would be cured by an act of indemnity. Various other observations were thrown out relative peared, multitudes were killed and wounded, whilst num- to the king's prerogative and to military law; upon which

Reign of Lord Mansfield observed, that neither the king's preroga- and the king was understood to be invested with a power Reign of George III. tive nor military law had any thing to do with the conduct of government in their endeavours to quell the late outrages. All men, of all ranks, descriptions, and denominations, were bound, by their oath of allegiance, to interpose for the prevention of acts of high treason or felony, wherever any attempts to perpetrate such crimes were made in their presence, and were criminal if they refused to do so. In the whole of these proceedings, therefore, the military had not acted in their technical capacity as military, but had merely exercised their duty as civil men, which they, in common with other civil men, had both a right and an obligation to exercise. When a body of men were convened, without proceeding to the actual perpetration of treasonable or felonious acts, then the presence of the civil magistrate was necessary before the military could interpose at all; and for this reason, that as no acts of felony were committed, they could have no plea in their civil character for meddling at all. But by the statute law of the country, it became felonious in any combination of men to persevere in that combination after the riot act had been read by a justice of the peace; and this being done, they had then, and not till then, a constitutional reason for their interposition, namely, the privilege and duty of hindering the commission of felony whenever

they had it in their power to do so. This extraordinary doctrine was far from being agreeable to the nation in general, and was very freely censured in publications of all kinds. It was admitted, that if soldiers came accidentally as individuals to any place where felonies were committing, they might interfere, as well as others of the king's subjects, in the prevention of them. But this was a different case from that of bodies of armed troops being sent under officers commissioned by the king, and with orders to act against riotous and disorderly persons without any authority from the civil magistrate. The constitution of England knew no such character as a mercenary soldier, at the sole will of the executive power. Soldiers were held to their duty by laws which affected no other part of the community; and no soldier, as such, could be employed in the service of the constitution without a particular act of parliament in his favour. The idea that a military man was convertible into a soldier or a citizen, as royalty might move its sceptre, was a novelty got up for the present occasion. Mercenary armies were understood to consist of men who had either detached themselves or been forced from civil societies; and on these suppositions laws were made regarding their liberties and lives, such as no members of civil society could submit to. Soldiers were only tolerated by annual bills, and under repeated pretences; and the very idea of blending them with the common subjects of the state, and giving persons of their description a right of judging on its most important occurrences, would have filled our ancestors with horror. The laws tolerated an army for certain periods, and under certain restrictions; but there was no existing law which admitted the interference of the military in any of the operations of civil government. It was acknowledged that the late atrocious riots had rendered an extraordinary exertion of power absolutely necessary; but it was at the same time contended, that the interposition of the army in those outrages, without any authority from the civil magistrate, was an act of prerogative unconstitutional and illegal, although perfectly seasonable and beneficial. The public safety and benefit might sometimes excuse exertions of power, which would be injurious and tyrannical on ordinary occasions; but the utmost care ought to be taken that such extraordinary exertions should not be established as precedents, which might operate fatally to the constitution. If a large standing army was kept up,

of ordering the troops to act discretionally whenever he George III. should judge proper, without any authority from the civil magistrate, the people could have no possible security for

their liberties. We now proceed to notice the operations of the war, which, notwithstanding the powerful confederacy against Great Britain, were rather in her favour than otherwise. The Spaniards had commenced their military operations with the siege of Gibraltar, but with very little success; and the close of the year 1779, and beginning of 1780, were productive of considerable naval advantages to Great Britain. On the 18th of December 1779, the fleet under the command of Sir Hyde Parker in the West Indies captured nine sail of French merchant ships under the convoy of some ships of war; and two days afterwards he detached Rear-Admiral Rowley in pursuit of three large French ships, which were supposed to form part of M. la Motte-Piquet's squadron returning from Grenada. About the same time several other vessels were taken by the same squadron commanded by Sir Hyde Parker. On the 8th of January 1780, Sir George Brydges Rodney, who had been intrusted with the command of a fleet, one object of the destination of which was the relief of Gibraltar, fell in with twenty-two sail of Spanish ships, and in a few hours captured the whole fleet. In little more than a week afterwards the same fortunate admiral met with still more signal success. On the 16th of the month he engaged, near Cape St Vincent, a Spanish fleet, consisting of eleven sail of the line and two frigates, under the command of Don Juan de Langara. The Spaniards made a gallant defence; but four of their largest ships were taken, and carried into Gibraltar. These were, the Phoenix of eighty guns and seven hundred men, on board of which was the Admiral Don Juan de Langara; the Monarca, of seventy guns and six hundred men, Don Antonio Oyarvide commander; the Princessa, of seventy guns and six hundred men, Don Manuel de Leon commander; and the Diligente, of seventy guns and six hundred men, Don Antonio Abornoz commander. Two other seventy gun ships were also taken; but one of them was driven on shore on the breakers and lost, and the other was likewise driven on shore, but afterwards recovered. Four ships of the line and the two frigates escaped; but two of the former were much damaged in the action, during which one ship, the San Domingo, of seventy guns and six hundred men, was blown up. The five men of war taken were remarkably fine ships, and being afterwards completely refitted and manned, were put into the English line of battle. The Spanish admiral and his officers applied to Sir George Rodney to obtain the liberty of returning to Spain upon their parole of honour; but this he declined for some time, having received information that a great number of British seamen, who ought to have been released, were then prisoners in Spain. However, having afterwards received assurances that these captives would be immediately set at liberty, he released the Spanish admiral and officers upon their parole; and the

of Madrid and the Spanish nation. When Admiral Rodney had supplied the garrison of Gibraltar with provisions, ammunition, and money, he proceeded on his voyage to the West Indies; having sent home part of his fleet, with the Spanish prizes, under the command of Rear-Admiral Digby. On the twentieth of March an action was fought in the West Indies, between some French and English men of war, the former under the command of M. de la Motte-Piquet, and the latter, forming part of Sir Peter Parker's squadron, under that of Commodore Cornwallis. The contest was maintained

prisoners in general were treated with a generosity and

humanity which made a great impression upon the court

Reign of on both sides with great spirit; but the French were at three millions of dollars were secured by the victors, and Reign of George III. length forced to sheer off, and make the best of their way

for Cape François. 1780.

Soon after Admiral Rodney had arrived in the West Indies, and assumed the command of his majesty's ships at the Leeward Islands, an action took place between the fleet under his orders and that of the French under the command of Count de Guichen. This occurred on the 17th of April. The British squadron consisted of twenty ships of the line, besides frigates; and the French fleet of twenty-three ships of the line, and several frigates. The action began a little before one, and continued till about a quarter after four in the afternoon. Admiral Rodney was on board the Sandwich, a ninety gun ship, which beat three of the French ships out of their line of battle, and entirely broke it. But the Sandwich and several other ships were so much crippled that an immediate pursuit was impossible, without compromising the safety of the disabled ships. The victory was accordingly claimed by both sides, but no ship was taken on either, and the French retired to Guadaloupe. Admiral Rodney's ship, the Sandwich, had suffered so much, that for twenty-four hours she was with difficulty kept above water. Of the British upwards of three hundred were killed and wounded in this engagement. On the 15th of May another action took place between the same commanders. But as it did not commence till near seven in the evening, and only a few ships were engaged, nothing decisive took place. The fleets met again on the 19th of the same month, when a third action ensued; but this, like the former, terminated without any material advantage to either side. On this occasion the British lost upwards of two hundred men killed and wounded; while, according to the French accounts, the total loss sustained by the enemy in the three actions, amounted to nearly a thousand killed and wounded. The preceding details show that the French at this time had a formidable fleet in the West Indies; and its force was augmented in June by the junction of a Spanish squadron near the island of Dominica; so that the French and Spanish fleets, when united, amounted to thirty-six sail of the line. Notwithstanding their superiority, however, they did not attack any of the British islands, nor even reconnoitre the fleet under the command of Sir George Brydges Rodney, which then lay at anchor in Gros Islet bay. By the vigilance and good conduct of the admiral, indeed, their efforts were in a great measure paralysed; and so sensible were the inhabitants of these islands of his services, that the houses of assembly of St Christophers and Nevis presecurity which they enjoyed in consequence of his spirited and seasonable exertions.

In the month of June, Admiral Geary, who commandbound from Port-au-Prince to Bourdeaux and other ports of France; but in the month of July a very unexpected and important capture was made by the Spaniards, which excited considerable alarm in Great Britain. On the 8th of August, Captain Moutray, who had under his command the Ramillies of seventy-four guns, and two frigates, with a fleet of merchantmen bound for the East and West Indies under convoy, had the misfortune to fall in with two frigates escaped; but the rest were so completely sur-Spaniards for the capture of Fort Omoa, where upwards of given an order to fit out a considerable naval force; that

other valuable commodities, including twenty-five quintals George III. of quicksilver, for extracting the precious metals from their ores, and the loss of which consequently rendered the mines useless.

But whilst the British were making the most vigorous efforts, and upon the whole gaining advantages over the powers who opposed them in the field, enemies were raised up throughout all Europe, who, by reason of their acting indirectly, could neither be opposed nor resisted. The power which most decidedly manifested its hostile intentions was Holland; but besides this, a most formidable confederacy, under the title of the Armed Neutrality, was formed, evidently with the design of crushing the power of Great Britain. Of this powerful confederacy the empress of Russia avowed herself the head; and her resolution was intimated on the 26th of February 1780, in a declaration addressed to the courts of London, Versailles, and Madrid. In this paper it was alleged, that her imperial majesty's subjects had often been molested in their navigation, and retarded in their operations, by the ships and privateers of the belligerent powers; that she found herself under the necessity of removing the vexations which were offered to the commerce of Russia, as well as to the liberty of commerce in general, by all the means compatible with her dignity and the welfare of her subjects; but that before adopting any serious measures, and to prevent all new misunderstandings, she thought it just and equitable to expose to the eyes of all Europe the principles which she had adopted as the guides of her conduct.

And these were contained in the following propositions: First, that neutral ships should enjoy a free navigation, even from port to port, and on the coasts of the belligerent powers; secondly, that all effects belonging to the subjects of the belligerent powers should be looked upon as free on board such neutral ships, excepting only such goods as were stipulated contraband; thirdly, that the principles recognised, and the articles enumerated as contraband, in the treaties between Great Britain and Russia in 1734 and 1766, should still be adhered to. In the former it was provided, that "the subjects of either party may freely pass, repass, and trade in all countries which now are, or hereafter shall be, at enmity with the other of the said parties, places actually blocked up or besieged only excepted, provided they do not carry any warlike stores or ammunition to the enemy," whilst, " as for all other effects, their ships, passengers, and goods, shall be free and unmolested; but," that " cannons, mortars, or other warlike sented addresses to him, testifying their gratitude for the utensils, in any quantity beyond what may be necessary for the ship's provision, and may properly appertain to and be judged necessary for every man of the ship's crew, or for each passenger, shall be deemed ammunition of war; ed the grand fleet, took twelve valuable merchant ships and if any such be found, they may seize and confiscate the same according to law; but neither the vessels, passengers, nor the rest of the goods, shall be detained for that reason, or hindered from pursuing their voyage." And in the treaty of 1766 the same enumeration was given of the goods stipulated as contraband, as in the treaty of 1734. Her imperial majesty further proposed, fourthly, that in order to determine what characterizes a port blocked up, that denomination should not be granted, except to places the combined fleets of France and Spain, which had sail- before which there were actually a number of enemy's ed from Cadiz the preceding day. The Ramillies and the ships stationed near enough to render its entry dangerous; and, lastly, that these principles should serve as rounded, that five East Indiamen, and fifty merchant ships rules in judicial proceedings and in sentences as to the bound for the West Indies, were taken. This was one of legality of prizes. Her imperial majesty declared, that the most complete naval captures ever made, and proved she was firmly resolved to maintain these principles; that, a heavy stroke to the commerce of Great Britain. The in order to protect the honour of her flag and the security prize, however, great as it was, scarcely compensated the of the commerce and navigation of her subjects, she had

1781.

Reign of this measure, however, would have no influence on the body to conclude a treaty with Holland. Mr Laurens Reign of George III strict and rigorous neutrality which she was resolved to observe, as long as she should not be forced to depart from her principles of moderation and impartiality; and that it was only in such an extremity that her fleet would be ordered to act, wherever honour, interest, or necessity, should require. This declaration was also communicated to the States-general by Prince Galitzin, envoy extraordinary of Russia, who invited them to make common cause with the empress for the protection of commerce and navigation; and similar communications and invitations were made to the courts of Copenhagen, Stockholm, and Lisbon, in order, as was alleged, that the navigation of all the neutral trading nations might be established and legalized, and a system adopted founded upon justice, and calculated to serve as a sort of maritime code for future

The memorial of the empress of Russia, though proceeding upon principles unfavourable to the views of Great Britain, and incompatible with her maritime superiority, received a civil answer from that court; but other powers, as might have been expected, received it with far greater cordiality. In the answer of France it was observed, that what her imperial majesty claimed from the belligerent powers was nothing more than the rules prescribed to the French navy; the execution of which was maintained with an exactness known and applauded by all Europe. Strong approbation was expressed of the principles and views of her imperial majesty; and it was declared, that from the measures now adopted by Russia, solid advantages would undoubtedly result, not only to her subjects, but also to those of all nations. Sweden and Denmark likewise acand the States-general, after an interval of some months, followed their example. It was further resolved by the parties to this armed league, to make common cause at sea against any of the belligerent powers who should violate, with respect to neutral nations, the principles which had been laid down in the memorial of Russia.

But though the British ministry could not openly engage in war with all the other powers of Europe, they determined to take signal vengeance on the Dutch, whose base ingratitude and perfidy now became a subject of ever since the commencement of hostilities with the Americans, the Dutch had shown a decided inclination in their favour; and this partiality continued to be evinced to a degree beyond what might have been expected from the natural avidity of a mercantile people. Frequent me-morials and remonstrances had in consequence passed between the two nations, and the breach gradually grew wider and wider, until at last matters came to extremities, by a discovery that the town of Amsterdam was about to enter into a commercial treaty with America. This came to light in the beginning of September 1780, by the capture of Mr Laurens, lately president of the Ame-

himself was instantly committed prisoner to the Tower, George III. and a spirited remonstrance was addressed to the states of Holland, requiring a formal disavowal of the transaction. The states, however, answered evasively, that they would take the matter into consideration according to the forms and usages of the country, and that a reply would be given as soon as the nature of their government would admit.

The British government could not possibly mistake this pitiful equivocation; and accordingly the most vigorous measures were instantly resolved on. On the 25th of January 1781, it was announced to the House of Commons that his majesty had directed letters of marque and reprisal to be issued against the States-general and their subjects. For the causes and motives of his majesty's conduct in this respect, the house were referred to a public manifesto against that republic, which had been ordered to be laid before parliament. The charges against the republic were briefly summed up by Lord North in his speech on the occasion. The states, he said, had, in open violation of treaties, not only refused to give Great Britain that assistance which those treaties entitled her to claim when attacked by the house of Bourbon, but had also, in direct violation of the law of nations, contributed to furnish France with warlike stores, and had now at length thought proper to countenance the magistracy of Amsterdam in the insult which they had offered to this country, by entering into a treaty with the rebellious colonies of Great Britain, as free and independent states. By the treaty of 1678, it had been stipulated, that in case Great Britain was attacked by the house of Bourbon, she had a right to take her choice of either calling upon the States-general to become parties ceded formally to the armed neutrality proposed by Russia; in the war, and to attack the house of Bourbon within two months, or of requiring an aid of six thousand troops and twenty ships of war, which the states were to furnish immediately after the claim was made. But though this country had always preserved inviolate her faith with Holland, yet that republic had refused to fulfil the terms of this treaty. The States-general had also suffered Paul Jones, a Scotsman, and a pirate, acting without legal authority from any acknowledged government, to bring British ships into their ports, and to refit there.\(^1\) A rebel privateer had in like manner been saluted at the Dutch island of St Eugeneral speculation. It has already been observed, that statius, after she had been suffered to capture two British ships within cannon-shot of their forts and castles. A memorial had been presented at the Hague in June 1779, on the breaking out of the war with Spain, to claim the aid we were entitled to require by the treaty of 1678; but of this not the least notice had been taken on the part Two other notices had since been deliverof the states. ed, each of which met with the same reception. The British ministry had done all in their power to bring the states to a true sense of their interest; and when the necessity of the case compelled them to seize on the Dutch ships carrying stores to France, they had paid the full value of the cargoes, and returned the ships; so that neirican congress, and who had been empowered by that ther the private merchant, the private adventurer, nor the

¹ This man, who had formerly been a servant in Lord Selkirk's house, had landed in 1778, and plundered it of the plate, but without doing any further mischief. The action, however, proved very disagreeable to his own party; and, at the desire of Dr Franklin, the plate was afterwards restored. After this exploit he attempted to set fire to the town of Whitehaven, but without success. In 1779 he made a descent on the coast of Ireland, but without committing any act of hostility: his people indeed carried off some sheep and oxen, but their captain paid liberally for what they had taken. In the month of September 1779, he appeared in the Frith of Forth with several prizes, and advanced up above the island of Inchkeith, so as to be nearly opposite to Leith. His design was supposed to have been to burn the shipping there; but he was prevented from attempting this by a strong westerly wind; and such measures were also taken for the defence of the harbour, by erecting batteries and otherwise, that he would probably have miscarried had any attempt been made by him. On leaving the coast of Scotland he fell in with the Scrapis and Scarborough, both of which he took after a desperate engagement, in which these vessels were reduced to almost total wrecks. These prizes were carried by Jones into a Dutch harbour; and it was this transaction to which Lord North now alluded. He was called a pirate, on account of his not being at that time properly furnished with a commission either from France or America; though this was denied by the opposite party.

George III. convenience, by her being deprived of that assistance which she would have received from those cargoes. The minister lamented the necessity of a war with Holland; but it appeared to him to be unavoidable. The difficulties with which the nation had to struggle were certainly great; but they were by no means insuperable. He was neither desirous of concealing their magnitude, nor afraid to meet them, great as they must be acknowledged; convinced, that when the force of this country was fully exerted, it would be found equal to the contest, and that the only means of obtaining an honourable and a just peace, was to show ourselves capable of carrying on the war with spirit and vigour.

But before this resolution could have been communicated officially to the naval commanders in the West Indies, the Dutch were actually attacked. The island of St Eustatius was, on the 3d of February 1781, summoned by Admiral Rodney and General Vaughan to surrender to the arms of Great Britain, and only one hour was given for consideration. Submission was inevitable. The island accordingly surrendered; the property found on it was confiscated, and a sale instituted, with circumstances of rapacity which afterwards became the subject of a discussion in parliament, and drew upon the nation the ill will of all Europe. The Dutch in fact seem to have acted with great imprudence, and, notwithstanding their provoking conduct towards Britain, to have made no preparations for war in the event of being attacked. But in spite of this inactivity, they still retained much of their ancient valour, and were had to contend with.

By August 1781 they had equipped a considerable squadron, the command of which was given to Rear-admiral Zoutman; and on the 5th of that month this squadron fell in with the British fleet commanded by Admiral Hyde Parker. The force under Zoutman consisted, according to the Dutch account, of one ship of seventy-four guns, one of sixty-eight, one of sixty-four, three of fifty-four, and one of forty-four, besides frigates; but the English account states the hostile fleet to have consisted of eight two-decked ships. No gun was fired on either side till the fleets were within half musket-shot distance. The action began about eight in the morning, and continued with the utmost fury for three hours and forty minutes. Both sides fought with equal ardour, and little advantage was gained by either. When the action ceased, both squadrons lay like logs on the water; but after a time the Dutch ships of war, with their convoy, bore away for the Texel, whilst the English were too much disabled to follow them. A Dutch seventy-four gun ship sunk soon after the action. On board the British fleet upwards of four hundred were killed and wounded; and the loss of the Dutch was probably greater. Admiral Zoutman, in his account of the engagement, states that his men fought like lions; and the British admiral, in the dispatch transmitted by him to the admiralty, observes that his majesty's officers and men behaved with great bravery, nor did the enemy show less gallantry.

The impossibility of crushing the power of Great Britain by any force whatever was now beginning to be evident even to her most inveterate enemies. In Europe, the utmost efforts of France and Spain were able to effect nothing more than the annual parade of a mighty fleet in the Channel; and this called forth the apparition of a British fleet, so formidable that the enemy never durst attack it. The states of Holland had sent out their force; and this too was opposed by one which, if insufficient to conquer, was at least able to prevent their effecting any

Reign of states, had suffered any loss. France only had felt the in- the united powers of the French and Indians had been con- Reign of quered, and the Dutch settlements had suffered severely. George III

> In the year 1781, however, the British naval power in the West Indies seemed to sink, and some events took place which threatened serious results. This was owing to the great superiority of the combined fleets of France and Spain, by which that of Britain was now so far outnumbered, that it could not achieve any thing of consequence. An ineffectual attempt was made by Admiral Rodney on the island of St Vincents, and an indecisive engagement took place on the 28th of April 1781, between Admiral Hood and the Count de Grasse, the event of which, however, was certainly honourable to Britain, as the French had a superiority of six ships of the line. But the damage done to the British ships having obliged them to retire to Barbadoes to refit, the French availed themselves of the opportunity to effect a descent on the island of Tobago; and although the governor made a gallant resistance, he was at last obliged to surrender. Admiral Rodney had sent Rear-admiral Drake with six sail of the line, three frigates, and some troops, to the assistance of the island; but they were dispatched too late, as the island had capitulated before the intended relief could have reached it.

But the great and decisive stroke, which happened this year, was the capture of Lord Cornwallis, with the division of the army under his command, at Yorktown. This was a great calamity; and other events were sufficiently mortifying. The province of West Florida had been reduced by the Spaniards; Minorca was besieged by them with every prospect of success; the island of St Eustatius had in fact the most formidable naval enemies whom Britain been surprised by the French; and in short every circumstance seemed to proclaim the necessity of putting an end to a war so calamitous and destructive. But all the disasters which had yet happened were insufficient to induce the ministry to abandon their favourite scheme of war with the colonies.

The parliament met on the 27th of November 1781. It has already been stated, that in the year 1780 the ministry had sustained a defeat so signal as seemed to prognosticate the ruin of their power. They had indeed afterwards acquired a majority, and the terror produced by the riots had contributed not a little to the re-establishment of their influence. The remembrance of what had passed, however, most probably induced them to dissolve parliament; whilst the successes at Charlestown and in other parts of America once more gave them a decided majority in both houses. But the disasters of the year 1781 involved them in the most serious difficulties. In the speech from the throne, his majesty observed, that the war was still unhappily prolonged by the restless ambition which had first excited the enemies of his crown and people to commence it-But he should not discharge the trust committed to the sovereign of a free people, nor make a suitable return to his subjects for their zealous and affectionate attachment to him, if he consented to sacrifice, either to his own desire of peace, or to their temporary ease and relief, those essential rights and permanent interests, upon the maintenance and preservation of which the future strength and security of Great Britain must depend. The events of war, he said, had been very unfortunate to his arms in Virginia, having ended in the loss of his forces in that province; but the misfortune in that quarter called loudly for the firm concurrence and assistance of parliament, in order to frustrate the designs of the enemy, which were as prejudicial to the real interests of America as to those of Great Britain. His majesty regretted much the additional burdens which a continuance of the war would unavoidably bring upon his subjects; but he still declared his perfect conviction of the justice of his cause, and hoped that, by the concurthing detrimental to our possessions. In the East Indies rence and support of his parliament, by the valour of his

1781.

Reign of fleets and armies, and by a vigorous, animated, and unit- attempts to reduce that continent by force (f arms would Reign of George III. ed exertion of the powers and resources of his people, he be in vain, and must be injurious to this country, by weak- George III. of a safe and honourable peace.

style, was made in the House of Commons; and it was urged, that a durable and advantageous peace could result only from the firm, vigorous, and unremitting prosecution of the war, and that the present was not the time to relinquish hope, but to resolve upon exertion. The motion, greater misfortune than had already been inflicted on this kingdom in the present disgraceful contest, it was hearing men rise up in the great assembly of the nation to vindicate such measures. If the ministry and the parliament were not to be taught by experience,-if neither calamities could make them feel, nor the voice of God make them wise,—what had this fallen and undone country to miscarry, an island might be captured, an army might be lost in the best of causes, and even under a system of vinistration, a brave people would not despair. But it was not so in the present case. Amidst all their sufferings and their misfortunes, they saw nothing so distressing as the weakness or wickedness of their ministers. They seemed still determined to go on, without plan and without foresight, in this war of calamities; for every thing that happened in it was a calamity. He considered them all alike, victories and defeats; towns taken and towns evacuated; new generals appointed, and old generals recalled; they were all alike calamities in his eyes, for they all spurred us on to this fatal business. Victories gave us hopes, defeats made us desperate, and both instigated us to go on. In the course of the debate, it was contended on the part of administration, and particularly by Lord North, that by the address, as originally proposed, the house did not pledge themselves to any continuance of the American war; but this was strongly denied by the gentlemen in opposition. However, the point was at last decided in favour of ministry by a large majority; and the address was then carried as originally proposed. In the House of Peers, a motion for an address similar to that of the House of Commons was made by Lord Southampton. and seconded by Lord Walsingham; but it was vigorously opposed by the Earl of Shelburne and the Duke of Richmond, whilst Lord Stormont and the lord chancellor defended the course adopted by ministers; and the address was ultimately carried by a majority of more than two to one. A short protest against the address was, however, entered by the Duke of Richmond, the Marquis of Rockingham, and Earl Fitzwilliam; in which they declared that they dissented, for reasons too often urged in vain for the last seven years, against the ruinous prosecution of the unjust war carrying on by his majesty's ministers against the people of North America, and too fatally confirmed by repeated experience, and the disgraceful loss of a second army, to stand in need of repetition.

Though ministers thus succeeded in carrying the addresses in the usual form, they did not meet with equal success in their main design of carrying on the war. After Lowther moved as a resolution of the house, that the war the expense was consequently greater by upwards of twenposes for which it was undertaken; and that all further the greater number of troops already sent, or then going, to

would be enabled to restore to his dominions the blessing ening her power of resisting her ancient and confederated enemies. This was supported by a number of arguments A motion for an address of thanks, couched in the usual interlarded with the most severe reflections on the conduct of ministers. But the motion was opposed by Lord North, who said that, if agreed to by the house, it would put an end to the American war in every shape, and even cripple the hands of government in other respects. It would point out to the enemies of this country what were however, was vehemently opposed by Mr Fox and Mr to be the mode and conduct of the war; and thus inform Burke. The latter remarked, that if there could be a the enemy in what manner they might best point their operations against this country during the next campaign. With respect to the American war in general, his lordship acknowledged that it had been extremely unfortunate; but he affirmed that the misfortunes and calamities which had attended it, though of a most serious and fatal nature. were matters rather to be deplored and lamented as the events of war, in themselves perpetually uncertain, than hope for? A battle might be lost, an enterprise might to be ascribed to any criminality in ministers. He added, that though he totally disapproved of the motion, yet he was willing to declare it to be his opinion, that it would gour and foresight; because the battle, after all the wis- not be wise nor right to go on with the American war as dom and bravery of man, was in the hands of heaven; we had hitherto done; that is, to send armies to traverse and if either or all of these calamities had happened in from south to north the provinces in their interior parts, a good cause, and under the auspices of a vigilant admi- as had been done in a late case, and which had failed of producing the intended and desired effect.

On the other hand, General Burgoyne observed, that declaring a design of maintaining posts in America, of the nature of New York, was declaring a design of offensive war; and that such a maintenance of posts would prove an improvident and preposterous mode of warfare. With regard to the American war, the impracticability of it was a sufficient justification for supporting the present motion. But he was now convinced that the principle of the American war was wrong, though he had not been of that opinion when he formerly engaged in the service in America. He had been brought to this conviction by observing the uniform conduct and behaviour of the people of America. Passion, prejudice, and interest, might operate suddenly and partially; but when we saw one principle pervading the whole continent, and the Americans resolutely encountering difficulty and death for a course of years, it must be a strong vanity and presumption in our own minds which could lead us to imagine that they were not in the right. It was reason, and the finger of God alone, which implanted the same sentiment in three millions of people.

After some further debate, Sir James Lowther's motion was rejected by a majority of two hundred and twenty to one hundred and seventy-nine. This, however, was a majority in which the ministry had little reason to exult, as it was sufficiently apparent, from the numbers who voted against administration, that the uninfluenced sense of the house was clearly and decisively against any further prosecution of the American war.

Other arguments to the same purpose with those of General Burgoyne, just mentioned, were used in the debate on the army estimates. On the 14th of December, the secretary at war informed the house, that the whole force of the army, including the militia of this kingdom, required for the service of the year 1782, would amount to one hundred and eighty-six thousand two hundred and twenty men, and for this force the parliament had to provide. The sum required for these troops for pay, clothing, and other articles, amounted to four millions two hundred and the debate on the number of seamen, which was fixed at twenty thousand pounds. This military force exceeded one hundred thousand for the ensuing year, Sir James that of the last year by upwards of four thousand men; and carried on with America had been ineffectual for the pur- ty-nine thousand pounds. The increase was occasioned by

George III. be reimbursed by the East India Company. After some further statements relative to the military force of the kingdom, and its expense, had been made by the secretary at war, Colonel Barré declared, that the estimates of the army as then laid before the house were scandalous and evasive. There was a much greater number of non-effective men than was stated in the estimates; in fact, they amounted to a fifth part of the army. The house should also recollect, that the estimates lying on the table did not compose the whole expense of the army; for extraordinaries of several millions were yet to come. Neither were the men under the several descriptions given by the secretary at war the Lord Sackville defended himself as well as he could whole number of military force employed. Other troops were employed solely at the discretion of the minister, and paid irregularly and unconstitutionally, without the consent or knowledge of the legislature; particularly the provincial corps in America, amounting to nine thousand men in acbeen called for from year to year, was never brought into the estimates. Lord George Germaine explained, that the reason why the provincial corps had not been included to the dignity of the peerage was virtually a repeal of the in the estimates was, that some share of the public money might be spared, by avoiding to vote an establishment for these troops. They were raised and paid in a manner by much the most economical for the nation. Sir George Saville expressed the strongest disapprobation of any further prosecution of the American war, or of raising any more troops for that purpose. General Conway also disapproved entirely of a continuance of the American war independence of America as a severe misfortune, and a heavy stroke against Great Britain; but of the two evils he would choose the least, and submit to the independence of America rather than persist a day longer in the prosecution of a ruinous war. Notwithstanding these and other arguments, however, the question was carried in favour of ministry by a considerable majority, and the supplies were voted accordingly.

Besides the grand question of the continuance of the were agitated during this session, particularly the affair of St Eustatius, already mentioned, and an inquiry into the state of the navy. But on these, as on the greater question, the ministry prevailed, though not without a strength of opposition which they had seldom encountered before. A motion for censuring Lord Sandwich was lost only by nineteen; and so general was the desire for a change of administration, that it excited surprise how the ministry still retained their places. Nothing could place in a more striking point of view the detestation in which they were held, than the extreme repugnance to the admission of Lord George Germaine to the dignity of the peerage. On this occasion the affair of Minden was not only brought above board; but, after his actual investiture, and when he had taken his seat in the house, under the title of Lord Viscount Sackville, a debate ensued respecting the dishonour which the peers had sustained by his admission into their house. The Marquis of Caermarthen moved, that it was reprehensible in any minister, and highly derogatory to the honour of the house, to advise the crown to exercise its indisputable right of creating a peer, in favour of a person labouring under the heavy censure of a court-martial; and urged, in support of his motion, that the House of Peers being a court of honour, it behoved them most carefully to preserve that honour uncontaminated, and to endeavour to mark, as forcibly as possible, the disapprobation which they felt at receiving into their assembly, as a brother peer, a person stigma-

Reign of the East Indies. But the expense of those troops was to vice. The Earl of Abingdon could not help conceiving, Reign of that although there was not a right of election, there must George IIL. be a right of exclusion vested in the house, when the admission of any peer happened to be against the sense of its members; that he considered the admission of Lord George Germaine to a peerage as an insufferable indignity to the house, and as an outrageous insult to the people; that it was an indignity to that house, inasmuch as it connected them with one whom every soldier was forbidden to associate withal; and that it was an insult to the people, as the person now raised to the peerage had done nothing to merit honours superior to his fellow-citizens. against this attack. He denied that he knew by whose advice he had been raised to the peerage; he impugned the justice of the sentence of the court-martial; he represented himself as the victim of an acrimony and hostility without example; he adverted to the time which tual service, the statement of which force, though it had had elapsed since the sentence of the court-martial was pronounced, and to the political offices which he had since been called to fill; and he contended that his elevation proceedings of the military tribunal in question. The Duke of Richmond replied with great ability to the various pleas which Lord Sackville had brought forward in his own justification. In particular, he observed, that their lordships were not ignorant, that the noble viscount rested a considerable part of the vindication of his behaviour at the battle of Minden upon the supposed existence of a striking variation in the orders delivered from in any form. He considered an acknowledgment of the Prince Ferdinand to the commander of the cavalry. It was understood that the first order was, that the cavalry should advance; and the second, that the British cavalry should advance. Yet even under these supposed contradictory orders, it was evident that the noble lord ought to have advanced, and, certainly, the distance being short, he enjoyed a sufficient space of time for obedience to his instructions. Lord Southampton, who delivered one of the messages, was now present in the house; and it would seem that he had no choice on this occasion but to acknow-American war, several other matters of smaller moment ledge, either that he did not properly deliver such orders to the noble viscount, or that the latter, having properly received them, neglected to obey them. But whatever difficulties might have arisen during the endeavours to determine exactly how much time had actually been lost in consequence of the non-compliance of Lord Sackville with the orders which he received, he could with much facility have solved what all the witnesses examined as to this point were not able positively to determine. If, summoned as he was to appear upon the trial, his deposition had been called for, he could have proved, because he held all the while his watch in his hand, and seldom ceased to look at it, that the time lost by the noble viscount delaying to advance, under pretence of receiving such contradictory orders as made it impossible for him to discover whether he ought to advance with the whole cavalry, or only with the British cavalry, was one hour and a half. It was therefore extremely evident that the noble lord had had it in his power to bring up the cavalry from the distance of a mile and a quarter; the consequence of which would have been that, by joining in the battle, they might have rendered the victory more brilliant and decisive. But before the arrival of this cavalry, the engagement was concluded. Such was the testimony, said the duke, which, having had the honour to serve at the battle of Minden under Prince Ferdinand of Brunswick, he must have borne, if, being summoned, the members of the court-martial had thought proper to have examined him on the trial. Under such circumstances, the noble viscount could have but little reason to complain tized in the orderly books of every regiment in the ser- of the sentence of the court-martial, of the orders which

Reign of followed it, or of the loss of his commission. The motion days relish these answers, that they addressed the king to Reign of test was however entered, signed by nine peers, in which and in which they declared, that they looked upon the raising to the peerage a person so circumstanced as a measure fatal to the interests as well as to the glory of the crown. and to the dignity of the house.

The ruinous tendency of the American war was now so strikingly apparent, that it became necessary for those who had a just sense of the dangerous situation of the country, and wished well to its interests, to exert their most vigorous efforts to put an end to so fatal a contest. Accordingly, on the 22d of February, a motion was made by General Conway, that an humble address should be presented to his majesty, imploring him to take into his consideration the many and great calamities which had attended this unfortunate war, and to listen to the humble prayer and advice of his faithful Commons, that the war on the continent of North America might no longer be pursued for the impracticable purpose of reducing that country to obedience by force. The motion was seconded by Lord John Cavendish, but vigorously opposed by administration, who had still strength sufficient to carry their point, though only by a single vote, the motion being rejected by a hundred and ninety-four to a hundred and ninety-three.

The increasing power of the opposition now showed that the downfal of the ministry was at hand. The decision of former, and Mr Fox instantly gave notice that the subject would be resumed in a few days under another form. It was accordingly revived on the 27th of February, when a petition from the city of London was presented, soliciting the house to interpose in such a manner as to prevent any further prosecution of the American war; after which General Conway moved, as a resolution, that it was the opinion of the house that the further prosecution of offensive war on the continent of North America, for the purpose of reducing the revolted colonies to obedience by force, would be the means of weakening the efforts of this country against her European enemies, and would tend to increase the mutual enmity so fatal to the interests both of Great Britain and America. It appears from the journals, said the general, that from the days of Edward III. down to the present reign, parliament has at all times given advice to the crown in matters relating to war and peace. In the reign of Richard II. it was frequently done, and also in that of Henry IV. One remarkable instance of this occurred in the reign of Henry VII. when that prince consulted his parliament respecting the propriety of supporting the Duke of Brittany against France, and also of declaring war against the latter; and when he told his parliament that it was for no other purpose than to hear their advice on these heads that he called them together. In the reign of James I. the parliament interfered repeatedly with their advice respecting the palatinate, the match with Spain, and a declaration of war against that power. In the time of Charles I. there were similar interferences; and in the reign of his son Charles II. the parliament made repeated remonstrances, but particularly in 1674 and 1675, on the subject of the alliance with France, which, they urged, ought to be renounced, and at the same time recommended a strict union with the United Provinces. To some of these remonstrances, indeed, answers were returned not very satisfactory; and the parliament were informed that they were exceeding the line of their duty, and encroaching upon the prerogative of the crown. But so little did the Commons of those

George III. was powerfully supported by other arguments, both by know who it was who had advised his majesty to return George IIL the Duke of Richmond himself and by other peers; but such answers to their loyal and constitutional remonit was nevertheless rejected by a large majority. A pro- strances. In the reign of King William, repeated instances were to be found in the journals, of advice given by parthe sentence and the public orders were particularly stated; liament relative to the Irish war and the war on the continent. The same thing occurred frequently in the reign of Queen Anne, who, in an address from the parliament, was advised not to make peace with France until Spain should be secured to Austria, and also not to consent to peace until Dunkirk should be demolished. In short, it was manifest from the whole history of English parliaments, that it was ever considered as constitutional for parliament to interfere, whenever it thought proper, in all matters so important as those of peace and war. Other arguments were urged in support of the motion, which was seconded by Lord Althorp; and petitions from the mayor, burgesses, and commonalty of the city of Bristol, and from the merchants, tradesmen, and inhabitants of that city, against the American war, were also read. But in order to evade coming to any immediate determination on the question, a proposition was made by the attorney-general, that a truce should be entered into with America, and a bill prepared to enable his majesty's ministers to treat on this ground; and under pretence of allowing time for this measure, he moved that the present debate be adjourned for a fortnight. This motion, however, was negatived by a majority of nineteen; and the original motion of General Conway was then put and carried without a division.

The general immediately followed up this victory with a the last question was considered as a victory gained by the motion for an address to the king, soliciting his majesty to put a stop to any further prosecution of offensive war against the colonies; which was agreed to, and presented to his majesty by the whole house on the 1st of March. On this occasion his majesty answered, that there were no objects nearer to his heart than the happiness and prosperity of his people; that, in pursuance of the advice of the Commons, he should take such measures as might appear conducive to the restoration of harmony between Great Britain and her revolted colonies; and that his efforts should be directed in the most effectual manner against our European enemies, until a peace could be obtained consistent with the interests and permanent welfare of the kingdom. The proceedings of the House of Commons gave general satisfaction; but the royal answer was not thought sufficiently explicit. Accordingly, on the 4th of March, General Conway moved that an humble address be presented to his majesty, to return his majesty the thanks of that house for his gracious answer to their last address; the house being convinced that, in the present circumstances of this country, nothing could so essentially promote those great objects of his majesty's paternal care for his people as the measures which his faithful Commons had most humbly but earnestly recommended to his majesty; and this motion was unanimously agreed to. The general then moved a resolution, that, after the solemn declaration of the opinion of the house, in their humble address presented to his majesty, and his majesty's assurance of his gracious intentions, the house would consider as enemies to his majesty and the country all who should endeavour to frustrate his majesty's paternal care for the happiness of his people, by advising the further prosecution of offensive war on the continent of North America. After some debate this motion was agreed to without a division; and, on the 6th, after a number of papers had been read in the House of Peers relative to the surrender of Earl Cornwallis and the army under his command, the Duke of Chandos moved, first, that, in the opinion of the house, the immediate cause of the capture of the army under Earl Cornwallis in Virginia, was the want of

Reign of a sufficient naval force to cover and protect the same; George III. and, secondly, that the not covering and protecting of the army under Earl Cornwallis in a proper manner was highly blameable in those who advised and planned the expedition. But after considerable discussion these motions also; and that power was still haughty and elated with

were rejected.

In spite of all these efforts, however, the ministry still kept their ground, and with astonishing resolution combated the force of opposition, which was daily increasing. On the 8th of March several resolutions were moved by Lord John Cavendish; one of which bore that the chief cause of the national misfortunes was the want of foresight and ability in his majesty's ministers; and another respected the immense sum expended on the war, which was alleged to be little less than a hundred millions. But all inquiry was still frustrated, and these motions were lost by a majority of ten. Meanwhile, as the unpopularity of Lord North was further increased by the proposal of some new taxes, particularly on soap, the carriage of goods, and places of entertainment, opposition determined if possible to force him to resign; and on the 15th of March it was moved by Sir John Rous that the nation could have no further confidence in the ministers who had the conduct of public affairs. Lord North endeavoured to vindicate his own administration. He affirmed that it could not be declared with truth that the national calamities originated from the measures of the present administration. The repeal of the American stamp-act, and the passing of the declaratory law, took place before his entrance into office. As a private member of parliament he gave his vote in favour of both, but as a minister he was not responsible for either. When he accepted office the times were scarcely less violent than the present. He approached the helm when others had deserted it; and, standing there, he had used his utmost efforts to assist his country. That the American war was just and requisite, and prosecuted for the purpose of supporting and maintaining the rights of the British legislature, was a position for the truth of which he would ever contend, whilst he enjoyed the power of arguing at all upon the subject. As to peace, he not only wished most earnestly for it, but also for the formation of such a ministry as might at once prove acceptable to the country, and cordially co-operate length divided upon the question, when there appeared a majority of nine in favour of administration.

But notwithstanding this decision, it was well known that the ministry could not stand their ground; and, accordingly, four days after, when a motion similar to that and that, in fact, those persons who had for some time conducted the public affairs were no longer his majesty's ministers. They were not now to be considered as men holding the reins of government and transacting measures of state, but merely as performing their official duty till other ministers were appointed to take their places. In Surrey agreed to waive his intended motion, and, after some further debate, the house adjourned. And thus an end was put to an administration which had long been obnoxious to a great part of the nation, and whose removal contributed very much to allay those ferments by which every part of the British dominions had been agitated. Peace now became as much the object of ministry as war had been formerly. But before we proceed to any account of the negociations for that desirable object, it will he necessary to notice the military events which disposed the other belligerent powers to an accommodation.

The ill success of Britain in America has already been Reign of taken notice of. The disaster of Cornwallis had produced George III. a sincere desire of peace with America; but this could not be accomplished without making peace with France

success. Minorca had now fallen into the hands of the Spaniards; and though the capture of a few miserable invalids, attended with such extreme difficulty as the Spaniards had experienced, ought rather to have intimidated them than otherwise, they now projected the most important conquests. Nothing less than the entire reduction of the British West India islands was contemplated by the allies; and indeed there was too much reason to suppose that this object was within their reach. In the beginning of the year 1782 the islands of Nevis and St Christophers were obliged to surrender to Count de Grasse the French admiral, and the Marquis de Bouillé, who had already signalized himself by several exploits; and Jamaica was marked out as the next victim. But the end of all these aspiring hopes was fast approaching. The advantages hitherto gained by the French in their naval engagements with the British fleet had proceeded entirely from their keeping at a great distance during the time of action, and from their good fortune and dexterity in gaining the wind. At last the French admiral De Grasse, prompted by his natural courage, or induced by circumstances, determined, after an indecisive action on the 9th of April 1782, to risk a close engagement with his formidable antagonist, Admiral Rodney. The action was brought on by the count shortening sail to prevent the loss of a disabled ship, by parting with which he might have avoided the disaster that followed. This memorable engagement took place off the island of Dominica, three days after the former. The British fleet consisted of thirty-seven ships of the line, and the French of thirty-four. The engagement commenced at seven o'clock in the morning, and continued with unremitting fury till half past six in the evening. It is said that no other signal was made by the admiral but the general one for action, and that for close combat. Sir George Rodney was on board the Formidable, a ship of ninety guns; and the Count de Grasse was on board the Ville de Paris, a ship of a hundred and ten guns, which had been presented to the French king by the city of Paris. for the welfare and honour of the state. The house at In the course of the action, the Formidable fired nearly eighty broadsides; and for three hours the admiral's ship was involved in so thick a cloud of smoke that it was almost invisible to the officers and men of the rest of the fleet. The van division of the British fleet was commanded by Sir Samuel Hood, and the rear division by Rear-adby Sir John Rous was about to be made by the Earl of miral Drake; and both these officers greatly distinguished Surrey, Lord North informed the house that his majesty themselves in the course of the action. But the decisive had come to a full determination to change his ministers; turn on this memorable day was given by a bold manœuvre of the Formidable, which, taking advantage of a favourable shift in the wind, passed through the French line, and threw them into irretrievable confusion. The first French ship that struck was the Cæsar, of seventy-four guns, the captain of which fought nobly, and fell in the action. When she struck she had scarcely a foot of canvass without a shot consequence of the declaration of Lord North, the Earl of hole. Unfortunately, soon after she was taken possession of, she took fire by accident, and blew up, when about two hundred Frenchmen perished in her, together with an English lieutenant and ten English seamen. The Glorieux and the Hector, both seventy-four gun ships, were also taken by the British fleet; together with the Ardent of sixty-four guns; and a French seventy-four gun ship was also sunk in the engagement. It was almost dark when the Ville de Paris, on board of which the Count de Grasse had fought gallantly, struck her colours. Five thousand five hundred troops were on board the French fleet, and the havoc among them was very great, as well as among the

Reign of French seamen. The British lost in killed and wounded dred women, besides children, perished on this occasion. Reign of George III about a thousand men. Captain Blair, who commanded the Anson, and several other officers, were killed in the action; and Lord Robert Manners, who commanded the Resolution, died of his wounds on his return home. It was universally allowed that in this engagement the French, notwithstanding their defeat, behaved with the greatest valour. De Grasse himself did not surrender till four hundred of his people were killed, and only the admiral and two others remained without a wound. The captain of the Cæsar, after his ensign-staff was shot away, and the ship almost battered to pieces, caused his colours to be nailed to the mast, and thus continued fighting till he was killed. The vessel, when taken, was a mere wreck. Other French officers behaved with equal resolution. The valour of the British requires no encomium; it was proved by their success on this glorious day.1

This victory was a very fortunate circumstance both for the interest and the reputation of the British admiral. Before this event the new ministry had appointed Admiral Pigot to supersede him in the command in the West Indies; and it was understood that they meant to set on foot a rigid inquiry into the transactions at St Eustatius. But the splendour of this victory put an end to all thoughts of the kind; he received the thanks of both houses of parliament for his services; and he was created an English peer, by the title of Baron Rodney of Rodney Stoke, in the county of Somerset. Sir Samuel Hood was also created Baron Hood of Catherington, in the kingdom of Ireland; and Rear-admiral Drake and Captain Affleck were created baronets of Great Britain. Some attempts were also made, in the House of Commons, to procure a vote of censure against the new ministry for having recalled Lord Rodney; but the motions for this purpose were rejected

by a large majority. Though the designs of the French against Jamaica were now effectually frustrated, the victory was not followed by those beneficial results which many had expected from it; and none of the British islands which had been taken by the French in the West Indies were afterwards recaptured. Some of the ships which had been taken by Admiral Rodney were also lost at sea, particularly the Ville de Paris, Glorieux, and Hector; and a British man of war, the Centaur, of seventy-four guns, foundered at sea on the 24th of September 1782. The Jamaica homewardbound fleet was also dispersed by a hurricane off the banks of Newfoundland, when the Ramillies of seventy-four guns and several merchantmen foundered. About this time the British navy sustained a very considerable loss at home, by the Royal George, of a hundred guns, being upset and sunk at Portsmouth. This melancholy accident, which happened on the 29th of August, was occasioned by a partial heel given to the ship, in order to cleanse and sweeten her. The guns on one side being removed to the other, or at least the greater part of them, and her lower deck ports not being lashed in, the ship thwarted on the tide with a squall from the north-west, filled with water, and sunk in the space of about three Admiral Kempenfelt, a number of other of-

The prosecution of the war was thus attended with dis-George III. asters and difficulties to all parties. The signal defeat above mentioned not only secured the island of Jamaica against the attempts of the French, but prevented them from entertaining any other project than that of distressing commerce.

In the beginning of May an expedition was undertaken to the remote and inhospitable regions of Hudson's Bay; and though no force existed there capable of making any resistance, a seventy-four gun ship and two thirty-six gun frigates were employed in the service. All the people in that part of the world either fled or surrendered at the first summons. The loss of the Hudson's Bay Company, on this occasion, amounted to L.500,000; but the humanity of the French commander was conspicuous, in leaving a sufficient quantity of provisions and stores of all kinds for the use of the British who had fled at his approach. Another expedition was undertaken by the Spaniards to the Bahama Islands, where an equally easy conquest was obtained. The island of Providence, defended only by three hundred and sixty men, could make no resistance when attacked by five thousand. An honourable capitulation was granted by the victors, who likewise treated the garrison with kindness. Some settlements on the Mosquito shore were also taken by the Spaniards; but the Bay-men, assisted by their negroes, bravely retook some of them; and having formed a little army of the Indians in those parts, headed by Colonel Despard, they attacked and carried the posts on the Black River, making prisoners of about eight hundred Spanish troops. The greatest disaster which befel this power, however, was their failure before Gibraltar, which happened in the month of September 1782, and was accompanied with such circumstances of horror and destruction as evinced the absurdity of persisting in the enterprise. Thus all parties felt that it was high time to put an end to the contest. The affair of Cornwallis had shown that it was impossible for Britain to conquer America; the defeat of De Grasse had rendered the reduction of the British possessions in the West Indies impracticable by the French; the final repulse before Gibraltar, and its relief afterwards by the British fleet, put an end to that favourite enterprise, in which almost the whole strength of Spain had been employed; and the engagement of the Dutch with Admiral Parker showed them that nothing could be gained by a naval war with Britain.

The events which led to the removal of Lord North and the other ministers who had so long directed public measures in this kingdom have been already noticed. On this occasion it was said that his majesty expressed considerable agitation of mind at being in a manner compelled to make an entire change in his councils; for the members in opposition would form no coalition with any of the old ministry, the lord chancellor only excepted. On the 30th of March 1782, the Marquis of Rockingham was appointed first lord of the treasury; Lord John Cavendish chancellor of the exchequer; the Earl of Shelburne and Mr Fox principal secretaries of state; Lord Camden president of the council; the Duke of Richmond master of ficers, and upwards of four hundred seamen and two hun- the ordnance; the Duke of Grafton lord privy seal; Ad-

¹ The Count de Grasse, after his defeat, was received on board the Barfleur man of war, and afterwards landed on the island of Jamaica, where he was treated with great respect. After continuing there some time, he was conveyed to England, and accommodated with a suite of apartments at the royal hotel in Pall-mall. His sword, which he had delivered up, according to the usual custom, to Admiral Rodney, was returned to him by the king. This etiquette enabled him to appear at court, where he was received by their majesties and the royal family in a manner suitable to his rank. From the time of his arrival in London to his departure, which was on the 12th of August 1782, he was visited by many persons of the first fashion and distinction, and was much employed in paying visits to the great officers of state and some of the principal nobility of the kingdom, by whom he was entertained in a very sumptuous and hospitable style. He received, indeed, every mark of civility which the British nation could bestow; and was treated with much respect even by the common people, from the opinion that was generally entertained of his valour and merit.

Reign of miral Keppel first lord of the admiralty; General Conway in the measure, though his ideas were different. He did not Reign of George III. commander in chief of all the forces in Great Britain; Mr Thomas Townshend secretary at war; Mr Burke paymas ter of the forces; and Colonel Barré treasurer of the navy. Other offices and honours were likewise conferred on different members of the opposition; and some were raised to the peerage, particularly Admiral Keppel, Sir Fletcher Norton, and Mr Dunning.

The first business in which the new ministry engaged was taking the necessary measures for effecting a general peace. No time, in fact, was lost in the pursuit of this great object; and the empress of Russia, having offered her mediation, in order to restore peace between Great Britain and Holland, Mr Secretary Fox, within two days after his entrance in office, wrote a letter to Simolin, the Russian minister in London, informing him that his majesty was ready to enter into negociations for peace, on the basis of the treaty of 1674; and that, in order to facilitate such negociations, he was willing to give immediate orders for a suspension of hostilities, if the States-general were disposed to agree to that measure. But the states of Holland did not appear inclined to enter into a separate peace; nor perhaps would it have been agreeable to the principles of sound policy if they had consented to any propositions of this kind. But immediately after the change of ministry, negociations for a general peace were commenced at Paris; and Mr Grenville was invested with full powers to treat with all the parties at war, and to propose the independence of the thirteen United Provinces of North America in the first instance, instead of making it a condition of a general treaty. Admiral Digby and General Carleton were also directed to acquaint the American congress with the pacific views of the British court, and with the offer made to acknowledge the independence of the United States.

But before this work of pacification had made any considerable progress, the new ministry sustained an irreparable loss by the death of the Marquis of Rockingham in July 1782. Even before this event, considerable apprehensions were entertained of their want of union; but the death of the nobleman just mentioned occasioned an absolute dissolution. The Earl of Shelburne, who succeeded him as first lord of the treasury, proved so disagreeable to some of his colleagues, that Mr Fox, Lord John Cavendish, Mr Burke, Mr Frederick Montague, and two or three others, instantly resigned. Others, however, though little attached to the earl, continued in their places; and his lordship found means to attach to his interest Mr William Pitt, son to the late Earl of Chatham. Though then in an early stage of life, that gentleman had already distinguished himself greatly in parliament, and was now prevailed upon to accept the office of chancellor. The seceding members of the cabinet were at pains to explain to the house their motives for taking this step, which were in general a suspicion that matters would be managed differently from the plan which they had proposed while in office, and particularly that American independence would not be acknowledged. But this was positively denied at the time, and with truth, as appeared by the event. There appeared, indeed, a duplicity in the conduct of the Earl of Shelburne not easily to be accounted for. Even after it had been intimated by General Carleton and Admiral Digby that the independence of the United Provinces would be conceded by his ruajesty in the first instance, instead of making it a condition of a provisional treaty, his lordship said, that "he had formerly been, and still was, of opinion, that whenever the independence of America was acknowledged by the British parliament, the sun of England's glory was set for ever." This had been the opinion of Lord Chatham and other able statesmen; nevertheless, as the majority of the cabinet were of a contrary way of thinking, he acquiesced

wish to see England's sun set for ever, but looked for a spark George III. to be left which might light us up a new day. He wished to God that he had been deputed to congress, that he might plead the cause of America as well as Britain. He was convinced that the liberties of the former were gone as soon as the independence of the states was allowed; and he concluded his speech with observing, that he was not afraid of his expressions being repeated in America, there being great numbers there who were of the same opinion with him, and perceived ruin and independence linked together."

If his lordship really expected that by a flourish of rhetoric he could persuade the Americans to abandon a system for which they had fought so desperately, he greatly overrated his own powers, and mistook the men with whom he had to deal. No obstruction, however, arose to the general pacification. As early as the 30th of November 1782, the articles of a provisional treaty were settled between Britain and America. By these it was stipulated, that the people of the United States should continue to enjoy, without molestation, the right to take fish of every kind on the grand bank, and on all the other banks of Newfoundland; and that they should continue to exercise the same privilege in the Gulf of St Lawrence, and at every other place in the sea where the inhabitants used heretofore to fish. They were likewise to have the liberty to take fish of every kind on such parts of the coast of Newfoundland as British seamen resort to, but not to cure or dry them on that island. They were to enjoy the privilege of fishing on the coasts, bays, and creeks of the other dominions of his Britannic majesty in America; and the American fishermen were permitted to cure and dry fish in any of the unsettled bays, harbours, and creeks of Nova Scotia, Magdalen Islands, and Labrador. But it was agreed that, after such places should be settled, this right could not be legally put in practice without the consent of the inhabitants and proprietors of the ground. It was arranged that creditors upon either side should meet with no impediment in the prosecution of their claims; that the congress should earnestly recommend it to the legislatures of the respective states, to provide for the restitution of all estates and properties which had been confiscated belonging to real British subjects, and of the estates and properties of persons resident in districts in the possession of his majesty's arms, and who had not borne arms against the United States; that persons of any other description should have free liberty to go to any part whatsoever of any of the thirteen United States, and remain in it for twelve months unmolested in their endeavours to recover such of their estates, rights, and properties, as might not have been confiscated; that the congress should earnestly recommend to the several states a revision of all acts or laws regarding the premises, so as to render them perfectly consistent, not only with justice and equity, but with that spirit of conciliation which, on the return of the blessing of peace, should universally prevail; that no future confiscations should be made, nor prosecutions commenced against any person, or body of men, on account of the part which he or they had taken in the war; that those who might be in confinement on account of such a charge at the time of the ratification of the treaty in America should be immediately set at liberty; that all hostilities by sea and land should immediately cease; that prisoners on both sides should be set at liberty; that his Britannic majesty should expeditiously, and without committing destruction of any sort, withdraw all his armies, garrisons, and fleets, from every port, place, and harbour, of the United States; that the navigation of the river Mississippi, from its source to the ocean, should remain for ever free

George III of the United States; and, finally, that if any place or should be conquered by the arms of either before the arrival of the provisional articles in America, it should be restored without compensation or difficulty.

In the treaty between Great Britain and France it was agreed that Newfoundland should remain with England, as before the war; and, to prevent disputes about boundaries, it was arranged that the French fishery should commence at Cape St John on the eastern side, and, sweeping round by the north, should have for its boundary Cape Ray on the western side. The islands of St Pierre and Miquelon, which had been taken in September 1778, were ceded in full right to France. Great Britain was to restore to France the island of St Lucia, and to cede and guarantee to her that of Tobago; and France was to surrender to Great Britain the islands of Grenada and the Grenadines, St Vincent, Dominica, St Christophers, Nevis, and Montserrat. The river Senegal and its dependencies were to be given to France; and the island of Goree was also to be restored. Fort James and the river Gambia were guaranteed to his Britannic majesty; and the gum trade was to remain in the same condition as before the commencement of hostilities. The king of Great Britain was to restore to his most Christian majesty all the establishments which belonged to him at the breaking out of the war on the coast of Orixa and in Bengal; and became bound to secure to the subjects of France in that part of India, and on the coasts of Orixa, Coromandel, and Malabar, a safe, free, and independent trade, either as individuals, or under the direction of a company. Pondicherry, as well as Karical, was to be restored to France; the two districts of Valanour and Bahour, round Pondicherry, and the four contiguous Magans round Karical, were also to be given up; and the French were again to enter into the possession of Mahe, and of the comptoir at Surat. The allies of France and Great Britain were to be invited to accede to the present pacification; and in the event of their disinclination, no assistance on either side was to be given to them. Great Britain renounced all claims to Dunkirk. Commissioners were to be respectively appointed by both nations to inquire into the state of commerce, and to concert new arrangements of trade on the footing of mutual convenience. And all conquests without difficulty, and without requiring compensation. The prisoners on each side were also to be released without ransom, upon the ratification of the treaty, and on paying the debts which they might have contracted during their captivity; and each crown was respectively to reimburse the sums which had been advanced for the maintenance of their prisoners, by the country where they had been detained, according to attested and authentic vouchers. These preliminary articles of peace were concluded at Versailles on the 20th of January 1783, between Mr Alleyne Fitzherbert, minister plenipotentiary on the part of his Britannic majesty, and Charles Gravier, Comte de king of France.

At the same time preliminary articles of peace between minister plenipotentiary of the Spanish monarch. His Florida was to be ceded to him by the king of Great Britive treaty were to be allowed to the subjects of Britain thirty-seven frigates, carrying in all near two thousand

Reign of and open to the subjects of Great Britain and the citizens who had settled in the island of Minorca and in the two Reign of Floridas, to sell their estates, recover their debts, and George III. territory belonging to Great Britain or to the United States transport their persons and effects, without being restrained upon account of their religion, or on any other pretence whatsoever, except that of debts and prosecutions for crimes. The liberty of cutting logwood, in a district of which the boundaries were to be ascertained, without molestation or disturbance of any kind whatsoever, was granted to Great Britain. The king of Spain was to restore the islands of Providence and the Bahamas, in the condition in which they were when conquered by his arms. And all other conquests of territories and countries upon either side, not included in the present articles, were also to be mutually restored without difficulty or compensation.

But no sooner were these articles ratified and laid before parliament, than they excited the most vehement declamations against ministry. Never had the administration of Lord North himself been arraigned with more asperity of language. The ministry defended themselves with resolution, but found it impossible to avoid the censure of parliament. An address without any amendment was indeed carried in the House of Lords by a considerable majority; but it was lost in the lower house. On the 21st of February some resolutions were moved in the House of Commons by Lord George Cavendish, of which the most remarkable were, that the concessions made by Britain were greater than its adversaries had a right to expect; and that the house would take the case of the American loyalists into consideration. The last motion indeed his lordship consented to waive, but the rest were carried against ministry.

These proceedings, however, made no alteration with regard to the treaty, which had already been ratified by all the contending powers, the Dutch only excepted. The terms offered the latter were a renewal of the treaty of 1674; which, though highly advantageous, they at that time positively declined. They afterwards, however, made an offer to accept the terms which they had formerly rejected; but the compliment was then returned by a refusal on the part of Britain. When the preliminary articles had been settled with the courts of France and Spain, a suspension of arms with Holland ensued; but though the definitive arrangements with the other powers were finally concluded by the month of September, it was not till then that the preliminary articles were settled with Holland. The terms were on either side, in any part of the world whatsoever, not a general restitution of all places taken on both sides dumentioned nor alluded to in the treaty, were to be restored ring the war, excepting only the settlement of Negapatnam in the East Indies, which was to remain in the hands of Britain, unless an equivalent should be given on the part of Holland. The navigation of the eastern seas was to remain free and unmolested to all British shipping. The remaining articles concerned only the exchange of prisoners, and such other matters as are common to all treaties.

Thus an end was put to the most dangerous war in which Britain had ever engaged, and out of which, notwithstanding the powerful combination against her, she came superior to all her enemies. The politicians who had imagined that the prosperity of Britain depended in a great measure on her colonies were singularly mistaken. This was shown Vergennes, the minister plenipotentiary on the part of the at the time, and has been completely confirmed by subsequent experience. For a number of years she had not only been deprived of these colonies, but opposed by them with Great Britain and Spain were also concluded at Versailles all their force; yet though attacked at the same time by between Mr Fitzherbert and the Conde d'Aranda, the three of the greatest powers in Europe, and looked upon with an invidious eye by all the rest, the damage done to Catholic majesty was to continue in possession of the her enemies still greatly exceeded that which she had island of Minorca, and to retain West Florida; whilst East received. Their trade by sea was almost ruined; and on comparing the loss of ships on both sides, the balance in tain. Eighteen months from the ratification of the defini- favour of Britain was twenty-eight ships of the line and

Reign of guns. Notwithstanding this, however, the state of the some directions for preventing the dock-yards and ma- Reign of George III. nation appears to have been really such that a much longer continuance of the war would have been impracticable.

Having thus given as full an account as our limits admit of the great national events till the conclusion of the peace in 1783, we shall now advert to some others, which, though of sufficient importance to deserve notice, could not be previously introduced without interrupting the narrative. On the 8th of December 1776 a fire broke out in the ropehouse of the dock-yard at Portsmouth, which totally consumed it, but without doing any very material damage. For some time the affair passed as an accident; but in clearing away the rubbish a tin-box was found with a wooden bottom, containing matches which had been lighted, and underneath was a vessel filled with spirits of wine. The fire, however, not having been properly supplied with air, had gone out of itself before it touched the spirits of wine; for if it had caught fire, all the stores in the storehouse, sufficient to fit out fifty sail of the line, would have been destroyed. In the beginning of the year 1777 a fire happened at Bristol, which consumed six or seven warehouses; and by the discovery of machines similar to those already mentioned, it was evident that the fire had not been accidental. The terror of the public was now greatly increased, and violent mutual accusations were thrown out by the ministerial and popular parties. On this point, however, they soon came to a right understanding, by the discovery of the author of all this mischief.

This was one James Aitken, otherwise called John the Painter, a native of Edinburgh. Having from his early years been accustomed to a vagrant life, to which indeed his profession naturally led him, he had gone through a variety of adventures. He had enlisted as a soldier, deserted, and, when pinched by want, made no scruple of betaking himself to the highway, or of committing thefts. Having traversed a great part of America, he had there imbibed to such a degree the prejudices against Britain, that he at last took the extraordinary resolution of singly overturning the whole power of the nation; an achievement which he was to accomplish by setting fire to the dockyards at Portsmouth and Plymouth, and afterwards to the principal trading towns of the kingdom. With this view he carefully inspected the docks and other places on which his attempts were to be made, in order to ascertain in what manner they were guarded, which he found in general as negligent as he could desire: and had there not been some deficiency in the construction of his machines, he must have done incredible mischief; for as his attempts were always detected by the discovery of his machines, it is evident that he had met with abundance of opportunities. For some time the affair at Portsmouth, as has already been mentioned, passed for an accident. It was soon recollected, however, that a person had been seen loitering about the rope-house, and had even been locked up a night in it; that he had worked as a painter, and taken frequent opportunities of getting into that house, and other buildings in the yard. These circumstances exciting a suspicion that he was the incendiary, he was traced to different places, and at last found in a prison, to which he had been committed on a charge of burglary. On his examination, however, he behaved with an assurance and apparent consciousness of innocence which almost disconcerted those who were appointed to examine him; but at last he was deceived into a confession by another painter, a native of America, who pretended to compassionate his case. Evithe testimony of his perfidious friend, on account of his great fortitude, but at length confessed his guilt, and left executed in the month of August 1782.

gazines from being exposed to similar danger in future. George III Thus it appeared that the whole of the alarm of treason and American incendiaries was occasioned by the political enthusiasm of a wretched vagabond, who chose to stake his life on the wild venture we have described.

Still, however, it appeared that the French court were very well acquainted with many particulars relating to the state of this kindgom, and the movements of our squadrons, which ought by all means to have been kept secret. These treacherous communications were first detected in the month of June 1780. One Ratcliffe, master of a cutter, disclosed that he had been hired by a fellow called Roger to carry packets to France, for which he was to be paid L.20 each time, and to have L.100 besides at a certain period; but apprehending that he might incur some danger by continuing this employment, he gave information of what was going on to one Mr Steward, a merchant at Sandwich, by whom his last packet was carried to the secretary of state. After being opened and sealed up again, it was returned, and he was directed to carry it to France as formerly. Several succeeding packets were treated in the same fashion, though it was some time before Ratcliffe saw the principal party concerned; but this was at last accomplished by his complaining to Roger that he had not been paid the L.100 according to promise. A meeting having been procured, it was found that the person who furnished intelligence to the enemy was one M. Henri de la Motte, a French gentleman then residing in London. On searching his house, no papers of any consequence were found; but being absent when the messengers first arrived, he, on his return, threw some out of his pockets, unperceived, as he thought, by any body. The papers, however, were taken up by the messengers, and gave plain indications not only of a treasonable correspondence with the enemy, but also of his being connected with one Henry Lutterloch, a German, who then resided at Wickham near Portsmouth. This person being also apprehended, not only made a full disclosure of the treasonable correspondence with France, but gave abundant proofs of being himself one of the most depraved of mankind, and lost to every feeling excepting the desire of accumulating wealth. His evidence, however, and other strong circumstances, were sufficient to convict M. de la Motte, who was accordingly executed, though the king remitted the more dreadful part of his sentence. During his trial, and on every other occasion, he behaved in such a manner as showed him to be an accomplished gentleman, and not only excited the compassion, but the admiration, of every one who saw him.

During the whole course of the war, only one other person was detected in any act of treason; and he appears to have been actuated merely by mercenary motives. This was a man called David Tyrie, a native of Edinburgh. Having been bred in the mercantile line, and engaged in a number of speculations with a view to gain money, in all of which he had discovered considerable abilities, he at last engaged in the more dangerous one of conveying intelligence to the French, of the ships of war fitted out in Britain, the time of their sailing, and other particulars. For this he was apprehended in the month of February 1782. The discovery was made by means of one Mrs Askew, who passed for Tyrie's wife. This person having delivered a bundle of papers in a hurry to a school-mistress, desired her not to show them to any one; the latter, however, not only inspected them herself, but showed them to another, dence was thus procured against him, but he still main- by whom they were sent to the secretary at war. By this, tained his character to the last, rejecting and invalidating and another packet discovered by William James, who had been employed to carry it to France, Tyrie was conbaseness and treachery. He received his sentence with victed of treasonable correspondence with the enemy, and

Reign of

On the whole, it appears that notwithstanding the ex-George III. cessive virulence of parties, which even proceeded so far as to produce duels between some members of parliament, neither entertained any designs against what was believed to be the true interest of the nation. The one seems to have regarded its honour too much, and to have been inclined to sacrifice even its existence to that favourite notion; the other perhaps regarded the national honour too little; nor indeed could an advantageous idea have been formed of the spirit of the nation which should have submitted to the dismemberment of its empire without a struggle. The event, however, has shown, that the loss of the colonies, so far from being a disadvantage, has been the very reverse. The commerce of Britain, instead of being dependent on America, has arrived at a much greater height than ever; whilst the consequent increase of wealth has enabled the nation to support that enormous debt, part of which was contracted, first in defending, and then in attempting to conquer, the colonies.

## CHAP. XIV.

REIGN OF GEORGE III .-- INTERMEDIATE PERIOD.

Nature of the opposition to Lord Shelburne's administration .-States of Parties .- Coalition between Lord North and Mr Fox. —Coalition Ministry.—Taxes.—Mr Pitt's Motion for Reform in Parliament.—Irish Independence Bill.—Mr Dundas's India Bill.—Mr Pitt's Office-Reform Bill.—Petition of the American Loyalists.—Establishment of the Prince of Wales.—New Inventions.—Opinion of the Public respecting the Coalition.—Mr Fox's India Bills.—Report of the Secret Committee.— Sir T. Rumbold and Mr Hastings accused by Mr Dundas.— Report of the Select Committee.—Debates on Mr Fox's Bills.—First Bill carried in the Commons.—His Majesty's disapprobation intimated.—Rejected in the Lords.—Change of Ministry, and accession of Mr Pitt to Office.—Contest between the Crown and the House of Commons.—Resolutions of the House against the new Ministry.—Mr Pitt's Bill for regulating India rejected.—Further Disputes.—The Public take part with the Administration.—New Coalition proposed.—Mr Pitt refuses to resign, and the King also refuses to dismiss the Minister.—Dissolution of Parliament.—Elections.—Total Defeat of the Coalition.—Consequences.—New Parliament.—Mr Pitt's new India Bill.—Debates on this Measure.—Finance.—Restoration of the Forfeited Estates.—Westminster Election.—Nabob of Arcot's Debts.—Nature of these Estates.—Vestminster Election.—Nabob of Arcot's Debts.—Nature of these Estates.—Vestminster Election.—Nabob of Arcot's Debts.—Vestminster Election.—Nabob of Arcot's Debts.—Nature of these Estates.—Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Elections—Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Election — Nabob of Arcot's Debts.—Nature of the Estates — Vestminster Debts.—Nature of these.—Exposition of Mr Burke.—Mr Pitt's Plan of Parliamentary Reform.—Rejected in limine.—Finances. -Duke of Richmond's Fortifications .- Regulation of Public Offices.—Irish Propositions.—Foreign Affairs.—League to protect the Germanic Constitution.—Commercial Treaties.—Britain and Hanover.—Debate on the Duke of Richmond's Plans. —Militia Laws.—Mr Pitt's Sinking Fund.—Discussion thereon.—Fallacy of the Scheme —Wine Duties.—Best size and form of Ships of War.-General State of the Empire.-India. Mr Burke's Proceedings against Mr Hastings.—Mr Pitt's India Bill amended by Mr Dundas's act.—Attempt against the King's Life by Margaret Nicholson.—Commercial Treaty with France.—Debates thereon.—Mr Pitt's Defence of the Treaty.
—Consolidation of Taxes.—Corporation and Test Acts.—Prince of Wales's Debts.-Accusation of Mr Hastings.-Mr Sheridan's celebrated Speech on the Begum Charge.—Articles of Impeachment prepared.—Impeachment Voted.—Reflections on this Proceeding.—Affairs of Holland.—State of Parties in the United Provinces.—Interference of the Neighbouring States.—Prusing in Marian of Parliament Conduct of Parties of Parties of Parties of Parliament Conduct of Parties of Parliament Conduct of Parliament Condu sians invade Holland.—Meeting of Parliament.—Conduct of the Government in regard to Holland approved of by the Opposition.—Naval Promotions, and Debates thereon.—Act against the Exportation of Wool.—State of the Revenue.—Compensa-tion to the American Loyalists.—Slave Trade.—Bill for Regulating the Transportation of Negroes.—Indian Affairs.—Declaratory Bill.—Trial of Mr Hastings.—Burke's Oration of Five Days.—Mode of Procedure.—Accusation of Sir Elijah Impey.—State of European Politics.—Sweden.—Wars between Sweden and Russia.—Danish Invasion of Sweden.—Interposition of the British Envoy, and Recal of the Danish troops King's Illness.—Regency Question.—Debates and Proceedings connected therewith.—Manœuvring and Procrastination of VOL. V.

the Ministry.-The Prince's Correspondence.-Regency Bill Reign of passed.—Recovery of the King.—Conduct of the Irish Parlia-George III.
ment respecting the Regency.—The Slave Trade.—Mr Wilberforce's Propositions.—Jesuitical Support of Mr Pitt.—Mr Addington chosen Speaker of the House of Commons—New Taxes.—Extension of the Excise Laws.—Proposed Repeal of Religious Tests and Penal Statutes.—Indian Affairs.—Trial of Mr Hastings.—Affair of Nundcomar.

It has been already remarked, that in the debates in the House of Commons upon the treaties concluded under Lord Shelburne's administration, by which the American war was brought to a close, the terms of those treaties were disapproved of by the majority of the house; and this disapprobation was expressed by carrying an amendment to the ministerial motion for an address of thanks to his majesty. It does not appear, however, that the nation at large disapproved of the conditions of the peace. All ranks of men had long been weary of the war with the colonies, and desirous to relinquish every claim of sovereignty over them; and this point being decided, other objects of negociation were of too little importance to excite any great degree of public interest. The majority which now voted against administration consisted of men brought together by views little connected with the accomplishment of any patriotic object, and in a manner which well merits the attention of the historian.

The death of the Marquis of Rockingham left in a very disjointed state the party which had opposed the American war. Lord Shelburne's administration appears to have been formed under the influence of the crown alone, to the exclusion of Lord North and his friends, as well as of Mr Fox and the other principal members of the former opposition. Thus an attempt appears to have been made to govern the kingdom without supporting the royal prerogative by the strength of any political party. An event, however, occurred of a nature undoubtedly not a little dangerous to the constitution; but being new in itself, it seems not to have been foreseen by speculative writers

upon the British government.

The American war had been conducted with a profusion of expense totally unexampled in former contests. The service of government became of itself an immense object of trade, an employment in which thousands of all kinds of artists, manufacturers, and merchants, engaged; and hence the patronage enjoyed by the minister for the time was proportionally extensive. The natural consequence was, that he and his friends, with a long train of their friends and dependents, were enabled to accumulate great wealth, and rise to the enjoyment of influence in all parts of the country. The impracticability of accomplishing the great object of the war at last led to its termination; and the minister who had been unsuccessful in conducting it was dismissed, as had usually been done upon such occasions in Britain, to make way for his antagonists, who had long recommended, and who could, therefore, with a better grace adopt, measures of pacification. But the dismission of the minister and his friends from their official situations did not at once destroy their political importance in the state. They constituted a very formidable body of men in both houses of parliament; and such was the influence which the possession of power had conferred upon Lord North, that to the latest period of his life he was understood to be able to carry along with him, at all times, upwards of forty votes in the House of Commons; a power which was evidently too dangerous to belong to a subject of a free state, and so indeed it proved by the event to be.

Mr Fox, and the other statesmen who had led the opposition to Lord North's measures during the American war, but who had retired from administration on the accession of Lord Shelburne to the treasury after the death

1783.

George III. come weary of an unprofitable opposition, and desirous upon almost any terms of entering into the enjoyment of power. But their party, though possessing very great talents, was too weak in point of numbers to be able to contend against the minister of the day, supported by the whole patronage of the crown. On the other hand, though Lord North and his friends formed in both houses of parliament a very formidable phalanx, still they also were too few to contend against ministerial influence, and the party usually called the "king's friends;" while from the natural course of things they might also expect that their numbers would gradually diminish. They had risen by attaching themselves to the service of the state; and the changes which mortality produces would by degrees enable the existing government to supplant them by a new race of ambitious men. In this state of matters the two opposition parties, led by Lord North and Mr Fox, thought fit to come to an agreement to unite their strength, and thus, by forming a complete majority in parliament, to impose themselves upon the sovereign as his ministers. In this way the majority was produced which opposed Lord Shelburne's administration, and it has since been known under the appellation of the Coalition.

The effect produced upon the public mind by this coalition was extremely important; and it is probable that even yet its consequences are not fully understood. In almost any other country than Britain, and indeed at many former periods of our history, such a combination of powerful men, possessing a predominance in the legislature, could not have failed to prove fatal to the constitution, and destructive of the internal tranquillity of the state. If the king gave way to such an aristocratical combination, and received its leaders into his service, it was to be feared that the whole patronage of the crown, together with the authority of the royal name, and the majority which they already possessed in the other branches of the legislature, might enable them to fortify themselves by new institutions and laws, and render them independent both of the king and people. No hope appeared from a dissolution of parliament, as the public at large were not at once aware of the critical situation to which the constitution had been brought by the Coalition; and a prince of a rash character would, in such circumstances, perhaps have seen no other resource for the protection of his prerogative, than to attempt to govern without a parliament, the majority of which were evidently acting, not the part of dutiful subjects or faithful representatives of the people, but of individuals conspiring to seize, for their own private advantage, the emoluments and authority of office. This judgment will not probably be regarded as too severe, when it is considered, that at the period in question there existed no pretext for opposition to the crown founded upon any complaint of the nation against the abuse of its prerogatives; and that the individuals who now coalesced could not have been induced to do so upon any pretence of political principle. Lord North, the steady assertor and supporter of the royal prerogative, and the conductor of the American war, now joined Mr Fox, the opponent of that war, and the eloquent champion of the privileges of the people; and neither of these men, nor their friends, ever pretended that they had relinquished their former opinions. The purpose of the present coalition was therefore notorious; whilst the outrageous abuse with which they had formerly treated each other served only to afford a new example how completely ambition is capable of subduing every resentment, and all the ordinary passions of the human mind.

The party now called the Coalition had displayed the superiority of their numbers in the House of Commons in

Reign of of the Marquis of Rockingham, appear to have at last be- the debates upon the treaty of peace in the middle of Reign of February. From that period it was considered as obvious George III. that a new administration must be formed; and hence from that time public business remained at a stand, and the nation was kept in suspense. The period was critical, on account of the termination of the war, at which great bodies of troops and seamen were to be discharged, and many pecuniary arrears paid off. The different regiments of militia were also disembodied, and sailors and soldiers dismissed in a state of turbulence, natural to men accustomed to arms, and whose pay had not been regularly paid. These and other circumstances, joined with the unsettled state of the government, produced various disorderly proceedings at Portsmouth, Plymouth, and other places. In the mean time, a loan could not be negociated by the ministry whilst they wanted the countenance of the House of Commons. During the whole month of March, however, they still lingered in their places, and a variety of negociations were carried on by the court for the purpose of attempting to form a new ministry, without an unconditional transfer of the government of the kingdom to the Coalition. Confident of their own strength, however, this political combination were desirous of attaining power upon their own terms, and continued to display their superiority in the House of Commons, with a view to compel their own reception at court. On the 24th of March, on the motion of Mr T. W. Coke, seconded by Lord Surrey, an address was agreed to, requesting his majesty to take into consideration the distracted state of the empire after an exhausting war, and to comply with the wishes of the house, by forming an administration entitled to the confidence of his people. His majesty answered, that it was his earnest desire to do every thing in his power to comply with the wishes of his faithful Commons. The delay, however, continued; and all descriptions of men were involved in doubt, suspense, and anxiety. On the 31st of the same month, a new address, moved by Lord Surrey, was agreed to, urging in very earnest terms the formation of what was called an efficient and responsible administration, formed upon principles of strength and stability, and suited to the actual state of his majesty's affairs both at home and abroad. And at last, on the 2d of April, his majesty, yielding to what appeared as necessity, appointed an administration consisting of the leaders of the Coalition.

The Duke of Portland was promoted to be first lord of the treasury; Lord North and Mr Fox were appointed principal secretaries of state; Lord John Cavendish was made chancellor of the exchequer; Lord Keppel was placed at the head of the admiralty; Lord Stormont was created president of the council; and the Earl of Carlisle was advanced to be keeper of the privy seal. These constituted the cabinet; and the other offices of government were filled by the supporters and friends of ministers. The right honourable Charles Townshend was appointed treasurer of the navy, Mr Burke paymaster general of the forces, and Lord Viscount Townshend master-general of the ordnance. The seals were put in commission, at the head of which was Lord Loughborough. The right honourable Richard Fitzpatrick was appointed secretary at war; James Wallace, Esq. was made attorney-general; John Lee, Esq. became solicitor-general; the Earl of Northington was appointed lord-lieutenant of Ireland; and, in Scotland, the honourable Henry Erskine was made lord-advocate, in the room of Mr Henry Dundas. But the new administration was no sooner installed, than an opposition was formed, which, in the House of Lords, was led by the Duke of Richmond and Lord Thurlow; and in the House of Commons by Mr Pitt, and Mr Jenkinson, afterwards created successively Lord Hawkesbury and Earl of Liverpool.

The Coalition administration, on entering into office,

Reign of were under the necessity of instantly negociating a loan India. The chief feature of his plan consisted in sub- Reign of George III of twelve millions, to supply the necessities of the state; and to provide for the interest of this loan various taxes were proposed by Lord John Cavendish, the chancellor of the exchequer. These were imposed on bills of exchange, receipts, probates of wills and legacies, bonds, and law proceedings, stage coaches, quack medicines, carriages, letters-patent, and other articles, whilst registers of births, marriages, and deaths, were also taxed. These taxes gave rise to debates which produced little interest. But the case was otherwise with regard to another subject in which Mr Pitt took the lead.

Towards the close of the American war, when want of success had begun to render it unpopular, it had been repeatedly urged, both in parliament and in various publications, that the ministerial majorities in favour of the measures pursued against the colonies would never have existed if the people of this country had been fairly represented in the House of Commons. By degrees this sentiment attracted attention; and to give countenance to parliamentary reform came to be regarded as a sure step towards the attainment of popular favour. Accordingly, Mr Pitt, then a young man, endeavoured to recommend himself to notice, by engaging eagerly in the pursuit of this object. He opened the subject in the House of Commons on the 7th of May, in an eloquent speech, in which, after declaring his admiration of the general fabric of the British constitution, and affirming that he wished not to alter but to restore its true spirit, which time and changes, accident and events, had enfeebled and diminished, he asserted that the state of parliamentary representation was partial and inadequate, and the progress of undue influence alarming and ominous; that the true spirit of liberty had decayed, and that the powers of control, in different branches of the government, were greatly debilitated; that wild speculations of reform were affoat without doors; but that the measures he was about to propose were equally moderate and necessary. He stated his plan of reform to be,—first, that measures ought to be taken to prevent bribery and expense at elections; secondly, that for the future, when the majority of voters of any borough should be convicted of notorious corruption, the borough should be disfranchised, and the minority of voters not so convicted should be entitled to vote for the county in which the borough might be situated; thirdly, that an addition ought to be made to the representation, to consist of knights of the shire, and of representatives of the metropolis. Mr Pitt was opposed with much earnestness by Lords North and Mulgrave, and also by Mr Powis. He was supported, however, by Mr Fox and Mr Beaufoy, and also by Mr Thomas Pitt, who offered, as a testimony of his sincerity, to make a voluntary sacrifice of his borough of Old Sarum. Mr Henry Dundas, who now attached himself to Mr Pitt, supported on this occasion the motion of his friend, and asserted, that to comply with the wishes of the people would be the happiest means of putting an end to their complaints. Mr Pitt's resolutions, however, were lost by a very large ma-

During the same session the new administration brought forward a bill, admitting in express terms the exclusive rights and absolute supremacy of the parliament and courts of Ireland in matters of legislation and judicature, and preventing any writs of error or appeal from the courts of that country to the courts of Great Britain. The bill passed with little opposition, and tended to gratify the people of Ireland, though, by increasing the line of separation between the countries, it evidently placed them in greater hazard of disunion.

During the present session Mr Dundas obtained leave

jecting the presidencies of Madras and Bombay to a con-George IIL trolling jurisdiction, to be conferred on the government of Bengal, which he wished to vest in the person a of governor, entitled to act when he thought fit, in opposition to the opinion of his council. Another object of this bill was to secure to the native proprietors their estates in perpetuity, on payment of a fixed tribute, and to extend these provisions to the nabob of Arcot and the rajah of Tanjore. Mr Dundas contended that such a measure was rendered necessary in consequence of the improper conduct and tyranny of the servants of the East India Company, and especially of their principal servant Mr Hastings, whom he proposed to recal, and to send out to India Lord Cornwallis, as governor-general, in his stead. The scheme, however, proved abortive; but it led to other legislative efforts on the same subject.

Though Mr Pitt had been unsuccessful in his proposal to reform the representation of the people in parliament, he immediately brought forward a bill containing a project for an inferior species of reform, respecting the fees, gratuities, and perquisites in the different departments of the public offices. The object of this bill being economy, it passed through the House of Commons, but was rejected in the House of Lords.

Towards the close of the session, a petition from the American loyalists was, by his majesty's command, presented to the House of Commons by Lord John Cavendish. It stated that the petitioners, some of whom were persons of the first character, fortune, and consideration, having adhered to Great Britain during the contest with the colonies, had been attainted in North America as traitors, and their effects confiscated by the legislatures of the different states. Many of the petitioners were widows and orphans, who had lost husbands and fathers by their adherence to the British cause; whilst others were military and civil officers, clergy and other professional men, who had lost their means of subsistence in the same manner. They prayed the House of Commons to grant them such relief as might seem adequate to their situation; and, on the motion of the chancellor of the exchequer, an act was accordingly passed, appointing commissioners to inquire into the circumstances of such persons as were reduced to distress by the late dissensions in

On the 23d of June his majesty, by a message, requested the aid of parliament in making a separate establishment for the Prince of Wales. Sixty thousand pounds only were demanded for this purpose; and it was stated by Lord John Cavendish, that his majesty intended to allow the prince L.50,000 a year out of the civil list, without requiring from the public any further assistance than the above sum of L.60,000, which would be requisite to defray the extraordinary expense attending a new establishment. This last sum was the more readily granted, because rumours had gone abroad, which were alluded to by Mr Pitt in the House of Commons, that an intention had existed on the part of the administration, particularly of Mr Fox, to give the prince a very splendid establishment at the public expense, but that this proposal had not proved acceptable to his majesty. Mr Fox said, that he undoubtedly considered the proposed establishment as much too low; and that if it had remained with him to have advised an establishment, he would most assuredly have proposed a sum more adequate to the object in view. person, however, most proper to decide in the business had been of an opinion very different, and it was his duty to submit.

Parliament was soon afterwards prorogued. The nation to bring into parliament a bill for regulating the affairs of was now in a state of perfect tranquillity. Some anxiety,

Reign of however, existed in the minds of men with regard to the second bill, which accompanied the first in all its stages, Reign of to flow into new and extensive channels, the returns of trade necessarily required some time to exhibit themselves in the form of a flourishing revenue. In the interval, therefore, between the period at which the ministerial expenditure for the support of the war ceased, and that at which the first profits of foreign trade were received, a considerable shortcoming took place in the public revenue, and individuals experienced many difficulties. These, however, gradually passed away; and two inventions were by degrees brought to perfection, which of themselves secured a profit to the public, almost equivalent to the burdens which it had incurred in consequence of the American war. These were the machine for spinning cotton, the invention of a man, originally of low station, Richard Arkwright; and the very valuable kinds of pottery contrived by Mr Wedgewood. The first of these, by producing at a cheap rate the most beautiful cotton fabrics, in a great measure put an end to the use of silk, and gave to the British manufacturers a kind of monopoly of many of the most useful articles of clothing; whilst the other not only drew to the nation immense sums from foreign countries, but, from the bulky nature of the commodity, employed an immense tonnage of shipping in its exportation.

In the mean time people had leisure to reflect upon the nature of the coalition of political parties which had recently taken place. The tendency of that measure, and the possible evils which might result from it, did not at once present themselves to the minds of men, because it was not known to the public at large that the sovereign had felt his own independence affected by the event. The general sentiment, however, was that of indignation against the political parties, who had so far forgotten all the principles which they had long and loudly professed, as to be capable of uniting with each other for the sake of power and emolument. It was universally said that no honesty was to be found among political men, and that no profession of patriotism ought henceforth to be trusted. Thus a severe wound was inflicted upon the public morals of the nation, by the want of consistency which its most conspicuous characters had exhibited; and the wound was only the deeper from the apparent strength of administration, which included in itself the men of greatest political influence in the kingdom, who were considered as likely to retain long the power which they now possessed.

In this state of affairs parliament assembled on the 11th of November. In the speech from the throne, the necessity of providing for the security of the revenue, and of attending to the situation of the East India Company, were stated to both houses, as apologies for calling them together after so short a recess. Some days passed in discussions relative to different parts of the revenue, when Mr Secretary Fox moved for leave to bring in two bills relative to the affairs of the East India Company. By the first of these, it was proposed to take from the East India Company the whole administration of their territorial and commercial affairs, and to vest it in seven directors, named in the bill, viz. Earl Fitzwilliam, the Right Honourable Frederick Montague, Lord Viscount Lewisham, the Honourable George Augustus North, Sir Gilbert Elliot, Sir Henry Fletcher, and Robert Gregory, Esq. These directors, or commissioners, were to hold their office during four years, and not to be removable by his majesty, without an address from either house of parliament; and they were to be aided by a board composed of nine assistant directors, who were to be removable by five of the principal directors, and were to have full authority over all the company's servants and affairs, civil as well as military. The

George III. public welfare. The load of public debt which had been was intended to regulate the administration of affairs in George III. incurred seemed excessive; and though commerce began India. It forbade the exchange, acquisition, or invasion of any territory in India, by the general council, or any presidency there. It abolished all monopolies in India, and prohibited the acceptance of presents, making them recoverable by any person for his sole benefit. It secured an estate of inheritance to the native landholders, and provided against the alteration or increase of rents. It prohibited the molestation of princes subject to the Company, and restrained the Company's servants from collecting or farming their revenues, or having any pecuniary transactions with them. It prescribed a mode for adjusting the disputes between the nabob of Arcot and the rajah of Tanjore, and also between them and their British creditors. It disqualified the agents of the Company, or of any protected Indian prince, from sitting in the British House of Commons; and directed all offences against the act to be prosecuted in the courts of India or in the Court of King's Bench.

The East India Company's affairs had hitherto been governed, in terms of the charter of the Company, by a court of proprietors, and a court of directors elected by the proprietors. The rights of these courts, however, were to be absolutely taken away; and their whole powers, or the sovereignty of British India, was to be vested during four years certain in the hands of seven individuals, nominated by the present administration, through the medium of their parliamentary majority. It was undoubtedly a bold measure, openly to assault the privileges of such a body of men as the East India Company; but it was still more new and singular under the British constitution, in the form in which it had existed for more than a century, to vest a large portion of the executive power, including the command of armies, and an immense pecuniary patronage, in the hands of a few individuals, who were to hold their places for a fixed period, independently of the will of the crown. By taking possession in this manner of the patronage of Hindustan, the present administration would have found means to render themselves for a certain time avowedly independent of their sovereign, and they would not have failed to renew their own powers at the end of that period. It is to be observed, however, that the administration had in some degree been led by circumstances which previously occurred, and which did not originate with them, to adopt some decisive measures for reducing India under better management than that in which it had been placed by the East India Company; and of these it will not be improper here to take a short review.

The circumstance of a great and wealthy empire having been vanquished by a company of merchants, was a thing so new in the history of the world that it could not fail to be attended with a variety of inconveniences. The European nations have a near resemblance to each other in laws, manners, arts, and religion; and the mutual jealousy which for some centuries they had been accustomed to entertain of each other had prevented any of them from making great conquests. When any power, therefore, happened to acquire a portion of territory, this addition was never very great; and the laws of the neighbouring states being nearly alike, the conquered province scarcely experienced any misfortune from a change of masters. Hence the evils attending upon great conquests had ceased to be known among the nations of Europe; and the conquerors and the conquered being in all cases men of similar characters and talents, easily mingled with each other. The nobles of Alsace were as well received at the court of France as those belonging to the ancient dominions of the French crown; and the natives of the Netherlands regarded with

Reign of much indifference their transition from the dominion of ther sum of L.119,000, amounting in all to L.160,000; Reign of George III. Spain to that of Austria and of France. But when the Brialthough his salary did not exceed L.13,335 per annum, George III which naturally attend the loss of national independence, and that most wretched of all states of human affairs, in which a race of strangers enjoys permanent dominion, whilst the natives of a country are subjected to hopeless depression and slavery. The British invaders of India undoubtedly possessed, or speedily acquired, the same rapacity with other conquerors; and as they were the servants of a company of merchants whose only principle of exertion was profit, it is probable that under them avarice and extortion assumed more vexatious forms, because accompanied with greater assiduity, and a more persevering temper, than were exhibited by the former conquerors of that country, who issued from the deserts of Tartary and Arabia. The people of Great Britain, accustomed at home to the mildest government, and to the most equitable administration of justice that the world ever experienced, heard with horror of the crimes, robberies, perfidies, and massacres which their countrymen had committed, and by which the na-East. The British government, also, being no party to these crimes, wished to see them repressed, and very naturally supposed that the best remedy would consist in taking India under its own immediate management. Some public-spirited individuals, indeed, dreaded the accession of influence which the crown would thus necessarily acquire; but men of humanity were willing to encounter considerable hazard, for the sake of altering the unjustifiable mode of management which had prevailed in the East.

Early in 1781, two committees were appointed by the House of Commons, to inquire into the mal-administration of the East India Company's affairs both at home and abroad; and all parties in the house concurred in the appointment. The first, or select committee, conducted by some of the most distinguished members of opposition, was directed to inquire into the state of the administration of justice in the provinces of Bengal, Bahar, and Orixa, and consider how the British possessions in the East Indies might be governed with most advantage to this country, and with the greatest happiness to the natives. The second, or secret committee, under the management of persons in the confidence of administration, was directed to inquire into the causes of the war in the Carnatic, and the condition of the British possessions in those parts.

On the 9th of April 1782, Mr Henry Dundas, lord-advocate of Scotland, and chairman of the secret committee, moved that the reports of that committee be referred to a committee of the whole house. Upon this occasion, Mr Dundas, in a long speech, enumerated the causes of the calamities of the East, particularly the departure of the Company's presidencies from the line of policy prescribed to them, namely, to avoid military operations with a view to conquest; the corrupt interference of their servants in the domestic and national quarrels of the country powers; their breaches of faith and disregard of treaties; their peculation and scandalous oppression of the natives; and the criminal relaxation on the part of the directors in the exercise of their controlling power over their servants, and their ready connivance at the grossest misconduct. Mr Dundas also brought forward a variety of other resolutions, which were adopted by the house; and criminated in strong terms Sir Thomas Rumbold, formerly governor of Madras, and Mr Hastings, then governor-general of Bengal. Among various charges, it was stated that Sir Thomas Rumbold had remitted to Europe, between the 8th of February 1778, the day of his arrival at Madras, and the beginning of August in the same year, the sum of L.41,000; and during the two subsequent years a fur-

tish made conquests in Hindustan, all the evils occurred and he had no other fair means of acquiring wealth. He was charged with having abolished the committees instituted to superintend the payment of the revenue due by the zemindars, or natives holding lands under the Company; with having compelled them to travel many hundred miles to negociate separately with himself the terms on which they were to hold their estates; with having suffered his private secretary to receive a bribe of no less than L.20,000; with having concealed other peculations of the Company's servants; with having given a lease of lands to the nabob of Arcot, in direct disobedience of the Company's orders; and with having violated the most solemn treaties entered into with the nizam of the Deccan. Charges so heavy could not be passed over, and leave was accordingly given to bring in a bill of pains and penalties against Sir Thomas Rumbold, and two of his associates, Peter Perry and John Whitehill, for breaches of public trust and high crimes and misdemeanours; and at the same time an act was passed restraining those persons tional name and character had been rendered odious in the from leaving the kingdom, and obliging a discovery of their property, and preventing its alienation.

In other resolutions brought forward on the 15th of April, Mr Dundas stated a variety of accusations against Mr Hastings and Mr Hornsby; and a resolution was adopted, declaring it to be the duty of the directors of the East India Company to recal the governor-general, and Mr Hornsby the president, from their respective offices. Accordingly, the court of directors issued orders for this purpose; but these were appealed from to a court of proprietors, who, on the 31st of October 1782, prohibited the court of directors from complying with the resolution of The result was, that Mr Hastthe House of Commons. ings retained his office, and Mr Dundas, in the following session of parliament, brought forward the bill which we have already mentioned, but which was not passed into

At the same time that Mr Dundas, as chairman of the secret committee, brought forward the resolutions already mentioned, the select committee presented their report; and on the 18th of April, General Smith, their chairman, proposed various resolutions, in some of which Mr Hastings was criminated along with Sir Elijah Impey, chiefjustice of the supreme court of Bengal. By means of investigations carried on by this committee, the leading members of opposition, particularly Mr Fox and Mr Burke, qualified themselves for directing at a future period the attention of the legislature and of the public to the state of Indian affairs. Mr Fox made use of his knowledge to bring forward the two remarkable bills already mentioned; and to justify so strong a measure, it was alleged that, by the mismanagement of the courts of directors and proprietors, the affairs of the Company had been brought into such a state of extreme embarrassment as rendered it absolutely necessary to vest the administration in other hands.

These abuses were arranged under three heads, as they affected, first, the independent powers of India; secondly, the states in alliance with us; and, thirdly, our own territorial possessions. Under the first head were classed the extravagant projects and expensive wars entered into by the Company to extend their dominions; their violations of treaty; the sale of their assistance in support of the ambition, rapacity, and cruelty of others; and the betraying in turn almost every prince, without exception, with whom they had formed any connection in India. The second class of abuses comprehended the corrupt and ruinous interference of the Company in the internal government of the princes dependent on them; the unjust

George III. peculations of the Company's civil servants; and the rapacity of the military. The third included the management of the countries under the immediate dominion of the Company, with respect to which it was affirmed, that the general system of their conduct in India was directed to a single end, the transmission of wealth from that country to this. With this view, monopolies had been established, not only of every article of trade, but even of the necessaries of life; the privilege of pre-emption had been secured to the Company; and a variety of no less ruinous and arbitrary preferences followed. By this oppressive conduct the merchants and bankers of India, many of whom in extent of trade and credit were scarcely equalled by those of the first class in Europe, fell gradually into decay; whilst the native cultivators and manufacturers were obliged to accept of a bare sufficiency for their maintenance, measured out to them by the judgment of those who alone were to profit by their labour. The case of the zemindars, and of the cultivators under them, was, if possible, still more deplorable. At the time we obtained the dewannee or stewardship from the Mogul, the provinces of Bengal and Bahar had been laid waste by a famine, which carried off upwards of one third of the population. But the first thing done for their relief was to exact from the remainder the same tribute which had before been paid by the whole. Nor was this all. The Company's government in India had set up to public auction the whole landed interest of Bengal, without the least regard to the rights of private property, or even giving a preference to the ancient possessors; and the zemindars, most of them persons of ancient families and respectable fortunes, were under the necessity of bidding against every desperate adventurer and schemer, or of seeing their estates delivered up to the management of strangers. The sufferings of the natives under our dominion in India were further aggravated by their being almost wholly excluded from any share in the expenditure of the Company's government; all the principal collections of the revenue, all the honourable, all the lucrative situations in the army, all the supplies and contracts of every kind, were in the hands of the English; so that the natives, with few exceptions, were only employed as the servants or agents of Europeans, in subordinate stations in the army, and in the inferior department of collection, where it was impossible to proceed a step without their assistance. It was therefore urged, that the present government of India was not in its nature capable of reform. Nothing could be expected from the court of proprietors, because the members, as individuals, derived more profit from supporting Indian delinquents, than they could ever hope to receive from the fair dividends of the Company: and the court of directors, being a representative body, naturally partook of the imperfections of its constituents.

In these views Mr Fox was powerfully supported by the splendid eloquence of Mr Burke. But Mr Pitt contended, that although India undoubtedly wanted reform, the alteration to be adopted ought to be constitutional, and not such as in its principle endangered the safety of every chartered incorporation in the kingdom. The company's charter was not the result of the mad prodigality violated without a gross disregard to public faith. By vesting the whole patronage of India in commissioners augmented to a degree which would enable it, like an irresistible torrent, utterly to overpower and sweep away the remaining liberties of the country. On the other hand, ed by references to the journals, and by the principle, that

Reign of exaction of exorbitant aids and tribute; the enormous Mr Dundas did not object to the measure under consi- Reign of deration because it increased the influence of the crown, George III. but because it did what was much worse, by placing a new and unexampled influence in the hands of the minister and his party for five years, which would be independent both of the crown and the parliament. The bills were further attacked, not merely by those persons who might be supposed to aspire to supplant ministers in their offices, but also by several country gentlemen of independent character and high reputation for integrity; whilst the ordinary members of opposition impugned the motives of their author in very pointed terms.

The principal supporters of the bills were the two secretaries of state, Mr Burke, Mr Sheridan, Mr Erskine, Mr Lee, Mr Adam, Sir Grey Coupar, Mr Anstruther, Mr Courteney, Mr Rigby, Lord Maitland, and Sir Henry Fletcher; and they were opposed by Mr William Pitt, Mr Thomas Pitt, Mr Jenkinson, Mr Powis, Mr Dundas, Mr Macdonald, Sir James Lowther, Mr Duncombe, Mr Martin, the Marquis of Graham, Mr Arden, Mr William Grenville, Mr Beaufoy, Mr Wilberforce, Lord Mulgrave, and Mr Wilkes. The first bill, however, was carried by a considerable majority; and on the 9th of December it was presented to the House of Lords by Mr Fox, attended by a great number of members. On the first reading, Earl Temple, Lord Thurlow, and the Duke of Richmond, reprobated the measure in the most unqualified terms, but without calling for a vote of the house; and Lord Thurlow, at the same time, pronounced a panegyric upon the character and services of Mr Hastings.

Meanwhile an alarm seems to have been excited in the mind of the sovereign. He had reluctantly given way to the strength of the coalition, and conferred upon its leaders the first offices of the state; and he now heard it alleged, with some plausibility, that this combination of ambitious men, not satisfied with the ordinary influence attending their situation, were about to fortify themselves in the possession of power in such a way as gradually to enable them to become independent both of him and his people. The moment seemed therefore to have arrived when temporizing measures could no longer be pursued, and a stand must be made for the support of the royal prerogative. Accordingly, on the 11th of December his majesty had a conference with Earl Temple, in which he confessed himself completely convinced of the correctness of the views entertained by opposition; and although it was now somewhat late to oppose a measure which had been brought forward by the ministers of the crown, and carried through the House of Commons under the apparent sanction of the royal authority, a resolution was nevertheless adopted to endeavour to prevent its further progress by means of the House of Lords. A card was accordingly circulated, understood to be sent by Earl Temple, in consequence of written authority from his majesty, in which it was stated, that his majesty allowed Earl Temple to say, that whoever voted for the India bill was not only not his friend, but would be considered by him as his enemy; and that if these words were not strong enough, Earl Temple might use whatever words he should deem stronger or more to the purpose. The consequence of this interposition was, that, on the 15th of December, upon a question of adjournof a Plantagenet, a Tudor, or a Stuart, but a fair purchase ment in the House of Lords, the ministers were left in a deliberately made from parliament, which could not be minority of eight. On the same day Mr Baker brought forward a motion in the House of Commons, to declare, that, to report any opinion of his majesty, upon proceednominally appointed by parliament, but actually selected ings depending in parliament, with a view to influence the by administration, the influence of the crown would be votes of the members, is a high crime and misdemeanour, and a breach of the fundamental privileges of parliament. This motion was seconded by Lord Maitland, and support-

Reign of advice ought only to be given to the king by his ministers, George III. who are responsible for all the measures of government. Mr Pitt, however, opposed it, as proceeding upon unauthenticated rumours, and asserted that the precedents alluded to in the journals were not applicable to the present case. But the motion was nevertheless carried by a large majority; and as it was feared that a dissolution would instantly take place, the house resolved that they would consider any person as an enemy to his country who should advise his majesty to interrupt their discharging the important duty of providing a remedy for the abuses which prevailed in the East Indies, and that they would resolve themselves into a committee on the state of the nation on the 22d December. But on the 17th Mr Fox's India bill was rejected in the House of Lords; and at twelve o'clock on the night of the 18th a message was delivered to the secretaries of state, requiring them to transmit to his majesty the seals of their offices, by the under secretaries, as a personal interview would be disagreeable to the king. Early next morning, letters of dismission, signed by Earl Temple, were sent to the other members of the cabinet, and a general resignation of offices followed.

A new administration was immediately formed, in which Mr Pitt was appointed first lord of the treasury and chancellor of the exchequer; the Marquis of Caermarthen and Mr Townshend, who had been created Lord Sidney, were made secretaries of state; Lord Thurlow became lord high chancellor; the privy-seal was transferred to the Duke of Rutland; Earl Gower became president of the council; the Duke of Richmond was made master of paymasters of the forces, and Mr Henry Dundas treasurer of the navy; the office of lord advocate of Scotland, which this gentleman had formerly held, being transferred from the Honourable Henry Erskine to Mr Ilay Campbell.

A spectacle was now about to be exhibited which had appointed by the crown, in direct opposition to the House of Commons. This, however, was no longer the House of Commons which had subdued the royal prerogative, and contended with success against our ablest and most ambitious monarchs. The late coalition had produced throughout the nation a general distrust of the character of those who formed the majority of its members; and it was soon influence, and may be safely disregarded, when it ceases to be the organ of the public sentiments. It was expected that an immediate dissolution of parliament would take place; but the change of the highest officers of the crown having been hastily made, it is probable that the new ministry dreaded entering instantly upon the business of an election against the powerful parties coalesced in opposition to them. The majority of the House of Commons also dreaded a dissolution, and, on Monday the 22d of December, they voted an address to the king, stating the present inconveniencies which would attend a prorogation or dissolution of parliament. His majesty returned an answer on the 24th, acquiescing, in general terms, in the sentiments contained in the address, and assuring the house that, after a short adjournment, their meeting would not be interrupted by any prorogation or dissolution.

When the house met on the 12th of January, Mr Fox attempted to introduce, previous to any other business, the discussion of certain resolutions which had been prepared by the opposition; whilst the new ministers endeavoured, by means of a stratagem, to be heard first, Mr Pitt declaring that he had a message to deliver from the king. But after some tumult, Mr Fox being allowed to proceed, called upon Mr Pitt to give the house an assu-that he neither could or ought to remain long in such a

rance that no dissolution would take place; and the latter Reign of having declined to comply with this requisition, Mr Fox George III moved that the house should resolve itself into a committee on the state of the nation, and the motion was carried by a large majority. It was then resolved, that to issue public money after a prorogation or dissolution of parliament, unless an act had previously passed, appropriating the supplies to specific services, would be a high crime and misdemeanour; that, in the present state of his majesty's dominions, it was necessary to have an administration possessing the confidence of the house and the public; that the recent appointments did not enjoy the confidence of the house; and that the second reading of the mutiny bill should be deferred till the 23d of February. Warm debates ensued upon these resolutions. The Coalition was branded as a corrupt confederacy of two desperate factions to seize upon the government of the country; and the India bill was represented as an experiment made by the late secretary of state, with a view to raise himself to a degree of power superior to that of the sovereign. On the other hand, the new administration was described as a coalition, not indeed of parties, but of the shreds and remnants, of the dregs and outcasts, of parties; as a body collected for the purpose of fighting the battles of secret and unconstitutional influence, of trampling on the power and dignity of the House of Commons, of establishing a government of cabal, intrigue, and favouritism, and of destroying the very principles of laudable ambition and honourable service in the state.

On the 14th of January Mr Pitt obtained leave to bring the ordnance, and Lord Howe first lord of the admiralty; in a bill for the better government and management of the Mr Grenville and Lord Mulgrave were appointed joint affairs of the East India Company. By this bill, commissioners were appointed by his majesty, authorized to superintend and control all operations of the courts of directors and proprietors of the East India Company, relative to the civil and military government or revenues of the territories and possessions of the Company. This long been unknown in Britain,—that of an administration board of control was to have access to all papers belonging to the Company; and the court of directors was on no pretence to send out orders to India, without the previous approbation of the board, which was also authorized to alter and amend the orders of the directors. His majesty was authorized to name the commanders-in-chief in India, and to remove any governor, general, or member of the councils, of any British settlement in India; and found that a representative body possesses little power or all nominations by the court of directors to these offices were declared to be subject to the approbation of his majesty; nor was the court of proprietors allowed, for the future, to revoke any proceeding of the court of directors which had been approved of by his majesty. It was objected to this bill, that it disfranchised the East India Company, or violated their charter, no less than Mr Fox's bill had done; and although a meeting of the court of proprietors had passed a vote in favour of the regulations contained in it, yet at the second reading, on the 22d of January, it was negatived by a small majority.

> The discussion of this bill did not prevent the House of Commons from endeavouring to shake the determination of the court, and to intimidate the new administration. A resolution was moved and carried, declaring in pointed terms the disapprobation of the house, of the appointment and continuance in office of the present ministers, which they considered as unconstitutional. Mr Pitt was also called upon to explain upon what principle he ventured to remain in office after the House of Commons had declared him unworthy of their confidence. He answered, that though novel and extraordinary, his conduct was by no means unconstitutional; that the immediate appointment or removal of a minister did not rest with the house;

an executive government. The public at large now began to be greatly interested in the dispute which had occurred between the king and the House of Commons. The common council of London voted an address of thanks to his majesty for the dismission of his late ministers; and this address was followed by similar addresses from the merchants and trades of the city of London, from the city of Norwich, and other parts of the kingdom. The Coalition made some attempts in the county of Middlesex, in of addresses in their own favour; but in these instances, if they avoided a defeat, they gained no victory.

In the meanwhile, a number of independent members of the House of Commons attempted to heal the present breach by proposing a new coalition of parties, and the formation of an administration upon a still broader basis than formerly. On the 26th of January, about seventy members of the House of Commons met at the St Albans tavern, and signed an address, to be presented, by a committee of their body, to the Duke of Portland and Mr Pitt, requesting them to communicate with each other on the arduous state of public affairs, and expressing a hope that, by a liberal intercourse, every impediment to a cordial coprinciples, might be removed. In answer to this address, Portland declined any interview with Mr Pitt, for the purpose of union, while that gentleman continued prime minister in defiance of the resolutions of the House of Commons; and, on the other hand, Mr Pitt refused to resign as a preliminary to negociation. To co-operate with the St Albans meeting, one of its members moved and carried unanimously a resolution, that the present critical state of public affairs required an efficient, extended, and united administration, entitled to the confidence of the people; and it was also resolved that the continuance of the present ministers in office was an obstacle to forming an efficient, extended, and united administration; resolutions which were ordered to be laid before his majesty. The meeting at the St Albans tavern next declared that an administration formed on the total exclusion of the members of the last or present administration would be inadequate to the exigencies of public affairs. Mr Fox expressed his wishes for a union, but insisted on the resignation of the chancellor of the exchequer in compliance with the resolutions of the House of Commons, as an indispensable preliminary. Mr Pitt, on the contrary, adhered to office, and declared that the house might address the crown for his dishim from his situation, he held it to be neither illegal nor unconstitutional to retain it, and would not recede from his former determination. He at the same time suggested, that there might be persons on the opposite side of the house with whom he could not act. Lord North, understanding himself to be alluded to, declared his readiness to relinquish his pretensions to an official situation, if these should be deemed any obstacle to a union; and this selfdenying declaration was received with great applause. Mr Marsham, Mr Powis, and other members of the St Albans association, then called upon Mr Pitt to yield to the pressing exigencies of his country, but in vain. These gentlemen, however, still continued their efforts; and, to remove the difficulty arising from Mr Pitt's refusal to resign, or to save the honour of the house upon that point, they procura negociation should be set on foot between the Duke of sumed to advise his majesty to act in contradiction to the

Reign of situation; but that he was bound to use his own discre- Portland and Mr Pitt. A message was accordingly sent Reign of George III. tion to prevent the consequences which might attend an by Mr Pitt, acquainting the duke that he was command-George III. instant resignation, from the country being left without ed to signify to him his majesty's earnest desire that his grace should have a personal conference with Mr Pitt for the purpose of forming a new administration, on a wide basis, and on fair and equal terms. The duke requested an explanation of the message with regard to the words equal terms; but Mr Pitt declined any preliminary discus-The Duke of Portland likewise proposed that he should be permitted to understand that the message implied a virtual resignation by Mr Pitt, or that he himself should receive his majesty's commands personally relative Westminster, and in the county of York, to turn the tide to the conference. But both of these propositions were refused, and here terminated the efforts of the St Albans association.

On the 18th of February the chancellor of the exchequer, in his place in the House of Commons, being required to say, previous to the consideration of the question of supply for the ordnance department, whether any communication was to be expected relative to the resolutions of the house which had recently been laid before the king, replied, that his majesty, after considering all the circumstances of the country, had not thought fit to dismiss his ministers, and that his ministers had not resigned. This produced a warm debate, in which it was observed by Mr Fox, that it was the first instance since the operation of men of character, acting on the same public revolution of a direct denial on the part of the crown to comply with the wishes of the House of Commons; and both parties expressed themselves desirous to comply with he threw out a hint that it might be necessary for the the wishes of so respectable a meeting; but the Duke of house to protect its own authority by refusing to vote the supplies. But to allow his majesty's ministers time to consider well their situation, he proposed to defer the report of the ordnance estimate for two days. The refusal of the supplies was treated by the friends of the new administration as a threat which the utmost madness of faction would not seriously attempt to execute, and which could never be justified by his majesty's refusal to dismiss ministers who had been condemned without a trial. On a division, however, there appeared a majority of twelve for postponing the supplies. On the 20th of February a new address to the throne for the removal of the ministers was carried by a majority of twenty-one; and on the 27th his majesty's answer was reported by the speaker, in which it was stated that no charge or complaint had been suggested against the ministers, nor was any one of them specifically objected to; and that, on the other hand, numbers of his subjects had expressed to his majesty the utmost satisfaction with the change of his councils. This answer was abundantly artful, as it tended to alienate the people from the House of Commons, and, at the same time, to perplex the Coalition, who could not accuse the prime minister of any political crime, as he was a young man, who mission; but till the king should think proper to remove had never enjoyed the chief direction of any important affair. A second address to the throne, however, was moved in the House of Commons on the 1st of March, and agreed to by a majority of twelve, remonstrating against the answer to the former address. His majesty replied in civil terms; but persevering in his resolution to retain his ministers, the opposition resolved to make a last effort to overcome the royal determination. Mr Fox declared that he would not propose an address to the throne, because he wished for no answer, but a humble representation, to which it was not customary to make any reply. And this representation consisted of a long remonstrance against the alleged unconstitutional appointment of an administration in opposition to the wishes of the House of Commons; and concluded by stating, that the house had done its duty in pointing out the evil, and that the blame and responsibied the royal interference to the extent of requesting that lity must henceforth lie wholly upon those who had pre-

Reign of uniform maxims which had hitherto governed his own con-payment of the bills accepted by them, in case the funds Reign of destiny, and suffered the mutiny bill, which had been their last security against a premature dissolution, to pass in the

Soon after the partial cessation of this struggle, parliament was dissolved; and in the elections which ensued, the new administration were extremely successful. Upwards of a hundred and sixty members of the former House of Commons lost their seats; and of these, nearly the whole were the friends of the previous administration. Thus the defeat of a powerful combination was completely accomplished, and its leaders were rendered of little importance in the legislature of the empire; and thus terminated the strength of the celebrated Coalition, the fate and effects of which ought never to be forgotten. That unfortunate measure may be said to have ruined the political fortunes of Mr Fox, undoubtedly one of the most accomplished statesmen whom Britain ever produced. From that period he was generally regarded as unfit to be intrusted with power; his eloquence ceased to persuade, and his counsels, even when full of wisdom, were regarded with distrust, because his coalition with Lord North constantly rose up against him, and suggested suspicions of his integrity, or at least of his wisdom. This coalition also had a tendency to diminish the attachment of the nation to the House of Commons, and its confidence in that branch of the legislature which, in fact, might be nothing more than a combination of factious men aiming at personal aggrandizement, and in certain circumstances rendering it necessary for the people to arrange themselves behind the throne, in order to obtain protection against one of the worst and most oppressive of all governments, that of a corrupt aris-

On the 18th of May the new parliament assembled; and in the speech from the throne his majesty assured both houses of his satisfaction in meeting them, after recurring, in so important a moment, to the sense of his people, and of his reliance on their being animated by the same sentiments of loyalty and attachment to the constitution which had been so fully manifested throughout the kingdom. He directed their attention to the affairs of the East India Company, but warned them against adopting any measures which might affect the constitution; and concluded with expressing his inclination to maintain, in their just balance, the rights and privileges of every branch in the legislature.

The affairs of the East India Company were speedily brought before parliament. On the 24th of June a bill was introduced by the chancellor of the exchequer to allow the Company to divide four per cent. on their capital for the half year concluding at midsummer 1784. The necessity of the case was urged in justification of this bill for supporting the credit of the Company; and it was alleged, that notwithstanding their present distresses, which were admitted to be great, there existed a sufficient probability that their affairs upon the whole might warrant such a dividend. The bill passed through both houses, and received the royal assent. On the 2d of July, Mr Pitt brought forward another bill, which had for its object to allow the Company a respite of duties due to the exchequer, to enafuture dividends. This act gave rise to various debates, particularly in consequence of a question put by Mr Phi-

George III. duct, as well as that of every other prince of his illustri- of the Company should prove deficient. But it neverthe-George III. ous house. This representation was carried by a majoriless passed into a law; and Mr Pitt, still further to supty of only one vote, which the Coalition appear to have port the East India Company, brought forward a bill to considered as a defeat; for they finally yielded to their diminish the duty upon tea, for the sake of preventing smuggling, and in lieu thereof to substitute a commutation tax upon windows. The amount of the revenue raised from tea was between L.700,000 and L.800,000; and the object of the new act was to proportion it in such a way as to raise upon that article in future no more than L.169,000, which it was supposed would enable the Company to sell thirteen millions of pounds of tea, instead of five millions and a half.

> But these, which all passed and received the royal assent, were subordinate to the bill for regulating the general management of the affairs of the Company, which, though framed upon the same model with that proposed by Mr Pitt in the last parliament, yet differed from it in several particulars. The powers of the board of control were enlarged; in cases of urgency and secrecy, it was authorized to transmit its own orders to India without these being subject to the revision of the court of directors; in the governor-general and council of Bengal was vested an absolute power over the other presidencies in transactions with the country powers, and in all applications of the revenues and forces in time of war; the receiving of presents was declared to be extortion and disobedience of orders; the Company's servants were required, on their return to England, to lodge in the exchequer a statement upon oath of their whole property; and for the effectual punishment of crimes committed in the East Indies, a new court of justice was instituted.

Mr Francis opposed in strong terms the general principle of this bill, as tending to create an incongruous power, nominal on the part of the directors, real on the part of administration; and Mr Fox affirmed that the proposed board of control violated the privileges of the India Company no less than the enactment of his bills had done, whilst it increased in a greater degree the dangerous influence of the crown. He treated with great contempt the new court of judicature, which he said might fairly be called a bed of justice, as justice would sleep upon it, and thereby embitter the calamities of India, by removing all fear of punishment. When the bill came to be discussed in the committee, Mr Pitt acted in a manner which afterwards on many occasions distinguished his mode of transacting the national business. Instead of coming forward, like the leader of a party, with a measure complete in all its parts, and prepared to receive the firm support of his adherents, he not only of himself proposed some essential alterations, but adopted those suggested by others, whether friends or antagonists. The consequence was, that, in the committee, it underwent important modifications. The power of issuing orders, in the first instance, was limited to the case of the court of directors neglecting to transmit dispatches to the board, after fourteen days' notice, upon any subject which the board might think it necessary to take up. The directors were also empowered to elect a secret c' mmittee of three members, to communicate with the board concerning such orders as the board might of its own authority transmit to India. The appointment of the commander in chief of the army was withdrawn from his majesty, and left with the Company, together with the negative upon nominations in general. ble them to accept of bills beyond the amount prescribed Mr Pitt himself also brought forward some amendments by former statutes, and to establish the regularity of their respecting the constitution of the new tribunal. Authority was now given to any person or persons to move the Court of King's Bench for an information. The court was lip Francis, how far the honour of parliament would be also authorized to issue commissions to the courts in Inpledged by it to enable the East India Company to make dia, for the purpose of taking depositions; and the direc-

George III were excluded from the judicature that was to be erected. between the other candidates the contest was carried on George III. The bill, thus amended, passed the House of Commons on the 28th of July, and the House of Lords on the 9th of

Early in July the chancellor of the exchequer informed the House of Commons that Sir Elijah Impey, chief judge of the supreme court of justice of Bengal, had arrived in England, in consequence of being recalled by his majesty, pursuant to an address of the house. The acute sensibility or powerful imagination of Mr Burke having induced him to interest himself greatly in the sufferings of the natives of India under the British government, he now called on the ministry to enforce the resolutions of the house respecting Sir Elijah Impey, by bringing him to trial; and he repeatedly endeavoured to introduce as the subject of deliberation the reports of the committees of the former parliament respecting Indian affairs; but he was either defeated, with little reply, by a motion for the order of the day, or overpowered and silenced by the loud and continual clamour of the house.

During the present session it was found necessary to have recourse to a loan of six millions, to settle the remaining expenses of the American war. The naval establishment was at the same time fixed on a higher scale than in former years of peace. The number of seamen and marines voted was twenty-six thousand; but the military force was not large, as it did not exceed seventeen thousand five hundred men for guards and garrisons. Several new taxes were imposed upon linen and cotton manufactures, hats, paper, candles, bricks, postage of letters, horses, hackney-coaches, persons dealing in exciseable commodities, and persons engaging in the amusement of shooting game or hunting, none of which met with almost any opposition.

The session closed with a motion, brought forward by Mr Dundas, for the restoration of the estates forfeited in Scotland in the rebellion of 1745, to the descendants or other heirs of the rebels. As this measure had for its object the relief of individuals whose unequivocal attachment to his present majesty and his family could not be supposed to be tainted or affected by the crimes of their ancestors, it met with the approbation of the Commons; but in the House of Lords it was opposed by the Lord Chancellor Thurlow, on the ground both of its impolicy and its partiality; impolicy, as rendering nugatory the settled maxim of the British constitution, that treason was a crime of so deep a dye that nothing was adequate to its punishment but the total eradication of the person, the name, and the family, out of the society which he had attempted to injure; and partiality, because the estates forfeited in 1715, and which were forfeited upon the same grounds and principles as those in 1745, were passed over in silence, whilst a person who had been forfeited in 1690 passed the Lords, and received the royal assent.

At this time the British nation enjoyed profound peace; and the public attention being no longer excited by national efforts, or by the enterprises of any political faction, was easily directed to objects of less importance, among which may be mentioned the discoveries in aerostation, which had hitherto proved of more curiosity than utility.

Parliament assembled again on the 25th of January 1784. In the speech from the throne, the object particularly recommended to the attention of both houses was the final adjustment of the commercial intercourse between Great Britain and Ireland. The first business taken up related to the choice of two members of parliament for Westminster at the late general election. Lord

Reign of tors of the Company, and persons returning from India, as candidates. Lord Hood easily carried his election; but Reign of with unexampled obstinacy. The engaging manners of Mr Fox, who had for some time represented the city of Westminster in parliament, enabled him, however, notwithstanding the general unpopularity of the Coalition, to engage with success in the contest. After the election had continued upwards of six weeks, it was concluded on the 17th May 1784, leaving a considerable majority in favour of Mr Fox. At this time, being the very day previous to the return of the writ for the election, the high bailiff, at the request of Sir Cecil Wray, granted a scrutiny into the votes which he had taken. This was protested against by Mr Fox and several of the electors; and immediately on the meeting of parliament, the conduct of the high bailiff was vehemently attacked by opposition, and no less vigorously defended by administration. On a motion of Lord Mulgrave, however, it was resolved that the high bailiff of Westminster should proceed in the scrutiny with all practicable dispatch. In the beginning of February the business was resumed in the House of Commons. The scrutiny had continued eight months, and only two parishes out of seven had been scrutinized; so that it was admitted that probably more than two years longer would be necessary to finish the scrutiny. On the 8th of February, however, Mr Welbore Ellis moved that a return of the election be immediately made by the high bailiff of Westminster; and, after a variety of debates, it was at length carried, and Lord Hood and Mr Fox were returned as members for Westminster.

On the 18th of February, the attention of the House of Commons was called to the payment of the debts of the pabob of Arcot. The statute which Mr Pitt had got passed during the preceding summer authorized in general terms the court of directors to establish, in concert with the nabob, funds for the payment of such of his debts as should appear to be justly due. The court of directors accordingly ordered the council at Madras to investigate these debts; but the board of control, with some trifling limitation, ordered the whole debts to be paid out of the revenues of the Carnatic. Mr Dundas undertook the defence of the board of control, and treated with ridicule a declaration made by Mr Francis, that rumours were abroad of a collusion between the board of control and the creditors of 1777. He justified the whole of the nabob of Arcot's debts. One set of debts incurred in 1767 consisted of money borrowed by the nabob at the rate of from thirty to thirty-six per cent. interest, to pay off a sum due by the nabob to the Company, which was at that time in the utmost distress, and the interest had afterwards been reduced to ten per cent. The second branch of the nabob's debts had arisen from sums borrowed to pay off his own cavalry, which the Company had ordered him to reduce, but which he was unable to dismiss from was even included in the provision. The bill, however, want of money to pay their arrears. He had borrowed this money, and the Company had engaged its credit for the loan. A third class of debts, incurred or consolidated in 1777, were acknowledged by the nabob to be valid, and were only approved of by the board of control, subject to his objections, or to objections by the Company or the rest of the creditors.

Mr Burke stated a variety of objections to the nabob's debts. It appeared that the nabob had contracted a debt with the Company's servants to the amount of L.888,000 sterling, which, in the year 1767, was settled at an interest of ten per cent. In the year 1777 a second debt of the nabob of Arcot, amounting to L.2,400,000, was settled at twelve per cent. interest; and to this was added another debt, called the cavalry debt, of L.160,000, at the same Hood, Mr Fox, and Sir Cecil Wray, had offered themselves interest. The whole of these four capitals, amounting to

1764.

Reign of L.4,440,000, produced at their several rates annuities tions to the utmost of his strength; and that he would ex- Reign of stood chargeable on the public revenues of the Carnatic. These annuities, equal to the revenues of a kingdom, were possessed by a small number of individuals of no consethe loan of 1767 was the fairest, as it could be convicted of nothing worse than the most enormous usury. The interest at thirty-six per cent. was first paid, then twentyfive, then twenty, and, lastly, the interest was reduced to ten per cent.; but all along the interest had been added to the principal, so that of L.888,000 Mr Burke doubted whether the nabob ever saw L.100,000 in real money. With regard to the cavalry debt, Mr Burke stated, that instead of ready money, the English money jobbers engaged to pay the nabob's cavalry in bills payable in four months, for which they were to receive immediately at least one per cent. per month, but probably two, such being the rate generally paid by the nabob, and that a territorial revenue was assigned to them for that purpose; but it was upwards of two years before the arrears of the cavalry were discharged; and these jobbers being all this time in receipt of the assigned revenue, they paid off the nabob's troops with his own money. As to the debt of 1777, Mr Burke observed, that in different accounts the principal sum rose from L.1,300,000 to L.2,400,000, and the creditors had never appeared the same in any two lists. In the year 1781 they were satisfied to have twenty-five per cent. at once struck off from the capital, yet they were now to obtain payment of the whole. It appeared, therefore, that the nabob and his creditors were not adversaries, but collusive parties; and that when the nabob gave an acknowledgment of debt to a European, he received no money, and only endeavoured to support his own influence by receiving the servants of the Company into his pay. The motion for an inquiry into the conduct of the board of control on this occasion was however negatived on a division.

When Mr Pitt came into office, he had the singular good fortune of being highly popular with the nation, while he was selected to support the royal prerogative and authority against the majority of the House of Commons, then possessed by the Coalition. Accordingly, it became one of the features of his conduct to attempt, if possible, to reconcile the services expected from him by the crown with the apparent pursuit of whatever measure happened for the time to be an object of popular favour. The attempt to procure a reform in the representation of the people in the House of Commons was one of these objects. He had formerly engaged in it while acting in opposition; and now, after he had become the first minister of the crown, he still undertook to stand forward as its advocate. Every writer of history must be sensible of the defective nature of the details which he is able to give as to the causes which produce or regulate the most important events, and which often lie hidden in a region far beyond the limits of his penetration or research. In what way, or by what means, Mr Pitt contrived to retain the confidence of his master, whilst he at the same time stood forward as the champion of a reform which every body knew to be hateful at court, it is impossible to conjecture. Certain it is, however, that after he had attained to the chief place in the present administration, he still continued to correspond with the leading advocates of parliamentary reform, whose meetings he had been accustomed to attend. In a circular letter to Mr Wyvil, president of a committee of Yorkshire gentlemen, it was stated that Mr Pitt had given authority to declare, that he would bring forward the

George III. amounting to L.623,000 a year, more than half of which ert his whole power and credit, as a man and as a minis. George III. ter, honestly and boldly, to carry such a system as should place the constitution on a footing of permanent security. And at the commencement of the session, when the subquence, situation, or profession. Mr Burke admitted that ject was alluded to, Mr Pitt took the opportunity to declare, that on this business he laboured incessantly; that it was that which of all others was nearest his heart, but at so early a period of the session it was impossible to state his plan specifically; that much remained to be done, but his ideas were not matured; that a reform in parliament comprehended a great variety of considerations, relating to the essentials of the constitution; that in this path he was determined to tread, but he knew with what tenderness and circumspection it became him to proceed; and he requested the house to come to the subject uninfluenced by any of those schemes and hypotheses which

had hitherto been suggested.

It was not till the 18th of April, however, that he called the attention of the house to this important subject. He declared himself aware of the difficulties he must expect to encounter in proposing a plan of reform; but he entertained more sanguine hopes of success than formerly, because there never was a moment when the minds of men were more enlightened on this interesting topic, or more prepared for its discussion. He was particularly anxious to remove the objection of innovation. Anciently great fluctuations had taken place in the franchise. The number of members had varied, and even the representation of the counties was not uniform. As one borough decayed and another flourished, the first was abolished and the second enfranchised. This arose from a maxim the application of which was intrusted to the crown, that the principal places, and not the decayed boroughs, should be called upon to exercise the right of election. He was no advocate for a revival of this discretionary power, but the maxim upon which it was founded ought now to be carried into effect. The outline of his plan was this: To transfer the right of choosing representatives from thirtysix of such boroughs as had already fallen, or were falling into decay, to the counties, and such chief towns and cities as were still unrepresented; to provide a fund for the purpose of giving to the owners and holders of such boroughs disfranchised, an appreciated compensation for their property; and to make the receiving of this compensation a voluntary act of the proprietor, and if not received when tendered, to place it out at compound interest, until it became an irresistible bait to such proprietors. He also proposed to extend the right of voting for knights of the shire, to copyholders as well as freeholders. Besides the thirty-six boroughs already mentioned, he proposed to purchase the franchise of other boroughs, and to transfer the right of returning members to unrepresented large towns, which should petition parliament for the privilege. Thus a hundred members would be given to the popular interest of the kingdom, and the right of election extended to a hundred thousand additional persons. Mr Fox disapproved of purchasing from a majority of the electors of a borough the property of the whole, and of holding out pecuniary temptations to an Englishman to relinquish his franchise, though he declared himself a friend to the general principle of a more equitable representation. Mr Wilberforce supported Mr Pitt's proposal, because, by putting an end to the representation of the decayed boroughs, dangerous aristocratical coalitions would in future be prevented. But it was warmly opposed by Mr Powis, who alleged that the people of England had not called for reform, and that the business in which Mr Pitt had unforsubject of a parliamentary reform as early as possible in tunately engaged himself was a volunteer crusade, or a the session; that he would support his intended proposi- piece of political knight-errantry. Lord North likewise

George III. contented, happy, and in full possession of their liberties. low the produce of the colonies to be imported into Bri-George III. large majority; which was probably the very result Mr Pitt not only anticipated, but also desired.

As the sole object for which the English monarchs anciently assembled their parliaments was to obtain money from their subjects, so the adjustment of the public expenses, and levying adequate supplies, always continue to occupy a large portion of the time of every session of parliament. The prodigal expenditure which had taken place during the war still required additional taxes. For this purpose new demands were made. Hawkers and pedlars, and attornies, were taxed; and the duties on male servants and post horses were enlarged. An impost laid upon retail shops, however, encountered persevering opposition in parliament, as well as much unpopularity in the nation. It was represented as unfair, because it fell upon a small number of industrious persons; and it was observed, that, unlike other taxes, those who imposed it were in no hazard themselves of paying any part of it. But of all the taxes proposed by the minister, none encountered such sarcastic animadversion as that upon maid-servants; and Mr Pitt, who was understood to be something of a misogynist, was accused by Mr Sheridan of holding out a bounty to celibacy. But the subject which excited most attention was that of the ordnance. As early as the year 1782, the Duke of Richmond had planned an expensive system of fortifications, for protecting the different dock-yards of the kingdom; the idea having originated in the alarm occasioned by the appearance of the combined fleet in the Channel. The works had for some time been carried on, and the sum of L.50,000 annually voted, without much attention being given to the subject. But during this session it was moved that an account should be laid before the house, of the expenses already incurred on fortifications, at Plymouth, Portsmouth, Gosport, Chatham, Dover, and Sheerness, with a report of the probable expense of completing the fortifications of Portsmouth and Plymouth; and afterwards the annual grant was opposed. Mr Pitt defended the Duke of Richmond, but agreed to a proposal which had been made to take the opinion of a council of officers; and this put an end to the debate.

A bill for better regulating the office of the treasurer of the navy passed without any sort of opposition; and another for the better examining of the public accounts met with little opposition; but a third brought in by Mr Pitt, for the general reform of public offices, encountered strenuous opposition. Mr Sheridan contended that it was unnecessary, as the treasury possessed ample power to make the necessary reforms; and Mr Burke contrasted, in strong terms, the trifling economy here proposed, with the prodigality of the ministers in their proceedings respecting the revenues of the Carnatic, and the sanction given by them to the pretended debts of the nabob of Arcot. The bill, however, passed through both houses, and received the royal assent.

One of the most important subjects brought under the consideration of parliament during the session, was an attempt by Mr Pitt to establish a plan of commercial union between Great Britain and Ireland. This plan was proposed to the Irish House of Commons on the 7th of February, by Mr Ord, and consisted of ten articles, usually styled the Irish Propositions, which were passed with little debate, and an address of approbation voted to his majesty. On the 22d of the same month Mr Pitt introduced the subject to the British House of Commons. He expatiated on the false and oppressive policy which had long been pursued by government in regard to Ireland, in order to render her completely subservient to the interest and opu-

Reign of opposed all change, alleging that the people were actually lence of this country; and concluded by proposing to al- Reign of And, finally, leave to bring in the bill was refused by a tain through Ireland, and to equalize the duties on the produce and manufactures of both countries; in return for which concession it was stipulated, that the parliament of Ireland should irrevocably secure some provision for defraying the expense of protecting the commerce of the empire in time of peace. After some debates upon the subject, petitions from Liverpool, Paisley, Glasgow, Manchester, and other places, to the number of sixty, were presented against the measure; and from the 16th of March to the 12th of May the House of Commons were almost incessantly employed in hearing counsel and examining witnesses. Certain exceptions were now introduced to the general rule of admitting an equal commerce between the countries; corn, meal, flour, and beer, were excluded in favour of British agriculture; and various regulations were made to secure an effectual equality of duties upon every particular object of trade in both coun-The plan thus amended produced a variety of debates, in the course of which Lord North expressed his wish for a complete incorporative union of the two kingdoms, in preference to a partial settlement, which might prove the source of perpetual discord. The resolutions, however, were warmly opposed; and being carried by only a small majority, administration did not think proper to press the adoption of the scheme.

> The American war had in some measure alienated the British nation from ideas of conquest and military splendour. Commercial pursuits were now chiefly valued, and formed the principal object of encouragement to the government, and of pursuit by the people; but to prosecute these with success, it was necessary to preserve a good understanding with the neighbouring powers; and this was effected, though with some difficulty, in consequence of certain foreign occurrences not unworthy of attention.

Joseph II. was at this time at the head of the house of Austria and of the Germanic body; and among the various projects which marked his restless career, there was one which, had it been attended with success, could scarcely have failed to affect the future condition of the Germanic body. He had entered secretly into a negociation with the elector of Bavaria, then an infirm old man, for an exchange of the electorate of Bavaria in lieu of the provinces of the Austrian Netherlands, which were to be converted into a kingdom for the elector. Count Romanzof, the Russian minister to the diet of Frankfort, informed the Duke of Deuxponts, nephew and heir to the elector, of the substance of this treaty; and at the same time assured him that it would be carried into execution, whether he consented to the exchange or not. In the month of January of this year the duke gave notice of the intended measure to Frederick II. king of Prussia, who regarded it as a project dangerous to his own independence, as well as to that of the other German states, and endeavoured instantly to spread an alarm through Europe. He alleged, that the proposed exchange was in the highest degree iniquitous and unfair; that though the population on both sides was nearly equal, the extent of territory on the side of Bavaria more than doubled that of the Low Countries, while their respective revenues were equally disproportioned; that in Bavaria, agriculture, commerce, and finance, were notoriously neglected, whereas in the Austrian Netherlands these resources had been extended to their utmost pitch; that, whilst the territory which the emperor hoped to acquire was capable of considerable improvement, that which he gave away might be expected to retrograde rather than to advance; that these circumstances, however, were of little importance, compared with the political consequences which must result from such a measure; that the Nether-

1785.

Reign of lands being situated at a distance from the other Austrian sion; but Mr Pitt declined entering into any defence of Reign of George III. dominions, had always proved a source of weakness, rather than of strength, to that power; that, although a considerable revenue was derived from these provinces, it was often dearly bought, in consequence of the wars occasioned by the vicinity of France; that great political efforts had recently been made by the court of Vienna to avoid all future grounds of quarrel with the French monarchy, and this had been accomplished by the marriage of an Austrian princess to the king of France; that the possession of Bavaria, from its vicinity to the rest of the Austrian dominions, would secure to the emperor a chain of territory from the banks of the Rhine along a great part of the course of the Danube, and give him such a preponderance as would overturn all power in Germany capable of resisting the head of the empire; and that this mighty country might, at no remote period, be consolidated into one mass, and Austria would then probably rank in every sense as the first power in Europe.

Thus reasoned Frederick the Great. Succeeding events seem to warrant a belief that such an acquisition of strength by the house of Austria might have proved of considerable utility to Europe; but at the time when the scheme was The treaty proposed it excited general apprehensions. for the exchange had been concluded under the auspices of Russia and France, and to them accordingly the king of Prussia addressed his remonstrances. But the emperor of Germany and the elector of Bavaria soon found their project so strongly disapproved of by other powers, that they absolutely disavowed it; whilst the court of France contented itself with replying to the remonstrance of the king of Prussia, that the exchange had been proposed, as depending upon the voluntary arrangement of the parties, but that, as the Duke of Deuxponts had refused his consent,

the proposition of course became fruitless.

Frederick, in the mean time, exerted himself with great assiduity in negociating a league with the electors of Hanover and Saxony, for the preservation of the Germanic constitution, and for preventing such cessions and exchanges of territory as might afterwards prove injurious to the balance of power in the empire. A treaty to this purpose was therefore concluded on the 23d of July, and several German princes acceded to it, among whom were the elector of Mentz, the landgrave of Hesse Cassel, the dukes of Brunswick, Namur, and Saxe-Gotha, and the prince of Anhalt. The elector of Hanover also entered readily into the transaction, and from that period an intimate connection commenced between the courts of London and Berlin. Some British politicians, however, supposed that the opposition made to the imperial project was unwise, as tending to excite a spirit of hostility against us on the part of Austria, which, of all the powers of the Continent, was considered as our most natural ally; and it was probably owing to the part taken by Britain in this transaction that the emperor published an edict prohibiting the importation of British manufactures into any part of the Austrian dominions. In the course of the summer also the French issued an edict restricting the sale of various articles of British manufacture, particularly saddlery, hosiery, woollen cloths, and hardware, unless upon payment of duties the amount of which was equivalent to a prohibition. counteract these proceedings commercial treaties were negociated with the courts of Petersburgh and Versailles; that with the latter having been undertaken in pursuance of a provision in the definitive treaty of peace.

Parliament met on the 24th of January 1786. In the speech from the throne some notice was taken of the continental dispute above mentioned, which was said to have terminated in such a way as to threaten no interruption to the tranquillity of Europe. This excited some discus-

the Germanic league, as he and his colleagues in office had George III. not interfered in the formation of it; observing that accident alone had placed the sovereignty of Hanover and of this country in the same hands, and desiring to have it understood that Great Britain was by no means bound by any leagues entered into by the elector of Hanover. Mr Fox, however, denied that the affairs of Hanover could be really separated from those of Britain. Supposing that it should hereafter appear necessary for Great Britain to join the court of Vienna against the league of the Germanic princes, and that the elector of Hanover should appear as one of those princes at the head of his own troops, he put the question, Whether a British army could be directed to act in a hostile manner against troops led by their sovereign in his character of elector of Hanover? George I. purchased Bremen and Verden from Denmark, the minister of that day, General Stanhope, used precisely the same language, and told the House of Commons that they had nothing to do with his majesty's conduct respecting his electoral dominions. But the consequence was, that the resentment of the Swedish monarch Charles XII. on account of this transaction, threatened Great Britain with a most dangerous invasion; and the very next year General Stanhope was under the necessity of demanding additional supplies, to enable his majesty to defray the expenses to which he was exposed in consequence of his purchase.

The attention of parliament was again directed to the Duke of Richmond's plan of fortification. In consequence of the former debate on the subject, the project had been remitted to the consideration of a board of officers, of which the Duke of Richmond was appointed president; and which consisted, besides the president, of Lieutenant-generals Earl Percy, Earl Cornwallis, Sir Guy Carleton, Sir William Howe, Sir David Lindsay, Sir Charles Grey, Lord George Lennox, and John Burgoyne, and six major-generals, together with Vice-admirals Barrington and Milbank, Rearadmirals Graves and Lord Hood, and Captains Hotham, Macbride, Bowyer, Luttrell, Sir John Jervis, and Sir Andrew Snape Hammond. On the 10th of February Mr Pitt stated to the House of Commons that the board had reported to his majesty their approbation of the plan, as perfectly adequate to the defence intended, and as being at the same time the least expensive in the construction, and requiring a smaller force to defend the works, than any other that could be proposed. He also presented an estimate, which had been prepared by the board of engineers, of the expense necessary to construct the fortifications. The decision of the House of Commons, however, was delayed till the end of February, when the subject was again brought forward by Mr Pitt, who proposed a resolution, bearing, that to provide effectually for securing the dock-yards of Portsmouth and Plymouth by a permanent system of fortification, was an essential object for the safety of the state, intimately connected with the general defence of the kingdom, and necessary to enable the fleet to act with vigour and effect whenever its services were required. This led to a long and not very interesting debate, the result of which was, that upon a vote the house divided equally, when the speaker gave his casting vote in opposition to the measure. On the 17th of May, however, the question was revived by Mr Pitt, who proposed that the fortifications should still be carried on at Portsmouth and Plymouth, though upon a more limited scale; but the motion was opposed with much severity of language, and at length withdrawn.

The attention of parliament was for some time occupied with a proposal for reducing the laws relative to the militia into a general act, and providing for their being an

1786.

Reign of nually called out and disciplined. Mr Pitt opposed the could not be done by stealth, and a minister would not Reign of ing that a different opinion prevailed, he consented, on mand the repeal of so necessary a law. condition that, though the whole number of men were bal-

opposition.

But the subject which occupied most attention during the session was the proposal of a sinking fund to be applied towards discharging the public debt. Mr Pitt had occasionally mentioned it, during the preceding session, as a great and important national measure which he intended to bring forward; and early in the present session he moved that certain papers should be laid upon the table of the House of Commons, to enable them to form an estimate of the annual amount of the national revenue and expenditure, from which a judgment might be formed of the existing disposable surplus, and of the sum it would be further necessary to provide to raise the total to the amount requisite to form the basis of the intended sinking fund. On the 7th of March he proposed the appointment by ballot of a select committee of nine persons to examine these papers, and to report the result to the house. He stated it as his intention to take every possible step to give complete satisfaction to the nation in a matter of such general concern; and he conceived that the solemnity of a committee, and the formality of a report, would answer the purpose better than a set of unconnected papers or the affirmation of a minister. The committee as balloted consisted of the Marquis of Graham, Mr William Grenville, Mr Edward Elliot, Mr Rose, Mr Wilberforce, Mr Beaufoy, Mr John Call, Mr Smith, and Mr Addington. When this committee had made its report, Mr Pitt, on the 29th March, proposed his plan to the Commons in a committee of the whole house. He congratulated parliament upon the prospects of the nation in a style of animated eloquence. He stated the revenue for the current year, as reported by the committee, to amount to L.15,397,000. The interest of the national debt was L.9,275,769, and the civil list L.900,000, which, together with the whole other expenditure for the army and navy, and other establishments, amounted to L.14,478,000; consequently there remained a surplus of the annual income, above the expenditure, of L.900,000. One million he stated to be the sum annually to be contributed to the sinking fund; and to make up the sum of L.100,000 wanted to complete this amount, he proposed small additional taxes upon spirits, timber, and hair powder and perfumery. The sum of L.1,000,000 thus provided he proposed to place in the hands of commissioners appointed for that purpose, in quarterly payments of L.250,000 each, to begin on the 5th of the following July. It was his wish that the commissioners should consist of persons of rank and distinction, the speaker of the House of Commons, the chancellor of the exchequer, the master of the rolls, the governor and deputy-governor of the bank of England, and the accomptant-general of the high court of chancery. He alleged, that by laying out the sinking fund regularly at compound interest, the million to be applied would rise to a great amount in a period that was not very long in the life of an individual, and but an hour in the existence of a nation. It would diminish the debt of this country so much as to prevent the exigencies of war from ever raising it to the enormous height which they had hitherto done. In the period of twentyeight years, the sum of a million, annually appropriated, would produce an income of four millions annually. By placing the sum in the hands of commissioners, to be applied by them quarterly to the purchase of stock, no sum would ever lie within the grasp of a minister great enough to tempt him to infringe upon this national revenue. It

George III. calling out of the militia annually; but afterwards, find- have the confidence to come to the house expressly to de-George III. 1786.

Mr Fox approved in general of the institution of a sinkloted for and enrolled, only two thirds should be actually ing fund, but thought twenty-eight years too long a peemployed. The measure, however, did not pass without riod to look forward to for the effect of the project. Before that term had arrived, it was not improbable that we might have another war; and a variety of circumstances might occur, which would operate as a temptation to a future chancellor of the exchequer, and a future House of Commons, to repeal the act, annul the institution, and divert the appropriation of its stock to the immediate services of the year. He stated two specific objections to the plan. The first was, that the sum appropriated ought not to have been made unalienable in time of war; and the second, that, by the institution, parliament being bound to nobody but itself, the whole plan was liable to be annihilated by a future parliament. Fox repeated his objections at a future stage, and at last, in consequence of the acquiescence of Mr Pitt, introduced an amendment, that whenever a new loan should hereafter be made, the minister should not only propose taxes sufficient to pay the interest of the loan, but also to make good whatever it should be found expedient to take from the sinking fund to supply the necessities of the nation; meaning, that if, when a new loan of six millions was proposed, there should be one million in the hands of the commissioners, then the commissioners should take a million of the loan, and the bonus of that million should be received by them for the public, who would thus have only five millions to borrow. In the House of Lords, the other objection stated by Mr Fox was urged with some variation by Earl Stanhope, who expatiated on the danger which might occur, in future wars, of diverting the fund from its proper destination. But the bill nevertheless passed into a law without any alteration.

> The establishment of a sinking fund appears to have been one of Mr Pitt's favourite schemes of finance; and, in fact, it was that which produced him the greatest degree of popularity; while, from his remaining in power during the long and expensive war which succeeded its establishment, it continued to be regularly and fully carried into effect. When a new loan was made, the minister not only proposed taxes sufficient to pay the annual interest of the new debt, but also to afford a surplus or sinking fund of one per cent. per annum, to be applied by the commissioners towards the extinction of the debt. It is almost superfluous to observe, that this scheme, from which such mighty results were anticipated, both by the political friends and opponents of the ministry, and which was loudly vaunted of as a monument raised to perpetuate his fame, is now known to every tyro in political science to have been bottomed on principles wholly fallacious; and the consequence has been, that some of its firmest supporters, having abjured the opinions which they originally entertained respecting it, afterwards united with those who had all along entertained sounder views, in putting an end to this expensive and cumbrous delusion, which had for a time imposed on the arithmetic as well as on the sense of the nation. The only effect of such a fund, when well contrived and steadily adhered to, seems to be, that it enables a nation to maintain its credit in difficult circumstances, and thus to carry on the accumulation of public debt to the highest possible amount, as well as to make trial in the completest manner of all the moral and political consequences of the funding system. We may add, that the project was not of Mr Pitt's contrivance; it formed only one, and that too not the most plausible, of three plans presented to him by Dr Price.

When the estimates for the navy were voted this year,

Reign of some observations were suggested by Captain Macbride, the empire. The remaining foreign possessions, such as Reign of sixty-four gun ships; and observed that our having so many vessels of this sort was a principal reason of the many defeats we had suffered in the last war. The French had now not more than three or four sixty-four gun ships, and they took care not to build any new ones upon that construction. Another thing against our navy was, that the third, the navy of England would prove one third stronger. He condemned the system of suffering the ships to remain in their copper bottoms during time of peace; and contended, that if we persisted in this practice there would be no occasion to argue whether ships of one size or another should be built, for we should soon have no navy in our possession. The French had discovered the folly of the practice, and had for some time left off the mode of sheathing their ships. We ought therefore to do the same, stroyed their bolts more than either worms or time; and hence, the instant the ships which had been long laid up in ordinary were sent to sea, their bottoms would drop out, and thousands of brave seamen would perish in the ocean. John Jervis, and, as far as related to the sheathing with copper, by Captain Luttrell.

At this time the British nation, recovered from the effects of the war, was enjoying considerable prosperity. The administration of justice, proceeding in the ordinary course sanctioned by the constitution, produced its usual and natural effects of tranquillity and general satisfaction. The sovereign, in consequence of his domestic virtues and regular life, was personally popular. The members of administration had obtained their offices under circumstances which originally secured the good will of the nation; and no public events had occurred to expose their characters to any severe trial, or to produce an alteration most distinguished members of the late coalition, continuing to hold seats in parliament, naturally wished to attract the public notice, and to rescue themselves from the neglect into which they had of late fallen. For this purpose they appear to have looked towards our Indian empire for materials upon which to exert their talents and to demonstrate their public spirit; and accordingly, during the prebring to trial and punishment Warren Hastings, late governor-general of Bengal, for crimes alleged to have been committed in that country.

There is something in the nature of the British constitution, or rather, perhaps, in that of every free state, which renders conquest, or even the acquisition of foreign territories, in any form, not a little inconvenient. In the case of the British American territories, a constitution established in every colony or province; and these separate constitutions had produced abundance of internal prosperity to the colonies; but the whole formed a disjointed empire, slightly bound together by a limited executive power, and destitute of a common legislature; and an attempt, made by the legislature of the parent state, to make laws for the whole of the subordinate communities,

George III which are worthy of being recorded, on account of their Ireland and the West India islands, might be supposed to George III relation to the progressive improvement of the chief de- remain in union with the metropolitan country chiefly in fence of the British islands. He censured extremely the consequence of their weakness, which rendered its protecvoting of large sums of money for the repair of sixty and tion necessary to their safety, or made them incapable of erecting themselves into separate governments in opposition to its will. But the territories which had been acquired by the British in India were, in this respect, in a very peculiar situation. It might perhaps have been possible, by an incorporating union, and an extension of the privilege of representation, to combine into one firm and con-French seventy-four gun ships were of two thousand tons solidated government the whole British islands, together burden, while our seventy-fours had been reduced to six- with the American colonies; but with regard to the terteen hundred tons. Captain Macbride expressed his be- ritory of Hindustan, any thing of this kind was altogether lief, that if the number of our ships were reduced one impracticable. That great and fertile country, inhabited by men of a feebler race, and of different language, character, and religion, is incapable of being united to the British nation upon principles of equal political freedom. It had been originally acquired, not by a conquest made under the direct authority of the executive government of Britain, but by a company of merchants, who, by uniting the military superiority of Europeans with the arts of commercial men, contrived gradually to subjugate one of the fairest portions of the globe, containing a population or at least to take off the copper when the ships were to remain long in still water. The copper corroded and deprogress of such a power towards empire was necessarily attended with the most cruel hardships to the natives of the subjugated country. When the mercantile invaders possessed abundance of European troops, they employed them in making direct conquests of additional territory; The ideas of Captain Macbride were confirmed by Sir when these troops were exhausted by war or by the climate, or, having enriched themselves, had returned to Europe loaded with the spoils of the East, and left their former employers in that quarter in a state of considerable weakness, the servants of the Company then exerted their ingenuity to foment divisions among the native princes; and when they could no longer act as principals, they appeared as seconds in every quarrel, and obtained new territories as the reward of their insidious aid. With such views they formed and broke alliances without scruple; and, on receiving supplies of troops from Europe, they were never at a loss for pretences upon which to extend their dominion. All this was the natural result of the situation of the British East India Company with regard to the nain the public opinion regarding them. Still, however, the tives of Hindustan. But as the jealousy of the neighbouring states of Europe, together with their equal progress in the art of war, had long put an end to the extension of conquests, and produced much political moderation in the transactions of nations, many of the people of Great Britain learned with astonishment that their countrymen had conducted themselves in Hindustan in a manner which in Europe would have been regarded with abhorrence. Efsent session, an attempt was commenced by Mr Burke to forts, however, had been made to ameliorate as much as possible the government of India, by subjecting it, in a considerable degree, to the direct authority of the executive government of this country, instead of suffering it to remain totally vested in a company of merchants; and here it appears to have been wished that the affair should be suffered to rest, and that whatever was past should be overlooked and forgotten.

This, however, did not suit the present views of oppoless or more resembling that of Great Britain had been sition. Mr Burke, in particular, had been led by an ardent imagination to interest himself deeply in the calamities suffered by the natives of India; and the policy of his party at this time coincided entirely with his feelings. Accordingly he endeavoured with much eagerness to bring to trial and punishment the most distinguished person who had recently figured upon the great theatre of Indian affairs. But great obstacles stood in the way of gave rise to a war which ended in the dismemberment of Mr Burke's proposed attempt to procure a parliamentary

Reign of conviction of Mr Hastings. He had to overcome a long to no protection from the British government. Upon the Reign of George III series of unpopularity, the personal indifference which had been shown to him by the House of Commons, and their indisposition so much as to give him a hearing, together with the coldness of the nation at large regarding complaints of East India delinquency. All these, however, he surmounted by efforts of the most obstinate perseverance, and of consummate eloquence, upon the fertile subject of cruelty, oppression, and treachery, committed under the authority of the British government in the East; the public attention was gradually attracted to the subject; and at last it formed the chief subject of conversation and of political discussion in all parts of the island.

Mr Hastings had arrived in England on the 16th of June 1785, and on the 20th of that month Mr Burke had given notice of his intention to move for an inquiry into the conduct of the ex-governor-general. On the day of the meeting of parliament, in January this year, Major Scott, the particular friend of Mr Hastings, publicly reminded Mr Burke of the menace he had thrown out, and requested Mr Burke speedily to decide upon the course he was to pursue. Accordingly, about the middle of February, this gentleman having resolved to proceed against Mr Hastings, by moving the House of Commons to impeach him at the bar of the House of Lords, endeavoured to prepare for substantiating the charges which were to be brought, by proposing that the house should order production of various papers; and motions to this effect were renewed by him at different periods. These motions gave rise to a variety of debates, in which Mr Dundas, who, as president of the board of control, now acted as minister for India affairs, together with Sir Lloyd Kenyon, master of the rolls, chiefly opposed Mr Burke, and threw considerable difficulties in his way. Mr Pitt appeared also to be favourable to Mr Hastings; but, upon the whole, he preferred assuming the character of a candid and impartial judge upon the occasion, affording neither protection to the accused nor favour to the accuser. At last, in the month of April, Mr Burke presented to the house his charges against Mr Hastings, twenty-one in number; and to these an additional article was afterwards added. The charges were of various degrees of importance; and some of them had sufficient weight to excite a considerable degree of public interest. Mr Hastings was accused of driving a whole people, the Rohillas, from their territory, without any show of cause for so doing; of arbitrarily confiscating the property of the native princes, and imprisoning them and their servants for the purposes of extortion; of entering into war with the Mahrattas without necessity, and treacherously delivering the Mogul into their hands on the conclusion of peace; together with a variety of other offences of minor importance. On the 26th of April Mr Hastings presented a petition, requesting to be furnished with a copy of the articles of impeachment, and to be heard in his defence against them before any witnesses should be examined. This request was at once granted; and Mr Hastings having appeared at the bar, stated the great efforts which he had made for the aggrandisement of the British power in the East, and entered into a defence of his conduct on the particular points upon which he had been accused. He asserted that the Rohillas were a tribe of adventurers, in driving whom from a usurped territory he had only assisted in performing an act of necessary justice; that the princes or princesses whose property he was accused of having seized for the use of the conquerors, had deserved their misfortunes by their treachery and rebellion; that the war with the Mahrattas had not been commenced by him; that the terms of the pacification were almost universally considered as advantageous; and that the Mogul having thrown himself into their hands, was entitled

other points he in like manner asserted, not only the inno-George III. cence, but the meritorious nature of his conduct, resting his defence chiefly upon such arguments as conquering princes usually employ to justify encroachments upon their weaker neighbours.

On the 1st of June Mr Burke brought forward in the House of Commons his first charge, which related to the expulsion of the Rohillas from their country, to the number of sixty thousand men, women, and children. On this occasion Mr Burke, exerting all his eloquence, represented the prosecution as not merely a question respecting the character of an individual, or brought forward for the purpose of inflicting a hardship upon him, but as a measure necessary for the establishment of the principle of responsibility with regard to the future governors of our distant possessions, and therefore as a national and imperial question, decisive of the good or ill government of millions yet unborn. He described, in interesting terms, the character of the Rohillas, the simplicity of their manners, the prosperity of their country, and their zeal for agriculture and commerce; and he denied that there existed any plausible ground to justify the assistance which Mr Hastings had given to one of their rapacious neighbours to expel them from their territory. After a debate, however, the house decided that this charge did not contain sufficient matter of impeachment against Mr Hastings. The next article of crimination against Mr Hastings was founded upon his alleged oppressive conduct towards Cheit Sing, the rajah of Benares. From this prince he had first arbitrarily demanded payment of a sum of money, in addition to the ordinary tribute, and, on the rajah delaying payment, imposed upon him a fine of half a million sterling; then he insulted him by an ignominious arrest, and thereafter expelled him from his dominions. This charge was opened with great ability by Mr Fox, and opposed by Major Scott and Mr Grenville, who inveighed against the rajah for his alleged unwillingness to support the British power in a dangerous crisis, and for the favour he had shown the schemes of its enemies. By this time the repeated discussion of the subject had begun to interest the public; and pamphlets were published, in which Mr Hastings' character was violently attacked, and as eagerly defended. His conduct as a governor-general of India, however, appeared to the majority of the people so totally inconsistent with those ideas of equity which regulate the opinions of men in this country, that a violent degree of popular indignation was excited against him. Hitherto, however, he had been supported in the House of Commons by those who usually adhered to administration; though Mr Pitt himself had on all occasions declared his wish to act candidly as a judge, and to avoid treating the matter as a question to be supported by a particular party. But upon this article of charge concerning the rajah of Benares he entered into the views of Mr Fox; and having declared himself satisfied that Mr Hastings had in this case acted unjustifiably, it was determined by a majority that the accusation contained matter of impeachment against the late governor-general of Bengal.

During this session some further provisions were enacted for the better regulation of the government of India. On the 7th of March a motion was made by Mr Francis, and seconded by Mr Windham, for leave to bring in a bill to explain and amend the act, formerly brought in and carried through by Mr Pitt, for regulating Indian affairs. Mr Francis censured strongly three différent parts of Mr Pitt's act; first, that which establishes a double government of India at home, by the court of directors and the board of control; secondly, the excessive power, by means of a constant casting voice in the council, which was bestowed

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Reign of upon the governor-general of Bengal; and, thirdly, the in- ought to be examined with much jealousy, on account of Reign of George III. stitution of a special court of justice for the trial of Indian its introducing an innovation into the established system George III.

of trial by jury. On the authority of Lord Macartney, Mr Dundas defended the powers conferred upon the governorgeneral of Bengal; and declared the necessity of a new court of judicature, from the voluminous nature of the evidence in the cases of Sir Thomas Rumbold and Mr Hastings, which could not be gone through by the ordinary form of jury trial. At the same time he stated it as his intention to bring forward a bill for amending, in certain respects, the regulating act of 1784. Mr Francis's motion was accordingly rejected; and on the 16th of March Mr Dundas brought forward his new bill for the regulation of India, which conferred still further powers upon the governor-general, authorizing him to act in opposition to the sense of his council when he thought fit to take the responsibility upon himself; united the offices of commander-inchief and governor-general; authorized the board of control to inquire into the fortunes of persons serving in India; and divided the service there into different branches, declaring that the servants of the Company should rise by gradation only in those branches of service for which they had been prepared by their former habits. After a variety of debates in both houses, the bill was passed.

The session of parliament terminated on the 11th of July, and during the remainder of the year the British empire enjoyed profound tranquillity. An incident, however, occurred, which called forth demonstrations of attachment to the person of the king from all orders of men in the kingdom. On alighting from his carriage on the 2d of August, a woman approached his majesty, under the pretence of offering a petition, and at the same time aimed a thrust at him with a knife, which, however, did no harm. Being instantly seized, and examined by some members of the privy council, with the assistance of several medical gentlemen, this woman, whose name was Margaret Nicholson, proved to be insane, and was ordered to be confined for life in Bethlehem Hospital. A public thanksgiving was ordered for his majesty's safety, and addresses of congratulation poured in from all parts of the country.

One of the most important measures of Mr Pitt's administration was carried into effect in the autumn of this year. It consisted of a commercial treaty, which, as we have already stated, Mr Eden was sent to negociate with France, and which was concluded on the 26th of September. This treaty stipulated, in general terms, that there should be a perfect liberty of navigation and commerce between the subjects of the two sovereigns in all their European dominions, with the view of giving fair encouragement to the produce and manufactures of both countries; and a particular tariff was adjusted with regard to a great number of were to be reciprocally imported on the terms allowed to the most favoured nations. Each of the monarchs reserved the right of countervailing, by additional taxes on certain commodities, the internal duties imposed on the manufactures, or the import charges paid on the raw material; and it was also declared, that if either of the sovereigns should be at war, every thing should be deemed free which might be found in the ships of the respective nations, with the exception of goods usually deemed contraband, even though the whole or a part of the lading should belong to the enemies of the other state.

This treaty appears to have been acceptable to a considerable majority of the nation. When parliament assembled on the 23d of January 1787, it was announced in the speech from the throne, and formed the first subject of deliberation. When the usual address to the throne

delinquents, which deprived such persons of the privilege of our policy; that all the wars of Great Britain had been wars of necessity; and that the jealousy of the power of France has been founded upon the fullest experience of her ambitious character. If this was a mere commercial treaty, the framers of it had only to prove that the new channel of trade which it opened would not obstruct, or would be more beneficial than, the other ancient channels which this kingdom had long been in possession of, and which had been found to be the sources of her commercial wealth and prosperity. But if, on the other hand, the treaty was intended as a political measure, and if ministers had in view such a close and intimate connection with France as would in future render it difficult for the two countries to go to war, strong and satisfactory reasons would be required for having pursued and concluded a measure so new in the history of this kingdom, and of such vast magnitude and importance. Mr Pitt reprobated the principles stated by Mr Fox, in as far as they went to sanction the policy of a constant animosity with France. Such a doctrine militated in the most direct manner possible both against humanity and common sense; for if war is the greatest of all evils, and commerce the chief blessing which a country can enjoy, it must be the duty of those to whom public affairs are intrusted, to endeavour as much as possible to render the one permanent, and to remove the prospect and danger of the other. This was the object of the present treaty; and the advantages likely to arise from it would operate upon succeeding administrations in both countries, so as to induce them to avoid a war as long as it could be done with honour and prudence, and would also strengthen the resources of this nation for carrying on hostilities whenever these should become indispensably necessary. This was the true method of making peace a blessing. The quarrels between France and Britain had not only continued to harass those great nations themselves, but had frequently embroiled the rest of Europe, and had disturbed the tranquillity of the most remote parts of the world. In time past they had acted as if they were intended by nature for the destruction of each other; but he hoped the period had now arrived when they would justify the order of the universe, and show that they were better calculated for the purposes of friendly intercourse and mutual benevolence.

On the 12th of February the house resolved itself into a committee for the purpose of considering the commercial treaty with France, when Mr Pitt entered into a full explanation and defence of the measure. He considered it in three points of view; as affecting our manufactures, our revenues, and our political situation. With respect to the first, he showed, that though the treaty had been commodities, while all articles which it did not include formed upon principles of strict reciprocity, yet that this country must, from the very nature of the case, unavoidably have the advantage. With regard to the effect of the treaty upon the revenue, he remarked, that although a considerable reduction must undoubtedly take place of the duties upon French wines, and even upon Portuguese wines, should the provisions of the Methuen treaty be still kept in force, yet this would be balanced by the increased consumption, and by putting an end to the fraudulent manufacture of home-made wine, which was brought to market as foreign wine, a practice which no regulations of excise had hitherto been able to suppress. And with reference to the political tendency of the treaty, he recurred to his former observations on that subject, which it is unnecessary to repeat.

On the part of the manufacturers, it had been objected to this treaty, that the proposed intimate connection with was moved, Mr Fox remarked that the treaty in question France would afford opportunities of enticing away our

George III. manufactures out of the kingdom. But to this it was answered, that the law in regard to these matters would remain as formerly, and afford to our manufactures the same protection as at present, by restraining the interference of foreigners in regard to the matters alluded to. It was also objected in general, that the commodities in which France traded, being the produce of her soil, which could not suffer in their quantity or quality by lapse of time, whereas our commodities being principally manufactures, which owe all their value to skilful and ingenious labour, the French might by degrees become as industrious and skilful as ourselves, and thereby enter into a successful competition with us in every branch of our present trade, whilst our soil and climate rendered it impossible for us to equal them in the articles of their produce. To this it was answered, that the different nature of the objects of British and French commerce was favourable to Britain, on account of the superior population employed in bringing our manufactures to market; and, at all events, that the threatened change could not occur in twelve years, which was the whole duration of the treaty. The members of opposition objected to the treaty chiefly upon political considerations. Mr Fox contended that the only situation in which Great Britain could stand, in the general system of Europe, with honour, dignity, or safety, was as a counterpoise to the power of France. Mr Francis reproached Mr Pitt with a desertion of the principles of his father Lord Chatham, the most prominent feature of whose political character was Antigallicanism. Mr Flood, Mr Sheridan, and others, expressed the same sentiments; whilst Mr Powis and Mr Alderman Watson opposed the treaty, as bringing the British commerce unnecessarily into hazard at a time when it was extremely prosperous. On the other hand, the treaty was defended by Mr Grenville, Mr Wilberforce, and Mr Dundas, and the resolution proposed by Mr Pitt was carried, on a division, by a large majority. In the House of Lords the treaty was warmly opposed by Dr Watson, bishop of Llandaff, and by Lords Loughborough, Stormont, and Porchester; but this opposition proved as unavailing as that in the lower house.

During the present session a plan for consolidating into one act of parliament the whole of the duties imposed by the statutes of customs and excise, was brought forward by Mr Pitt, and received the universal approbation of the House of Commons. The duties imposed upon French merchandise, in pursuance of the late commercial treaty, were also included in the same act, although that part of the measure was resisted by opposition.

On the 28th of March Mr Beaufoy, at the request of the deputies of the dissenting congregations about London, moved for the repeal of the corporation and test acts. He observed that the test act was originally levelled against the Roman Catholics, and the corporation act against those sectaries who had agitated the kingdom in the times of Charles I. and during the usurpation, but with whose character the dissenters of the present age had nothing in common; and he contended that, as every man had an undoubted right to judge for himself in matters of religion, he ought not, on account of the exercise of that right, to incur any punishment, or to be branded with what is undoubtedly a mark of infamy, an exclusion from military service and civil trust. He referred to the examples of Scotland, Holland, Russia, Prussia, and the dominions of the emperor, in none of which religious opinions were now made the ground of civil disqualification. Lord North spoke against the proposed repeal, chiefly on the footing of the hazard attending innovation. He denied that a man was subjected to any punishment because he did not choose to

Reign of workmen, and conveying the tools and raw materials of our the usage of the church of England. He only deprived Reign of himself of a privilege which he might otherwise enjoy, George III. and which the law, for the safety of the church, had limited to persons of particular opinions. Mr Pitt supported the same view of the question, upon the ground of the danger to the established church which would result from intrusting official situations to dissenters. Mr Fox supported the motion in favour of the dissenters; remarking, however, upon this occasion, that, from their conduct in a late political revolution, he could not be suspected of being biassed by an improper partiality towards them. The motion was lost on a division by a majority of seventy-eight.

On the 20th of April Mr Alderman Newnham brought under the view of the House of Commons the pecuniary situation of the Prince of Wales, whose affairs had at this time fallen into a state of embarrassment. In 1783, when the prince came of age, Mr Fox and his colleagues, who were then in office, wished to grant him an annual income of L.100,000; but his majesty insisted that he should only be allowed one half of that amount. In the year 1786 the prince, having contracted a debt of L.100,000, exclusive of L.50,000 expended upon Carlton House, applied to his majesty to obtain relief from this incumbrance; and on receiving a refusal, he instantly dismissed the officers of his court, ordered his horses to be sold and the works at Carleton House to be stopped, and reduced his household to the scale of that of a private gentleman. By these savings an annual sum of L.40,000 was vested in trustees for the payment of his debts. But this decisive and spirited conduct was represented at court as disrespectful to the king; and from the period in question his majesty's dissatisfaction with the prince appears to have been no longer concealed. On the occasion of the assault made upon the king's person by Margaret Nicholson, no notice of the accident was sent by the court to the Prince of Wales; and when, on receiving the intelligence, he instantly repaired to Windsor, he was received there by the queen, but the king did not see him. In these circumstances the prince permitted his situation to be brought before the House of Commons, with a view of submitting his conduct to the judgment of the public. Accordingly, on the day already mentioned, Mr Newnham demanded of the chancellor of the exchequer whether ministers intended to bring forward any proposition for the relief of the Prince of Wales; at the same time alleging, that it would be disgraceful to the nation to suffer him to remain longer in his present reduced circumstances. Mr Pitt replied, that he had received no commands from his majesty upon the subject, and that without such it was not his duty to bring forward an affair of this nature. Mr Newnham then intimated his intention of bringing forward a motion on the subject upon the 4th of May. But on the 24th of April Mr Pitt requested to know the precise nature of the intended motion; stating his wish to avoid a discussion of the subject, and adding, that if it was persisted in, he would be under the necessity of bringing before the public some circumstances of extreme delicacy. At the same time Mr Rolle, an adherent of the ministry, declared that the question involved matter by which the constitution both in church and state might be essentially affected. This menace was believed to allude to an intimate connection supposed to subsist between the prince and Mrs Fitzherbert, a lady of a Roman Catholic family, with whom it was alleged that the prince had been married both by Catholic and Protestant clergy, men, although such a proceeding, even if it had taken place, could be productive of no legal effects, in consequence of the provisions of the royal marriage-act. Mr Newnham replied, that his intended motion would be for an address to his majesty to relieve the Prince of Wales from his present receive the sacrament of the Lord's Supper according to difficulties; and when some members expressed a wish that

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Reign of the affair might be privately accommodated, Mr Sheridan brought forward, and opened by Mr Thomas Pelham, Sir Reign of been made, the prince could not possibly recede with honour. Accordingly, on the 30th of April, when the subject was again mentioned, Mr Fox, who had been absent during the former debate, stated, that he had authority from the prince to say, that there was no part of his conduct which he would not willingly submit to public investigation. The allusions made to something full of danger to the church and state he treated as a tale fit to be imposed only on the lowest of the vulgar; and added, that his royal highness was ready, in the other house, as a peer of parliament, to give his majesty, or his ministers, any assurances or satisfaction on the subject which they might require. Mr Fox, at the same time, directly assured the house that the whole story alluded to was untrue. The result therefore was, that an accommodation took place. The prince was allowed an annual addition to his income of L.10,000, and a sum of L.180,000 was granted by parliament for the payment of his debts.

But the subject which chiefly occupied the attention of parliament during the present session was the accusation of Mr Hastings. After examining Mr Middleton and Sir Elijah Impey as witnesses in the beginning of February, Mr Sheridan, on the 7th of that month, opened the third charge against Mr Hastings, which set forth, that without justice, or any excuse of political necessity, he had seized the lands, and confiscated the treasures, of the begums or princesses of Oude, the mother and grand-daughter of the reigning nabob, and that he had even compelled the latter to become the instrument of this robbery. Mr Sheridan's speech lasted five hours and a half. The subject of the charge was well fitted for a display of all the powers of pathetic eloquence, owing to the rank and sex of the parties whom, on this occasion, Mr Hastings was accused of having treated with the most barbarous rapacity, treachery, and cruelty. Every advantage was taken of these circumstances by the eloquent accuser; and Mr Sheridan's discourse was considered as a model of splendid and impressive oratory. When he sat down, the whole house, which was filled with members, peers, and strangers, instantly joined in a loud and long-continued tumult of applause, expressing their approbation in the irregular mode of repeatedly clapping with their hands. Mr Burke declared it to be the most astonishing effort of eloquence, argument, and wit united, of which there was any record or tradition; Mr Fox said, that all that he had ever heard or read, when compared with it, vanished like vapour before the sun; and Mr Pitt asserted, that it surpassed all the eloquence of ancient or modern times, and possessed every resource which genius or art could furnish to control and agitate the human mind. After a short suspension of the debate, some of Mr Hastings' friends attempted to speak in reply, but found it impossible to procure a hearing. At last some members proposed, that for the sake of decorum, the debate should be adjourned; and this proposal was carried. On the following day Mr Francis resumed the charge, which was opposed by Mr Burgess, Major Mesurier. After having heard the arguments on both sides, Mr Pitt rose, and having stated the sense he entertained of the high importance of the procedure against stated in each particular charge the fullest investigation, declared himself fully satisfied that criminality was brought home to Mr Hastings, though not perhaps to the full extent alleged by the accusers. The motion for accusation was accordingly carried, upon a division, by a very large majority.

At a future period of the session other charges were pany nine millions and a half sterling. Mr Wilkes thought

George III. declared, that after the insinuations and threats which had James Erskine, Mr Windham, and Mr Francis. Mr Pitt George III. adopted the cause of the accusers, and on some occasions, though in a very mild tone, Mr Dundas did the same. At one period Lord Hood stood forward, and, in a very solemn manner, requested the attention of the house to the consequences of proceeding, with too scrupulous a nicety, to canvass the conduct of those who had filled stations abroad of high difficulty and important trust. Certain actions, which appeared to those at a distance in a very criminal light, were yet, he alleged, on a nearer investigation, perfectly justifiable on the grounds of absolute and indispensable necessity; and if the dread of an impeachment by parliament were to be hung over every commander in whose hands was placed the defence of our national possessions, it must necessarily operate as a dangerous restraint on their exertions, when it was considered that no general nor admiral had scarcely ever been fortunate enough to conduct himself in the performance of his duty, so as not occasionally to fall into circumstances in which the public service compelled him to do things in themselves neither pleasing to his feelings, nor strictly legal, but, from the indispensable necessities of their situation, perfectly justifiable. But Mr Pitt denied that these sentiments had any application to the case of Mr Hastings, since no adequate political necessity had been pointed out which could justify his conduct. In the course of the proceedings, also, it appeared that several members were disposed to consider the merits of Mr Hastings as in some measure compensating his crimes; and thus, although they voted his conduct criminal on particular occasions, they had an intention of voting in his favour when the general question should come to be proposed about the propriety of proceeding to impeachment. But Major Scott took an opportunity to declare that Mr Hastings and his friends wished to decline such a mode of defence; and he read to the house as a part of his own speech, a paper signed by Mr Hastings, in which he requested, if a general vote of criminality should pass against him, that they would further proceed instantly to an impeachment, and thus afford him an opportunity of defending himself judicially.

A committee was at length appointed to prepare articles of impeachment against Mr Hastings. It consisted of Mr Burke, Mr Fox, Mr Sheridan, Sir James Erskine, the Right Honourable Thomas Pelham, the Right Honourable William Wyndham, the Honourable St Andrew St John, John Anstruther, Esq. William Adam, Esq. M. A. Taylor, Esq. Welbore Ellis, Esq. the Right Honourable Frederick Montague, Sir Grey Cooper, Sir Gilbert Elliot, Dudley Long, Esq. Lord Maitland, the Honourable George Augustus North, General Burgoyne, and Mr Grey. An attempt was made by Mr Burke to procure the appointment of Mr Philip Francis as a member of this committee, but without success. On the 25th of April Mr Burke presented the articles of impeachment, which were read, and ordered to be printed, and considered on the 9th of May. Upon that day Lord Hood repeated his former arguments, and was supported by Mr Scott, Mr Nichols, Mr Vansittart, and Mr Alderman le Smith and the notorious John Wilkes. This last person insisted strongly on the silence of the natives of India respecting the dreadful oppression said to have been practised against them, and attributed the greater part of what Mr Hastings, and his endeavours to give to every fact appeared criminal in the conduct of Mr Hastings to the craving and avaricious policy of this country, whose demands had in some instances driven Mr Hastings to the use of means not strictly justifiable. The amount of the charges, supposing the facts to be true, was, in his opinion, this, that Mr Hastings, by oppression, by injustice, and by corruption, had obtained for the East India Com-

Reign of the acts complained of politic and just, and declared that extent which it could bear without ruin. Accordingly, Reign of George III he could not vote for the impeachment of Mr Hastings, in 1782, Mr Hastings, in one of his letters, complained George III. while he benefited by his misdeeds. He added, that it appeared incomprehensible to him how gentlemen who condemned his actions suffered a day to pass without proposing retribution to the sufferers. The lord advocate of Scotland, Mr Ilay Campbell, also supported this view; considering the necessities of the Company, and the dangerous crisis of their affairs, as grounds of justification for the strong measures pursued by Mr Hastings, in order to extricate them; and declaring that, as the Company had actually reaped the benefit of them, and so far approved of them as never to signify any intention of restitution, he could not conceive with what propriety Mr Hastings could be impeached. Mr Pitt acknowledged that many measures during the administration of Mr Hastings were uncommonly brilliant, and that in these his merits were unquestionable; but he trusted that no man who seriously regarded the honour of the House of Commons would think that the justice of the country could admit of any compromise whatever.

The question of impeachment was therefore carried by a large majority; and on the 10th of May, at the bar of the House of Lords, Mr Burke, in the name of the House of the Commons of Great Britain, impeached Warren Hastings, Esq. late governor-general of Bengal, of high crimes and misdemeanors; and informed the Lords that one is founded upon the principle of obedience to his emthe Commons would, with all convenient speed, exhibit ployers, and fidelity to the trust reposed in him; and the and make good articles against him. On the 21st of the other upon the eternal law of humanity. According to same month, upon the motion of Mr Burke, Mr Hastings was taken into the custody of the serjeant at arms of the which tends in the highest degree to promote the interest house; but he was immediately admitted to bail by the House of Lords, himself in the sum of L.20,000, and two sureties in L.10,000 each. But as the session of parliament was prorogued on the 30th of May, the trial was necessarily postponed to another session, and by various delays it was ultimately protracted to an extraordinary length.

The impeachment of Mr Hastings, from the attention which it excited, and the talents which were exerted in carrying it through, undoubtedly forms an event of considerable importance in British history. It ended in the acquittal of the party accused; but the immense expense which he incurred, and the uneasiness which he must have suffered from the odium excited against him, unquestionably amounted to a very severe punishment. A British House of Commons held him guilty of inhumanity, rapacity, perfidy, and tyranny, towards a numerous and civilised people, who had been subjected to his power; and these sentiments were so widely diffused throughout Great Britain, that the minister of the day, always studious of popularity, thought it necessary to join in the general current of opinion. But to enable the reader to appreciate correctly the merits of Mr Hastings, or the reasonableness of the accusations which were brought against him, it is necessary to consider correctly the situation in which that gentleman stood. He was invested by the British East India Company with absolute power over a large portion of Hindustan, in order to govern for the profit of the Company, and if possible to acquire for them still more extensive territories. To fulfil the purposes for which he was employed, it was necessary for him to procure a large revenue for the Company, and at the same time to enable the young men of rank, whom they sent out in their service, to return speedily to Britain loaded with wealth; these being the only objects on account of which the East India Company, or the British nation, had made efforts for the conquest of the East. But such objects evidently imply, not that Hindustan was to be mildly and generously go-

strongly of the cruelty of his situation, and of the expensive establishments and offices which he was under the necessity of constituting in India, in order to gratify the avarice of his employers; declaring that he had at that time about him two hundred and fifty persons, the younger sons of the first families in Britain, all looking up to him for patronage, and expecting to be put in possession of sudden riches. But these riches, it is evident, could not be drawn from the natives of Hindustan without much oppression; and when this oppression produced rebellion, or combinations of the native princes against the British power, it became necessary to be guilty of further oppression, or more grievous extortion, to collect means by which to overcome the resistance of an oppressed people. It is admitted on all hands that Mr Hastings was almost unboundedly successful in the service of his employers. He sent home annually great numbers of men loaded with the plunder of the East; while at the same time, by great activity and intrepidity, he collected resources wherewith to maintain and extend the British power, and was enabled to support it in all quarters against the most extensive combinations of the princes of that country. Now there are two systems of morality according to which the character of such a man as Mr Hastings may be tried. The the first of these, that conduct is most worthy of applause of those whom we serve; and, considered in this point of view, the merits of Warren Hastings have seldom been surpassed. It is true that he plundered the provinces of the East; but it was to aggrandise and enrich his country that he did so. He accounted their persons and fortunes as of little consideration; but he did so because he was the devoted servant of Britain. Accordingly, the French, whose public enemy he had been, regarded him with admiration, and uniformly extolled his actions as more than human. But if, in opposition to all this, we are to weigh the conduct of Mr Hastings by those maxims of morality which assume the immutable law of humanity as the rule by which human actions ought to be regulated, there can be no doubt that he must be condemned. He can only be regarded as one of those robbers of nations, to whose crimes historians and poets have given a too fatal celebrity. He was guilty of plundering and oppressing a pacific race of men, at the extremities of the earth, in whose affairs neither he nor his country had any right to interfere. But the principal criminals in this case were the British East India Company, the British legislature, and the British nation, who sent him upon such a service. Mr Hastings was only the guilty tool of a guilty people; and surely it ill became the British House of Commons, which had authorized the acquisition of conquests, or, in other words, sanctioned rapine and oppression, in the East, and whose constituents had become rich by the plunder or the profits of such enterprises, to accuse as a criminal the most successful servant of the state. John Wilkes and the lord advocate for Scotland appear, therefore, to have rested Mr Hastings' defence upon an unanswerable footing, when they considered his crimes as services, which he was employed by his country to perform for its aggrandisement, and for the moral rectitude of which he could not be responsible to that power from which he derived his commission, and which scrupled not to reap the fruit of his labours.

During the year 1787, the amity subsisting between Britain and France seemed likely to be disturbed, in converned, but that it was to be plundered to the utmost sequence of the affairs of Holland. The grounds of dif-

Reign of ference, indeed, were speedily adjusted; but the events volunteer associations were originally the creatures of the Reign of Britain. That country, being situated upon the mouths of the navigable rivers which communicate with some of the most important parts of the European continent, holds as it were the keys of the different passages by which our manufactures reach their places of ultimate sale and consumption; and in the most important efforts for reducing the power of France, the Dutch had acted along with the British nation. In the history of the United Provinces, during a couple of centuries, two parties were always found struggling for superiority. The one was that of the house of Orange, which had been originally raised to power in consequence of the talents of its chiefs, united with their rank and property, which had induced the states to intrust to them the direction of their armies, first against the Spanish monarchy, from which the united provinces had originally revolted, and afterwards against the power of France. By their great public services, the princes of the house of Orange had established in their own favour a kind of hereditary claim to the offices which they held in the republic, of stadtholder, captain-general of the forces, and admiral; and thus there existed in their persons, in succession, a kind of limited monarchy, by which the Dutch republic was influenced and led, rather than formally governed. The second party in the Dutch republic consisted of a kind of aristocracy, composed of the senates or town-councils of different cities, which possessed the power of nominating to the vacancies in their own order, that is, of electing their own successors in office. This party was usually denominated the Party of the States, or the Republican Party. Its members were, in point of form, the sovereigns of the country, as well as the wealthiest individuals in it; and the chief constitutional control which the stadtholder possessed over them, was founded on a regulation established by William III. prince of Orange, in 1674, by which he enjoyed a negative in the elections of town governments, and a power, in certain cases, of introducing members into them. But it is to be observed, that the mass of the people, who always find greater safety under the dominion of one superior than under that of a multitude of petty local chiefs, were decidedly attached to the house of Orange, or to the power of the stadtholder, in opposition to that of the town senates or republican party; and the ancient nobles also, together with the clergy of the established church, and the officers of the army and navy, adhered to the same family, and thereby enabled it on ordinary occasions to support its power against the party of the states.

During the participation of the United Provinces in the late war against Great Britain, a proposal had been made to enrol bodies of volunteers in the different towns, for the purpose of internal defence. The senates of the towns, that is, the aristocratical, or, as they called themselves, the republican party, encouraged the formation of these armed bodies of burghers, over whom at their first enrolment these bodies of citizens, as soon as they had been trained to the use of arms, began to be sensible of their importance. The opinions propagated in North America during the war were known over all Europe, and being received with considerable avidity by the Dutch volunteers, produced in that country a kind of third or democratic party, the ob-

George III. out of which they arose are worthy of notice, on account senates or aristocracy, for the purpose of counteracting George III. of their tendency to explain some future occurrences in the power of the stadtholder, so they appear, in their first the history of Europe. The state of the Dutch republic movements, to have been directed by that faction. One always had been regarded as of much importance by Great of these movements took place at Utrecht. The armed burghers, amounting to upwards of two thousand, presented a petition to the states of the province of Utrecht, requesting them to abolish the regulation of 1674, by which the stadtholder was enabled to influence the nomination of the magistracy; and they presented an address of a similar nature to the town senate of Utrecht, and to the prince of Orange. As might have been expected, the answer of the prince was unfavourable; but the magistrates of Utrecht, in compliance with the wishes of the armed burghers, proceeded to fill up a vacancy in their own number without consulting the prince. This event occurred in January 1784; but it appears that, in the course of the same year, either from the intrigues of the stadtholder's court, or a dread of betaking themselves to the assistance of the new and dangerous democratic party, the states of the province and town senate of Utrecht deserted the cause of the armed burghers, whom they themselves had instigated to action, and recalled or annulled the steps towards innovation which they had previously taken. Meanwhile the senate and the armed burghers continued alternately to menace each other. But, by degrees, a spirit of political reform diffused itself from Utrecht to the different towns in the provinces where bodies of volunteers or armed burghers had been established. The armed burghers of Utrecht elected a representative body to watch over the management of public affairs, and various other towns followed the example; but these representative bodies soon quarrelled with the old senates; and the prince of Orange appears to have had it in his power to select either of the parties he might think fit as his adherents. His ancient enemies were the aristocracy or town senates; but as he could not, without a total alteration of the constitution of the United Provinces, derive a regular and legal support from the bodies of armed burghers, he resolved to support the ancient magistracies, and to rest his power upon its former footing of influence over these magistracies, though he knew them to be his rivals in political importance. It would seem, however, that the aristocracy of the province of Holland, who had always been the most decided enemies of the family of Orange, were not satisfied with the disposition of the prince to support the ancient constitution, and resolved to undermine or overthrow his power, even at the hazard of a revolution, which must be equally fatal to their own. But this aristocratical body was not of an enterprising character, and rather waited than attempted to direct the course of political events; while, in consequence of the support afforded by the stadtholder to the senates of Utrecht and other places, the armed burghers throughout the whole United Provinces became disposed to act in opposition to him. Meanwhile the populace of the Hague retained their usual attachment to his person and family. On the 4th of September 1785, twelve volunteers of the corps of the town of Leyden appeared at the Hague in uniform. Offended by this appathey had complete influence, as affording them a kind of rent defiance, the populace attacked and drove them into a counterpoise against the military power, which, although neighbouring house, the windows of which they smashed; paid by them, was commanded by the stadtholder. But but a part of the garrison, without interfering with the populace, took the volunteers into custody, and sent them home privately by night. This riot, however, served as a pretext to the states of Holland for superseding the prince of Orange in the command of the garrison at the Hague, which they intrusted to the deputies of Haerlem, a town long noted for its zeal in opposition to the stadtholder; ject of which was to procure for the citizens of the towns and as the prince had been engaged in endless controa share in the nomination of the magistrates. But as the versies with the states of Holland, in which the strength

Reign of of the aristocratical party was concentrated, this affront tion, and a variety of attacks, it admitted a foreign garri- Reign of tection to Great Britain, whose cause he had uniformly supported, and to the king of Prussia, who was the uncle of his wife. The aristocratical party, on the contrary, made application to the court of Versailles, which it had supported by entering into the confederacy against Great Britain, and from which it had always received encouragement; and at the same time it endeavoured to effect a union with the armed burghers.

In the mean time Frederick II. of Prussia died, and was succeeded by his nephew, Frederick William, the brotherin-law of the stadtholder. The French court appeared to espouse with vigour the combined aristocratical and democratical parties in the United Provinces; but the new king of Prussia hesitated to engage in a dispute with France; and there is little doubt that, had the French on this occasion shown themselves ready to act with vigour in support of their party in Holland, the stadtholder must have fallen before his enemies. But the French monarchy, under a benevolent and well-meaning though weak prince, was at this period rapidly sinking into a state of great feebleness, owing to the extreme embarrassment of its finances. A negociation was indeed proposed between the courts of France and Berlin, for the purpose of adjusting, in some friendly manner, the differences between the stadtholder and his enemies. But the weakness of France becoming gradually more apparent, Prussia and Great Britain were induced to take a more decisive part in the affairs of Holland, chiefly in consequence of the suggestions of the British ambassador at the Hague, Sir James Harris. The stadtholder, who had now established himself at Nimeguen, was a man of little activity or enterprise; but his princess being of a different character, ventured to undertake a journey to the Hague, unaccompanied by her husband, probably with a view to what actually happened. On the 28th of June 1787 she was arrested by some troops of the opposite party; and this circumstance afforded an excuse to the king of Prussia for interfering in the internal affairs of the United Provinces, in order to demand reparation for the insult offered to his sister.

A Prussian army, commanded by the Duke of Brunswick, the brother-in-law of the king of Great Britain, immediately prepared to invade Holland; and to secure additional aid to the Prince of Orange, a treaty was concluded between Great Britain and the landgrave of Hesse-Cassel, for the assistance of twelve thousand troops. In the mean time the United Provinces remained in a state of great internal distraction. The defects of their political constitution had originally occasioned the appointment of a stadtholder; and there had yet been substituted in its stead no simple system, which, by doing away the distinctions of states and provinces, might unite the force of the country, for the purpose of enabling it to resist such powerful aggression as that with which it was now threatened. The promised aid from France did not arrive; and although troops had been levied by the states of Holland, the chief command of them was intrusted to the rhingrave of Salm, a man whose character appears to have inspired little confidence. Meanwhile the Duke of Brunswick, at the head of a powerful army, entered the country. The reputation of the Prussian armies in Europe was at this time extremely great; and the frontier towns of Holland, which were capable of resisting regular sieges, were now taken without a struggle. It is unnecessary to detail the progress of the Prussian troops, which was extremely rapid, since in little more than a fortnight the republican party found itself confined to the city of Amsterdam. This city was besieged on the first of October; and after much negocia-

George III. drove him to the resolution of leaving the Hague, which son to take rossession of its gates. The influence of France George III. he did on the 14th September 1785. He applied for proof the stadtholder restored; but it was restored by the power of Prussia and Britain alone; and the consequence was, that a decided enmity to these two countries, from that period, took possession of the minds of a great portion of the inhabitants of the Dutch territories.

When the British parliament met on the 27th of November 1787, the most remarkable circumstance alluded to in the king's speech was the state of Holland. It was there mentioned, that the disputes in the republic of the United Provinces had become so critical as to endanger their constitution and independence; that his majesty had endeavoured by good offices to maintain the lawful government of those countries, and judged it necessary to explain his intention of counteracting forcible interference on the part of France; that, accordingly, when his most Christian majesty, in consequence of an application for assistance by the party which had usurped the government of Holland, had notified his intention of granting their request, his majesty had declared that Britain could not remain an unconcerned spectator, and immediate orders had been issued for augmenting the forces both by sea and land; that the rapid success of the Prussian troops having soon after enabled the provinces to re-establish their lawful government, an amicable explanation had ensued between him and the most Christian king; and that both parties had engaged to disarm, and to place their naval establishments on the same footing as at the beginning of the year. When the address was moved, Mr Fox took an opportunity of expressing the fullest approbation of the measures which had been lately pursued, and took credit to himself as one of those who had invariably been of opinion that this country is at all times deeply interested in the situation of affairs upon the Continent, and ought, whenever occasion required, to take an active and vigorous part in preserving the balance of power in Europe. In the House of Lords the Bishop of Llandaff also expressed his satisfaction at seeing the republic of the United Provinces again united in its views with Great Britain.

During the interference of Great Britain and Prussia in the affairs of Holland, and whilst a dread was entertained that the discontented party in the provinces might receive assistance from France, and preparations were on that account made for fitting out a fleet, the lords of the admiralty had promoted sixteen captains of the navy to the rank of admirals. In this promotion a selection had been made, by which upwards of forty senior captains were passed over; a circumstance which gave rise to various debates in parliament. To understand the subject, it is necessary to remark, that in 1718 an order of council directed the lords of the admiralty, in promoting officers to the rank of admirals in the navy, to prefer the senior captains, providing only that they were duly qualified for the rank to which they were to be promoted. And by a subsequent order of 1747 the lords of the admiralty were authorized to place such captains as should be found incapable, by reason of age or infirmity, of serving as admirals, upon the list of superannuated admirals, usually called the list of the yellow admirals. In the promotion above mentioned the board of admiralty had offered to place upon the list of yellow or superannuated admirals most of the captains who were passed over; but these, from their capacity for future service, conceiving themselves entitled to the rank of acting admirals, had refused the retreat which was offered them; and a general disgust prevailed among the officers in the navy, on finding that their hopes of employment in active service must at all times depend on their interest with the first lord of the admiralty. On the 20th of February

Reign of 1788 Lord Rawdon, in the House of Lords, stated their that loyalists of this class wno had not lost more than Reign of George III. case, and proposed an address to his majesty upon the subject. But the first lord of the admiralty, Lord Howe, justified the exercise of a discretionary power by the board in promoting navy captains to the rank of acting admirals, upon the ground that a man might be fit to command a single ship who ought not to be intrusted with the care of a fleet; and Lord Sandwich admitted the impropriety of interfering with the executive government in an affair of this nature; upon which Lord Rawdon's proposal was rejected. The same subject was also brought before the House of Commons in various forms, and supported by almost all the naval officers who had seats in the house. But Mr Pitt defended the admiralty, by declaring that no degree of misconduct had been stated sufficient to authorize the interference of parliament with the exercise of its powers; and the board was protected from censure by a small majority.

At this time a bill was brought into parliament for subjecting to higher penalties than formerly all persons who should export wool from the country, the object of it being to confirm the monopoly enjoyed by our own manufacturers in that article. The manufacturers asserted, that thirteen thousand packs of British wool were annually smuggled into France, which tended to raise the price of the commodity against our own manufacturers. Several country gentlemen, however, opposed the bill, as an unjust hardship upon the profits of land in this country, which ought to have the world open as a market for its productions; but the minister, who was aware of the importance of enjoying popularity with the commercial part of the nation, gave full countenance to the bill, which accordingly passed into a law.

In his financial exposition of the revenue, Mr Pitt made some remarks as to the improving state of the country, which are not unworthy of being noticed. He stated that the receipt of the permanent taxes, in the year 1787, exclusive of the land and malt tax, had been L.13,000,000, whereas the receipt of the taxes in the year 1783 had only been L.10,184,000. Thus there was an increase of revenue amounting to three millions, of which not more than one million and a half accrued from new taxes. In trade, navigation, and fisheries, the progressive improvement had kept pace with the increase of revenue. In the year 1772 the imports were L.14,500,000, and the exports L.16,000,000; in 1787 the imports were about L.15,800,000, and the exports amounted to L.16,600,000. Navigation had in like manner increased. The Newfoundland fishery in 1773 produced 516,000 quintals; but in 1786 it produced 732,000. In 1773 the Greenland fishery gave employment to 27,000 tons of shipping; but in 1786 the amount employed was 53,000. The southern whale fishery, a new and valuable branch of trade, which only commenced at the beginning of the last war, had also prospered equally. In this fishery, in 1785, there were employed eighteen ships, producing L.20,000, whereas in 1787 there were employed thirty-eight ships, producing L.107,000. The general result, therefore, showed that the commerce and industry of the country were in a prosperous condition, and extending themselves in every direction.

On the 8th of June Mr Pitt called the attention of the house to the compensation which was intended to be made to the American loyalists, on account of the losses sustained by them from their adherence to this country during the American war. He divided the loyalists who had made claims of compensation into four classes. In the first class he ranked those who had resided in America at the commencement of the war, and who had been obliged to abandon their estates and property, which were seized and confiscated by the Americans, and he proposed money was subscribed for the purpose of collecting infor-

L.10,000 should receive full compensation; for losses above George III that sum, and below L.35,000, ninety per cent. on the excess above L.10,000; for losses above L.35,000 and under L.50.000 eighty-five per cent. on the excess above L.10,000; and for losses above L.50,000 eighty per cent. on all above L.10,000. The next class of claimants, consisting of those who had lost property in America, but who had resided in England during the war, Mr Pitt proposed to indemnify also in full to the amount of L.10,000; but that all whose claims amounted to from L.10,000 to L.30,000 should suffer a deduction of twenty per cent, and a further additional deduction of twenty per cent. in progression upon every additional L.50,000 claimed. Of the third class of claimants, consisting of loyalists who had enjoyed places and exercised professions in America, which, by adhering to this country, they had lost or been forced to abandon, he proposed to put upon half pay those whose incomes amounted to no more than L.400 per annum, and to grant forty per cent. upon any excess of income above L.400 per annum, unless the income exceeded L.1500 per annum, in which case thirty per cent. only was to be allowed upon the excess of income above L.400 per annum. Lastly, it was proposed to pay the full amount of their claims to persons connected with West Florida, because, by the treaty of peace, that country had been ceded by Britain to a foreign power. Mr Pitt concluded by moving, that, in order to satisfy these claims, L.1,228,239 should be voted to the several American claimants, and L.113,952 14s. 3d. to the Florida claimants; and the motion was unanimously agreed to. The liberality with which the British nation acted upon this occasion merits high approbation, as an instance of the wisest policy, from its tendency, in future discontents or insurrections in the subordinate parts of the empire, to secure the attachment of persons of property to the cause of the mother country. As the claims of the American loyalists were stated by themselves, and not scrutinized with extreme severity, it was generally understood that these persons were in very few instances ultimate losers by the part which they had taken; a circumstance of which the public did not disapprove.

The trade carried on by Great Britain and other European nations upon the coast of Africa, for the purchase of negro slaves to be employed in the cultivation of the West India islands, and certain parts of the continent of America, does not appear to have been at this time considered with that general attention which a practice so abhorrent in its nature to the mild principles of modern policy and manners might have been expected to excite. This may probably have been owing, partly to the distance of the object, which tended both to conceal the sufferings, and to lessen the sympathy of the public for the unfortunate sufferers; and partly to the connivance of politicians, unwilling to examine too severely into the nature of the means by which distant colonies were enabled to pour luxury and wealth into the bosom of the mother country. The first public attempt made to put a stop to this traffic was by the Quakers of the southern provinces of America, who, soon after the establishment of their independence, not only presented a strong and pathetic address to their several legislative assemblies on this subject, but actually proceeded in many instances to emancipate the slaves in their own possession. In Great Britain the same sect appears also to have taken the lead; and, after the example of their American brethren, they presented, in 1787, a petition to the parliament of this kingdom. The cause soon afterwards became extremely popular, and was taken up with great zeal and earnestness by various descriptions of people. A society was formed; a considerable sum of

Reign of mation and supporting the expense of an application to fore the House of Commons, where administration pos- Reign of George III parliament; a great number of pamphlets were published upon the subject; several eminent divines recommended the abolition from the pulpit and in printed discourses; and, in the present session, petitions against the slave-trade were presented from the two English universities, and from several of the most considerable towns and corporations in the kingdom. By a sort of general consent, Mr Wilberforce had been intrusted with the care of bringing the business before the House of Commons; but he being prevented by ill health, Mr Pitt, on the 9th of May, proposed that the house should come to a resolution to take into consideration the circumstances of the slave-trade early in the next session. He added, that the privy-council had ap- its tendency to deprive the East India Company of the pointed a committee to inquire into the matter, and that management of its own affairs, and of the patronage arisnext session the result would probably be laid before the house to facilitate their investigations. Mr Fox and Mr Burke expressed their regret on account of the proposed delay; lamenting that the privy-council, who had received no petitions from the people, should have instituted an inquiry, and that the House of Commons, whose table was loaded with them from every part of the kingdom, should not have instituted an inquiry at all. Sir William Dolben called the attention of the house to the condition of the slaves in that intermediate state of misery which they suffered in their transportation from the coast of Africa to the West Indies, entering into a short detail of the horrors of the middle passage, and declaring himself ready to bring evidence to the bar to prove the fact. This called aloud for a remedy, and that remedy ought to be applied immediately; for if parliament delayed doing so, ten thousand lives would be lost between the present session and the beginning of the next. This suggestion met with general approbation; and a bill was accordingly brought in and passed into a law for regulating the transportation of the natives of Africa to the British colonies in the West Indies.

During this session the affairs of India still continued to occupy the attention of the legislature and of the public. Under the apprehension of a rupture with France on account of the affairs of Holland, government had resolved to send out four additional regiments to India, on board the Company's ships, for the protection of our possessions in that quarter; and the proposal had been received with approbation by the court of directors; but even after the danger was past, government still adhered to their resolution of sending out these regiments, with a view to form a permanent establishment of king's troops in that quarter of the world. Hence a question arose with the court of directors of the East India Company, about the expense of sending out, and afterwards paying, these troops. By an act passed in the year 1781, the Company were declared liable for the expense attending such troops only as should be sent out upon their own requisition. But administration now contended, that the act brought forward by Mr Pitt in 1784, which gave to the board of control a power of counteracting the orders of the court of directors, and of directing the application of the Company's revenues, ought to be understood as authorizing that board to carry into effect the proposed measure. The court of directors, however, having obtained the opinion of some eminent lawyers in their favour, refused to take the troops on board the ships which were about to sail for India; and for this reason, on the 25th of February, Mr Pitt proposed, in the House of Commons, that all difficulties should be removed by a declaratory act, stating the intention of the legislature, in the act of 1784, to have been conformable to the construction put upon it by the board of control. This mode of proceeding was strongly opposed, upon the grounds to be tried in a court of law, instead of being brought be- House of Commons in conducting the trial; and on the

sessed an undue influence; that the measure was in itself George III. ill judged, as it would have been more economical to permit the Company to raise four regiments, which would have enabled them to provide for many of their own officers, who were living in India in very distressed situations, in consequence of having been reduced at the peace; and that the mode of sending out recruits to complete the king's regiments at that time in India might have been adopted with more advantage to the Company, as it would have enabled them to avoid the additional burden of all the officers of four new regiments. But the point on which the declaratory act was chiefly resisted referred to ing from its revenues, which, at the time when Mr Pitt's bill was passed, had never been understood to be the intention of the legislature or of government. Mr Pultenev, and some other members who usually voted with Mr Pitt, now declared that they supported his bill in 1784 only because it appeared to preserve uninjured the rights of the East India Company; and that the construction attempted to be put upon it in the declaratory act rendered it fully as obnoxious as the celebrated bill rejected by the Lords in 1783; with this difference only, that what the one had for its professed object only and without disguise, the other was attempting to effect by fraud and dissimulation. Other members also expressed similar sentiments, which excited great triumph on the part of Mr Fox and his friends, who loudly congratulated themselves upon the complete justification which his India bill had now obtained, by the tacit confession of his adversaries themselves. In support of the declaratory act, Mr Pitt contended, that the express object of the institution of the board of control was to take the entire management of the territorial possessions and the political government of India out of the hands of the Company, leaving them only the direction of their commercial concerns; that the board of control was in future to be responsible to the public for the prosperity and safety of our Indian possessions, and was therefore to be invested with the powers necessary for the due discharge of its important duties; and that administration in 1784 had not held any other language with regard to its nature, or the authority which it was to possess. On the 5th of March the bill was passed by a considerable majority. In the House of Lords the Marquis of Lansdown opposed it on nearly the same grounds as had been urged in the Commons, but with as little success. And upon the whole, if the augmentation of the power of the crown was at this period a misfortune, it was a misfortune which the conquest of India appears to have rendered inevitable. The East India Company, by whom the conquest had been made, was admitted to have shown itself unfit to govern that great country. The management of it, therefore, naturally devolved upon the executive government, unless the constitution itself was to be endangered, by intrusting the exercise of new and unusual powers to some branch of the legislature; or, unless a new kind of authority or power was to be created, like that attempted by Mr Fox's India bill, the result of which, as a political experiment upon the constitution, or mode of administering part of the affairs of the empire, was necessarily hazardous, because heretofore entirely without example in our history.

The attention of the nation still continued to be occupied in no small degree by the prosecution of Mr Hastings. The members of the committee which during the preceding session had prepared the articles of impeachthat the claims of government upon the Company ought ment, were now appointed to act as managers for the

Reign of 13th of February the trial commenced with extraordinary George III. solemnity in Westminster Hall, which had been fitted up for the purpose. At an early hour the Commons, preceded by the managers, issued from their own house into the hall, Mr Burke leading the procession; and thereafter came the Peers in procession, preceded by the clerks of Parliament, the masters of chancery, the serieants at law, and the judges. That and the following day were consumed in reading the articles of impeachment, and in receiving the answers of Mr Hastings. On the 15th of February, Mr Burke began an oration, which he continued during that and the four following days, and in which his talents were exerted with great splendour, and his eloquence listened to with admiration. After an appeal to the justice of the court on the part of the people of India, he entered into a detail of the history of Hindustan from the earliest times; sketched a luminous outline of the revolutions which had occurred in it, of the civil and religious institutions, with the arts, customs, and manners of the various classes of its inhabitants; traced the progress of British intrusion, and minutely described the establishments effected by our countrymen; gave an animated account of the blessings which India might have derived from communication with the most enlightened nation in Europe; lamented that, instead of acting as friends or instructors of the natives, our countrymen had marked their way by treachery and rapine, and taught vice rather than virtue; expatiated on their usurpations of power, and their frequent enormities; specified the acts of Mr Hastings, representing them as beyond all bounds arbitrary and raa monster of tyranny. The governor-general had attempted to justify his oppressions, by asserting that the Asiatic governments were all despotic; that he did not make the people slaves, but found them such; that the sovereignty he was called to exercise was an arbitrary sovereignty; and that he had exercised it in no other way than was done by the other sovereigns of Asia, and the native princes of the country. Mr Burke reprobated this geographical morality, and these claims to absolute power; denied that either the East India Company or the British government had it to bestow; asserted that no such arbitrary government was attempted to be justified in the East, every Mahommedan government being regulated by the laws of the Koran, while those of the Gentoos proscribed the idea of arbitrary will in magistrates; and contended that the conduct of tyrants, or the corrupt practices of mankind, were no principles upon which to regulate the duty of a British governor, bound to act, and liable to be judged by his country, upon British principles. Mr Burke concluded by declaring, that he impeached Mr Hastings in the name of the Commons of Great Britain, whose parliamentary trust he had betrayed, and whose national character he had dishonoured; in the name of the people of India, whose laws, rights, and liberties he had subverted, whose properties he had destroyed, and whose country he had rendered desolate; and in the name of human nature, which he had cruelly outraged in both sexes, in every age, rank, and condition of life.

The managers of the impeachment next proposed that they should come to a conclusion on both sides, upon each article separately before they opened another; but the counsel for Mr Hastings insisted that the House of Commons ought first to proceed to a conclusion upon the whole charges, before any part of the defence was demanded; and the House of Lords having deliberated on the point, decided it in their favour. The managers for the Commons acquiesced in the decision, and entered upon the particular charges, two of which employed the House of Lords during the remainder of the session.

During the investigations occasioned by the trial of Mr Reign of Hastings, and the discussion of India affairs, the opposi-George III. tion were led to bring forward a series of charges, importing high crimes and misdemeanours, against Sir Elijah Impey, formerly chief justice of the supreme court of Bengal. The substance of these charges, six in number, and which were presented to the House of Commons by Sir Gilbert Elliot, was, that the chief justice had in a variety of instances rendered himself the agent and tool of Mr Hastings, particularly in the decision of a considerable number of important causes. Sir Gilbert stated that Sir Elijah Impey had been declared criminal by parliament, before the parties into which it was at present divided had any existence; and that the proceedings out of which this accusation arose had been carried on by persons of all connections, and countenanced by the different administrations which had succeeded each other during the last six years. He contended that the only means left of reforming Indian abuses, was the punishment, in some great and signal instances, of Indian delinquency; and this proposition he endeavoured to establish by comparing the different force and efficacy of laws, arising from their penal sanctions, when applied in our own internal administration, and in the government of distant possessions. Of the particular charges brought against Sir Elijah Impey, that respecting the fate of Nundcomar, a Hindu prince of the sacred caste of the Brahmins, was the most remarkable. This man having had the weakness or imprudence to lodge an information, or rather accusation, with the East India Company, against their principal servant, Mr pacious, and endeavoured to hold him up to execration as Hastings, the governor-general, it was alleged, had procured an accusation to be brought against him, in the court where Sir Elijah Impey presided; and Nundcomar having been tried for forgery on an English statute, was condemned and executed. In the course of the session,

witnesses were examined against Sir Elijah Impey; and

his defence was undertaken by the chancellor of the exchequer, and the solicitor and attorney-general. On the

9th of May the first charge was rejected by a small ma-

jority; and on the 27th the house voted a delay of proce-

dure during three months. This saved the accused, and

no impeachment resulted from the inquiry.

During the interval which followed the prorogation of parliament, the only occurrence worthy of notice arose out of the contests of the northern nations. At this period the relative condition of the European powers had undergone a very important change. During a century and a half the power of the monarchy of France had been formidable to all Europe; and, at different periods, the most extensive combinations had been found necessary to resist its ambition. But since the termination of the American war, that monarchy had evidently lost much of its importance among the neighbouring nations. Its influence over Holland had ever been one of its favourite objects of pursuit; but during the preceding year it had suffered that influence to be overturned without a struggle; and, as far as regarded any external effort, France appeared at this time to have fallen into a state of complete imbecility. The powers whose ambition had now become dangerous to the repose of Europe, were Austria and Russia. The latter, in particular, proved extremely restless and enter-prising. The empress Catherine II. had contrived to engage in her views the emperor Joseph II. and had prevailed with him to engage in a sanguinary contest on the eastern frontiers of Europe, with a view to the partition of the provinces of Turkey; whilst France, the ancient ally of that power, was unable to afford it any countenance or aid.

In the mean time Catherine held in a state of dependence approaching to subjection the kingdoms of Sweden and Denmark. After the reign of Charles XII. whose

George III. sources of the country, Sweden sunk into a state of political weakness. The nobles had resumed the independence of the feudal times; the anarchy to which that form of government is so remarkably subject had returned; the crown and the people were equally insignificant; and the mutual animosities of the nobles exposed the state to the intrigues of neighbouring nations. In their diet there was a French party and a Russian party, but there was not an individual among them who supported the party of Sweden. Gustavus III., however, was now in the vigour of his age, and a man of an enthusiastic and enterprising character. By attaching to himself the peasantry of the country and their deputies in the diet, he had, in 1772, re-established absolute power; but the nobles having gradually recovered a portion of their authority, and having been aided by the intrigues of Russia, had now become dangerous to the throne. This rendered the situation of the Swedish monarch extremely uncomfortable, and, exciting in his mind a desire of shaking off all dependence upon Russia, he resolved to take advantage of the war, in which she was actually engaged with the Turks, in order to make an attack on her north-western frontier. To accomplish this object, however, it was necessary that Sweden should be safe on the side of Denmark. But that power had already contracted engagements with Russia; and Gustavus having, it is said, afforded countenance and encouragement to the malcontents of Norway in 1772, this circumstance has been alleged by the Danes as an excuse for the treaty into which their government secretly entered, and by which it was agreed that, if Russia were attacked, Dehmark would assist her with twelve thousand auxiliary troops and six ships of the line. But whatever may have been the conduct of the king of Sweden in 1772, he now endeavoured in the most anxious manner to conciliate the good will of Denmark, and at the close of the year 1787 paid an unexpected visit to the Danish court at Copenhagen, where he endeavoured by every argument to prevail with the prince regent and his council to enter into his views regarding Russia. But the court of Denmark could not be induced to countenance his schemes, and appears to have concealed its secret engagements with Russia, as well as the part which it meant to take in the event of a war between Russia and Sweden.

In the month of July the king of Sweden commenced offensive operations on the side of Finland. But the discontents which had been fostered by Russia among the Swedish nobles soon broke out; several officers declared sent of the states of the kingdom; and the troops refused to advance. Whilst the king was in this embarrassed situation, a Danish army suddenly advanced against Sweden under Prince Charles of Hesse-Cassel, accompanied by the prince of Denmark as a volunteer; and to give this force The affairs of Sweden were now all but desperate. During states of the kingdom; but Gustavus unexpectedly arrived at Stockholm from Finland, put an end to their pro-

Reign of extravagant military enterprises had exhausted the re- king next hastened to the province of Dalecarlia, inhabit- Reign of ed by a fierce and ignorant but honest people, celebrated George III. for the share which they had in the revolution by which Gustavus Vasa rescued his country from the despotism and cruelty of Denmark, which had massacred the citizens of Stockholm, and almost exterminated the nobility of the kingdom; and the loyalty of these people being kindled to enthusiasm by this visit of the king to their mines and forests, four thousand of them instantly came forth as volunteers. In the mean time the Danish army, proceeding along the sea coast, which had been left undefended, took a body of Swedes prisoners, and advanced towards Gottenburg, which being mostly built of timber, was liable to instant destruction by bombardment. The place had actually been summoned, when the king, by unusual personal exertion, passed at the critical period unnoticed through the enemy's parties, and entered the city. His presence had the effect of restoring the confidence of the inhabitants, who resolved to encounter every hazard in defence of the city; but the place was thus saved only for a moment, and its situation, as well as that of the king himself, was still extremely perilous. On this occasion, however, the city, the king, and perhaps the monarchy of Sweden, owed their safety to the interference of a British subject, Mr Hugh Elliot, the British envoy at Copenhagen. From the first notice of hostilities, this gentleman, discerning the interests of his country and of Europe, passed over into Sweden, and offered his mediation to the king, at the same time that he threatened the Danes with an immediate invasion by a Prussian army, supported by a British and Dutch fleet. The Danish commander became intimidated, and delayed his threatened hostilities; a Prussian envoy soon arrived, and confirmed all the menaces of Mr Elliot; and the consequence was, that after much negociation, a suspension of hostilities was concluded, and in the month of November the Danish troops evacuated the territory of Sweden.

At the close of autumn this year a domestic event of a singular nature, and new in the British history, occurred. The health of the sovereign had suffered, not from freedom of indulgence and excess of luxury, but from too severe a regimen, too laborious exercise, too rigid abstemiousness, and too short intervals of rest. As a remedy for the symptoms which manifested themselves, he was advised to resort to the medicinal waters of Cheltenham, and accordingly repaired thither immediately after the prorogation of parliament, and did not return to the metropolis till the 18th of August. But no material benefit had rethat the king had no right to make war without the con- sulted from this excursion. His health continued in a precarious state; and on the 22d of October symptoms were observed by one of the royal physicians, of that alienation of mind which was afterwards the occasion of so many important and interesting transactions. For some time it was thought proper to observe the utmost secrecy respectthe appearance of an auxiliary army, the prince of Hesse ing the nature of the king's indisposition; and the retreat had been created a field-marshal in the Russian service. of the sovereign at Windsor was favourable for this purpose. For several days an opinion was entertained that the king's absence the senate of Stockholm had assumed his indisposition arose from fever, and that it had attained extraordinary powers, and summoned a meeting of the so alarming a height as to threaten speedy dissolution; but the real nature of the malady could not long be suppressed. By the law and practice of the English consticeedings, instantly sent off the whole regular troops from tution, almost every species of public business is, in some the capital, and having assembled the citizens, declared manner, connected with the exercise of the royal prerothat he intrusted to their fidelity the defence of his capi- gative. The administration of the general government, tal, and the protection of the queen and the royal family. in particular, was by this event virtually suspended; and His audience were seized with a military enthusiasm; the notwithstanding the critical situation of Europe, and the citizens armed and embodied themselves, and performed very active share which we had taken in its concerns, it the whole duty of the garrison; while such of the officers was now deemed impracticable to return any sort of anas had returned from the army in Finland were insulted swer to the dispatches of foreign courts, or even to those as traitors, and compelled to conceal themselves. The of our own ambassadors. In this situation the most natu-

Reign of ral expedient was to suffer the two houses of parliament, George III which stood prorogued to the 20th of November, to assemble at that time, and either to adjourn for a short interval, or proceed immediately to discuss the measures which it would be proper to adopt at such a juncture. Circular letters were accordingly addressed to the members of the legislature on the 14th, signifying that the indisposition of the sovereign rendered it doubtful whether there would be a possibility of receiving his commands for the further prorogation of parliament; that in such a case the two houses must of necessity assemble; and that a numerous attendance of the members was extremely desirable.

When parliament assembled, the lord chancellor observed in the House of Lords, that the reason of their being thus unusually called together without the ordinary notice, for the dispatch of business, arose from the severity of the king's indisposition, which had rendered it impossible for him to approach the royal person in order to receive his commands. Lord Camden remarked, that the customary practice of giving forty days' notice previous to the meeting of parliament, was not in his opinion absolutely necessary; that there was an express act of parliament, which limited the notice, in case of treason or rebellion, to fourteen days; that he would therefore recommend an adjournment for that term; and that the chancellor should, by order of the house, address an official letter to every individual peer. In the House of Commons Mr Pitt stated that every authority had been consulted respecting the present singular situation of affairs; that none pointed out either the possibility of directing a new prorogation, or of enabling ministers to open the session of parliament in any regular way; that, under these circumstances, it would be improper for the house to proceed to the discussion of any public business; and that it was absolutely necessary to adjourn. He therefore recommended the interval of a fortnight, when, if the king's illness should unhappily continue, it would be indispensably incumbent upon them to enter upon the immediate consideration of the state of public affairs; and he further moved a call of the house for the 4th of December, and that the speaker should be directed to send circular letters, requiring the attendance of every member on that day.

The tenor of the precedents afforded by the history of regency, under which the whole, or a considerable part of the power of the state, should be confided to the next heir to the crown, or to the adult of the royal family most nearly related to the king; and what rendered this consideration the more material upon the present occasion was, that the Prince of Wales was understood to entertain an avowed partiality for the political connection which had lately been instrumental in obtaining for him the discharge of his debts and an increase of his annual income, as well as some personal resentment against the ministers now in possession of office. Accordingly, soon after the indisposition of the king had been ascertained, the prince dispatched an express to Mr Fox, who was at that time in Italy, requesting his immediate presence to assist him in forming an administration. The ministers were also aware of the intentions of the Prince of Wales, and wished, if possible, to retain possession of office. Besides, as the duration of the king's illness was necessarily uncertain, and he might speedily be able to resume the reins of government, it was obviously their interest to procrastinate as long as possible; and they were enabled to do so in consequence of the tranquil state of the nation, which rendered the exercise of the executive power of less immediate necessity than in times of war or public alarm. The effect of mere reputation in supporting any political measure was remarkably illustrated on this occasion. Mr Pitt and it, especially as their side of the question was likely to be

his colleagues in office were in possession of the public fa- Reign of vour in a degree in which perhaps no ministers had ever George III. before enjoyed it for so long a period of time. To Mr Fox and his associates still attached part of the odium which the coalition and the Indian bill had originally excited. The Prince of Wales himself was even less popular. The sobriety of his father's life formed a contrast to his youthful indiscretions; and the rumour of his marriage with Mrs Fitzherbert was still propagated, and met with credit. In this state of affairs the king's ministers, who had ceased to be any thing more than ministers by courtesy, had every advantage in their project of delaying as long as possible the relinquishment of their official situations, by placing the exercise of the royal authority in new hands. Mr Pitt likewise conducted himself with great dexterity in contriving subjects of discussion in the House of Commons; whilst his antagonists, in contending against him for victory upon speculative political questions, seem not to have been aware that they were in fact fighting his battle, by delaying the period of their own entrance into power.

Upon the re-assembling of parliament on the 4th of December, a report of the privy council, containing an examination of the royal physicians, was presented to the two houses by Lord Camden and Mr Pitt; and it was suggested, that when the delicacy of the subject and the dignity of the person in question were considered, parliament would probably perceive the propriety of acting upon this report, rather than of demanding that more direct and ample information to which, in strictness, they were entitled. This suggestion seemed reasonable, as it could scarcely be supposed that the ministers of the crown would act so directly in opposition to their own interests, as falsely to represent their master as incapacitated by mental disease for the exercise of his royal functions. Mr Fox, Mr Burke, and others, however, would not take any assurance upon this point, but insisted on the solemnity of an inquiry by a committee of the two houses. This was accordingly agreed to, and the report of the committee was laid upon the table of the House of Commons on the 10th, when a further proposition was moved by Mr Pitt for the appointment of a committee to examine precedents respecting those cases in which the personal exercise of the royal authority had been prevented or England was regarded upon the whole as in favour of a interrupted by infancy, sickness, infirmity, or any other cause. Mr Fox observed, that though he had no objection to the appointment of a committee for the purpose proposed, yet as it was notorious that no precedent existed which could be applied to the present case, he took the opportunity of stating as a general principle, that the king being at present incapable of holding the executive government, the Prince of Wales had as clear and express a right to assume the reins and exercise the power of sovereignty during the continuance of the present incapacity, as if his father were actually dead; but he added, that though the prince's right was perfect and entire, the two houses of parliament, as the organs of the nation, were alone qualified to pronounce when he ought to take possession of his right. In reply to this observation, Mr Pitt stated, that for any man to assert such a right in the Prince of Wales, otherwise than as it was voluntarily conferred upon him by the two houses of parliament, was little less than treason against the constitution; and that, except by their election, he had no more right, in point of principle, to assume the government, than any other subject in England.

On the following day the opinion which had been stated by Mr Fox was attacked in the House of Lords by Lord Camden, and defended by Lord Loughborough and Lord Stormont. Ministers had now got an abstract question as a subject of debate, and they resolved not to lose sight of

Reign of most popular, from being founded on an assertion of the hereafter be open to the wisdom of parliament to reconsi-George III. powers of parliament in opposition to hereditary right. Accordingly, when the subject was next mentioned, Mr Pitt said, that the question which had been started respecting the rights of parliament was of much greater magnitude and importance than those which related to the present exigency; and that it was impossible to dismiss the question of right without its being fully discussed and decided. And on the 16th of December, in a committee upon the state of the nation, he entered at large into the subject, and endeavoured to prove by ancient precedents that the powers vested in a regent had always been inferior to those of the king, and that parliament had interfered in cases of royal infancy in appointing councils of regency, nay even a single regent or protector; but he at the same time admitted that it would be expedient to intrust the government to the Prince of Wales, whatever limitations it might be thought necessary to impose on him. Mr Fox, on the contrary, contended that his doctrine was supported by the very nature of a hereditary monarchy. Upon Mr Pitt's principles, said he, if a man were questioned whether the monarchy is hereditary or not, the answer must be, I cannot tell; ask his majesty's physicians. When the king of England is in health the monarchy is hereditary, but when he is ill and incapable of exercising the sovereign authority, it is then elective. He ridiculed the absurdity of Mr Pitt's assertion, that the Prince of Wales had no more right than any subject of the realm, while he at the same time confessed that parliament was not at liberty to think of any other regent. But Mr Pitt's motion on the question of right was carried by a considerable majority.

On the 22d of December Mr Pitt proposed in the House of Commons, a resolution, the object of which was to declare it necessary, for the purpose of supplying the present deficiency, and maintaining entire the constitutional authority of the king, that the two houses should determine on the means by which the royal assent might be given to the bill which they might adopt for constituting a regency. The object of this proposition was obvious. Administration had resolved not to confide the regency to the Prince of Wales except under certain restrictions; but without the royal assent, an act of parliament, fixing these restrictions, could not be passed. They wished, therefore, to devise a solemnity which, in this case, might be held as equivalent to the royal assent; and Mr Pitt proposed, that the great seal should be affixed by the lord chancellor to the act of parliament, and that this should be held as equivalent to the royal assent. Mr Fox, on the contrary, urged an immediate address to the Prince of Wales, requesting him to take upon himself the regency; and upon the point long debates occurred in both houses of parliament, in which administration continued to be supported by the majority.

In the meanwhile Mr Pitt, in the name of the rest of the cabinet, explained to the Prince of Wales, in a letter, the restrictions which were meant to be inserted in the regency bill. These were, that the care of the king's person, and the disposal of his household, should be committed to the queen; and that the power to be exercised by the prince should not extend to the personal property of his father, nor to the granting of any office, reversion, or pension, except where the law absolutely required it, as in the case of the judges, for any other term than during the king's pleasure, nor to the conferring of any peerage, unless upon such persons of the royal issue as should have attained the age of twenty-one years. It was added, that these ideas were founded upon the supposition that the royal malady would only be temporary, and might be of short duration; that it was difficult to fix at present the precise period for which these provisions ought to endure; but that it would

der them whenever circumstances might appear to render George IIL it eligible. In his answer, which was dated on the second of January 1789, the prince declared, that it was with deep regret he perceived, in the propositions of administration, a project for introducing weakness, disorder, and insecurity, into every branch of public business; for dividing the royal family from each other; for separating the court from the state, and depriving government of its natural and accustomed support; for disconnecting the authority to command service from the power of animating it by reward; and for allotting to him all the invidious duties of the kingly station, without the means of softening them to the public by any one act of grace, favour, or benignity. He stated it as a principle of the British constitution, that the powers and prerogatives of the crown were held in trust for the benefit of the people, and were sacred as conducing to preserve that balance of the constitution which formed the best security for the liberty of the subject; and he objected to making trial in his person, of an experiment to ascertain with how small a portion of kingly power the executive government of the country could be conducted. He stated his conviction, that no event could be more repugnant to the feelings of his royal father on his recovery, than to know that the government of his son and representative had exhibited the sovereign power in a state of degradation and diminished energy, injurious in its practice to the prosperity of the people, and mischievous in its precedent to the security of the monarch and the rights of his family; but he nevertheless declared himself resolved to undertake, under every disadvantage, the office of regent, in order to avoid the evils which might arise from his following a different line of conduct.

The most singular part of this project for the government of the kingdom appears to have been that for confiding to the queen the power of removing, nominating, and appointing the officers of the royal household; assisted by a permanent council, to be selected by parliament, and to consist, in some measure, of the members of administration. The annual income of the royal household was computed at L.300,000, and the number of officers of which it consisted amounted to four hundred; an influence which would certainly have been sufficiently formidable to a government in other respects restricted and limited. The lords of the bed-chamber had been made use of to defeat Mr Fox's India bill, and might, under a separate establishment, have proved embarrassing to the existing government. It is obvious, however, that, on this occasion, administration were encouraged in the pursuit of the plan which they had formed for restricting the prince's power, by the addresses presented to them from various parts of the kingdom, expressive of gratitude for the assertion by the House of Commons of their right of providing for the present de-

On the 16th of January Mr Pitt proposed his regency bill, resting it, in some measure, upon the decisive opinion of Dr Willis, who expressed great hopes of the king's recovery; and after long debates, the limitations were sanctioned by a considerable majority. In the House of Lords similar debates occurred, but there also administration proved victorious. On the 31st of January Lord Camden moved in the House of Lords, that the lord chancellor should be directed, by authority of the two houses of parliament, to issue a commission in the name of the sovereign, for the purpose of immediately opening the session of parliament; and this resolution having been carried in both houses, the session was opened in the proposed form on the 3d of February. Though the principles of the regency bill had been previously discussed, yet its various clauses gave rise to new divisions, in which administration still maintained

Reign of their superiority. The bill passed the House of Commons George III. on the 12th of February, and was presented on the following day to the House of Lords, where it was discussed on the 17th and 18th, and a few unimportant amendments

> But here the whole of these proceedings terminated. On the 12th of February, the king having been declared by his physicians to be in a state of progressive amendment, an adjournment of the House of Lords was therefore proposed on the 19th. On the 25th his majesty was declared by his physicians free from complaint; and on the 10th of March the lord chancellor, by the king's authority, addressed both houses of parliament in a speech, after which the ordinary business of the session commenced.

In the meanwhile the administration of Mr Pitt had been less fortunate in Ireland than in this country. The unexampled popularity which reconciled the people of Great Britain to all his measures, and the odium and suspicion which had fallen upon his opponents, had not hitherto been communicated to the neighbouring island. The prospect, therefore, of his departure from office excited little regret in that country, and its parliament made haste to worship what they accounted the rising sun. It had stood adjourned, previous to the royal incapacity, till the 20th January 1789; and the Marquis of Buckingham, then lord-lieutenant, with consent of the privy council of Ireland, ventured to defer its meeting till the 5th of February. On the 11th of that month, two motions were offered to the consideration of the House of Commons, the one by Mr Grattan, the member most distinguished for his talents; and the other by Mr Conolly, the richest of the Irish com-By the first the royal incapacity was declared; and by the second it was proposed to present an address to the Prince of Wales, requesting him to take upon himself the government, with its various powers, jurisdictions, and prerogatives. After a long debate, the propositions of Mr Grattan and Mr Conolly were carried by a large majority; and on the following day an address to the Prince of Wales was also voted, and sent to the House of Lords, where it was adopted by a great majority. On the 19th of February the address was carried to the lord-lieutenant, who, however, refused to transmit it to England; upon which the two houses appointed six commissioners to present the address immediately to the prince: but these measures had scarcely been carried through parliament when the king's recovery rendered them ineffectual, and the consequence was, that the majority of the Irish parliament, who were far from intending to engage in a contest with the British government, found themselves in an awkward situation.

The subject of the slave-trade, which had been brought under the consideration of parliament during the preceding session, was resumed upon the 12th of May. In the interval, petitions against the abolition of the traffic had been presented by persons in London, Liverpool, Bristol, and other places interested in the trade. Meanwhile, the report of the committee of the privy council, of which Mr Pitt had previously given notice, was presented to the House of Commons; and the enemies of the trade had been extremely active in endeavouring to excite the indignation of the public against this odious and inhuman traffic. Innumerable pamphlets were distributed, either gratuitously or at a low price, giving an account of the calamities endured by the unhappy natives of Africa; the wars in which petty princes were tempted to engage, with a view to sell their prisoners to European traders, were fully explained; the wretched manner in which these slaves were transported to the West India colonies, fettered and crowded together so as to occasion the destruction of multitudes by disease, was represented by prints, distributed along

with the popular publications upon the subject, and, last- Reign of ly, instances were given of the cruelty of the masters in George IIL the West Indies, tending to render the white inhabitants extremely odious. By these means the public were led to interest themselves in procuring, if not an abolition of the state of slavery, at least a complete prohibition of the importation of additional slaves from Africa; and to this last object the attention of the legislature was now con-The business was opened by Mr Wilberforce, who stated the effects of the trade upon Africa; noticed the mode of transportation, which he very fully described; adverted to the diseases contracted on ship-board, with the astringents and washes employed to hide the wounds of the miserable sufferers; descanted on the wickedness of the trade, which he felt to be so enormous and irremediable, that he could stop at nothing short of abolition; asserted that the number of negroes in the West Indies might be kept up without the introduction of recruits from Africa; and moved twelve propositions, stating the number of slaves annually carried from Africa, imported into the British West Indies, and entered in the custom-house accounts; the consequences produced upon the inhabitants of Africa; the injury sustained by the British seamen; the fatal circumstances which attended the transportation of the slaves; the causes of the mortality of the negroes, and a calculation of the relative increase of population in Jamaica and Barbadoes; together with a declaration that no considerable or permanent inconvenience would result from discontinuing further importation. Mr Pitt supported that side of the question which had received the sanction of popular approbation; declaring himself satisfied that no argument, compatible with any idea of justice, could be assigned for the continuation of the slave-trade; and expressing a hope, that while Great Britain took the lead of other countries in a matter of so great magnitude, foreign nations would be inclined to share the honour, and contented to unite with us in so excellent a work. Mr Fox highly approved of what had fallen from Mr Pitt, and declared that he had considered the trade in human flesh as so scandalous, that it was in the last degree infamous to suffer it to be openly carried on by the authority of the government of any country. Mr Burke was of opinion that, whatever might be the present situation of Africa, it could never be meliorated under the present system; that while we continued to purchase the natives, they must for ever remain in a state of savage barbarity; that it was impossible to civilize a slave; and that there was no country situated like Africa into which the shadow of improvement had ever been introduced. On the other hand, Mr Wilberforce's propositions met with considerable opposition. Mr Savage and Mr Newnham, on the part of the city of London, asserted, that the measure, if carried into effect, would render the metropolis bankrupt; Mr Dempster thought that Mr Wilberforce's first proposal ought to be, to make good out of the public purse the losses which individuals would sustain from the abolition of the trade; Lord Penrhyn asserted, that as there were mortgages in the West India islands to the amount of seventy millions sterling, Mr Wilberforce's project would subject the country in the repayment of that sum; Mr Henniker opposed the abolition, on account of the alleged depravity of the Africans, which rendered them incapable of civilization; and Lord Maitland, Mr Marsham, Mr Hussey, Mr Rolle, Mr Drake, and Mr Alderman Watson, each alleged something intended to pass as a reason for entertaining similar views. Lastly, the matter ended in the renewal of Sir William Dolben's act to regulate, for a limited time, the mode of conveying slaves in British vessels from the coast of Africa.

The annual business of the budget was not brought for-

Reign of ward this year till the 10th of June; and immediately pre- ment of the revenues of India, which, after deducting Reign of of Commons was vacated by the promotion of Mr Grenville to be one of his majesty's principal secretaries of state. On this occasion Mr Henry Addington, the personal friend of the premier, and son of Dr Stephen Addington, physician to Mr Pitt's family, was appointed to succeed Mr Grenville in the chair. His opponent was Sir Gilbert Elliot, who was proposed by the opposition; and both Mr Fox and Mr Burke animadverted on the youth and inexperience of his competitor; but on a division Mr Addington was elected by a large majority.

The expense incurred by the recent armament, the allowance to the American loyalists, and other circumstances, rendered it necessary to have recourse to a loan of one million, to defray the interest of which additional taxes were imposed upon newspapers, advertisements, cards, and dice, probates of wills, legacies to collateral relations, and carriages and horses. And as one of Mr Pitt's methods of extending the revenue consisted in endeavouring to suppress smuggling, and as he had formerly transferred the management of the duty on wine from the customs to the excise, he now pursued the same course in regard to the article tobacco. The subject was opened in the House of Commons on the 16th of June, when it was observed that tobacco had come to be considered as the staple of the smuggler, in the same manner as tea, wine, and spirits, had formerly been. The quantity of tobacco consumed in the kingdom had been found to bear a tolermillions of pounds; and the loss to the revenue upon the half of this consumption exceeded three hundred thousand pounds per annum. Under these circumstances, Mr Pitt thought it necessary to have recourse to the system of excise, by which the stock of the dealer was taxed, instead of the duty being collected on importation. A bill was accordingly introduced for effecting the transference proposed by the minister, and, after a good deal of discussion, passed by a large majority.

the repeal of the shop-tax, which had proved extremely unpopular in the capital, Mr Pitt at length consented that it should be abolished. Mr Beaufoy again introduced a was supported by Mr Fox, opposed by Lord North and Mr Pitt, and rejected by a narrow majority. A bill introduced into the House of Lords by Earl Stanhope, for relieving members of the church of England from various penalties and disabilities under which they laboured, and for extending freedom in matters of religion to persons of all denominations, Catholics excepted, was equally unsuccessful. The laws it intended to repeal were those which imposed penalties upon persons who did not frequent the established worship; prohibiting men from speaking or writing in derogation of the doctrine of the book of common prayer; enjoining the eating of fish on certain days; authorizing the imprisonment of persons excommunicated prohibiting the exportation of women; and declaring all persons who went to court, without having previously made a certain declaration, to be in the eye of the law Popish recusant convicts. But these absurd and obsolete enactments were stoutly defended by the episcopal bench; and the bill was ultimately rejected.

On the first of July the East India Company petitioned the House of Commons for permission to add a sum of one million to their capital; and the request was granted with little difficulty. On the same day Mr Dundas, as president of the board of control, brought forward a state-

George III. vious to the discussion, the office of speaker of the House every article of expenditure in that country, he calculated George III. at L.1,820,000. During the present session, the trial of Mr Hastings still proceeded before the House of Lords. The third charge brought forward, respecting presents received by him during his government of Bengal, was opened by Mr Burke, who, in the course of his speech, alluded to the trial and execution of Nundcomar, and asserted that Mr Hastings had murdered that man by the hands of Sir Elijah Impey. But as the transaction respecting Nundcomar formed no specific part of the charges which had been preferred against Mr Hastings by the House of Commons, and as the question, in as far as Sir Elijah was implicated, had been examined and rejected during the preceding session, Mr Hastings presented a petition to the house, in which he entreated them, either to cause the additional allegations urged against him to be brought forward, and prosecuted in specific articles, or to afford him such other redress as they might judge suitable and proper. Mr Pitt supported the petition, upon the ground that the murder of Nundcomar formed no part of the crime of peculation, and every rule of evidence was against its being alleged; that it had been charged in order to discredit the character of the accused, although it was a rule in the courts of law that no fact could be given in evidence to discredit even a witness; that if the murder of Nundcomar was not admissible as evidence, it could only be urged as matter of aggravation, which it was impossible to allow; and that the common sense of the ably near proportion to the quantity of tea; and at least house, and of all mankind, would not permit the crime of one half of this quantity was the exclusive commodity of murder to be urged as an aggravation of the crime of pethe smuggler. The consumption amounted to fourteen culation. Mr Fox, on the contrary, cited the case of a culation. Mr Fox, on the contrary, cited the case of a captain of a ship, against whom murder was charged in having thrown his cargo of slaves overboard, in order to prove that he had by sinister means endeavoured to defraud the underwriters of the amount of the insurance; and maintained that the present case exactly corresponded to this. It was impossible to describe the corrupt transactions of Mr Hastings without alluding to the crimes which had accompanied them, or to relate the crimes without mentioning the names of the persons by whom they Mr Fox having annually brought forward a motion for had been committed. A resolution, however, was moved and carried, by which it was declared, that no authority had been given by the House of Commons for making any allegation against Mr Hastings respecting the death of motion for the repeal of the corporation and test acts, which Nundcomar, and that the words of Mr Burke, complained of in the petition, ought not to have been spoken.

The session of parliament was terminated on the 11th of August, by a speech from the lord chancellor in the name of the king. The summer passed away without producing any memorable event, and parliament assembled again on the 1st of January 1790, when they were met by the king in person, who, in the speech from the throne, observed that he continued to receive assurances of a pacific nature from the different powers in Europe, and at the same time congratulated the nation on the happiness it enjoyed, from the increasing advantages of peace.

## CHAP. XV.

## REIGN OF GEORGE III .- FRENCH REVOLUTION.

Origin of the French Revolution.—Allusions thereto in the House of Commons.—Approved of, in the first instance, by Mr Pitt.— Hostility of Mr Burke.—Revolution defended by Mr Fox and Mr Sheridan.—Conduct of Mr Pitt.—Motion for repeal of the Corporation and Test Acts.—Mr Flood's motion for a Reform in Parliament.—Affair of Nootka Sound.—Disturbances in the Austrian Netherlands.—New Parliament.—Schism amongst the members of Opposition.—Burke and Paine on the French Revolution.—Desertion of the Opposition by Mr Burke.—Slave.

Reign of George III. 1790.

trade and Sierra Leone Company - Dispute about Oczakow .-General state of Europe —Catholic Relief Bill.—War in India. Early popularity of the French Revolution .- Riots at Birmingham.—State of Europe.—Project for the partition of Poland and France.—Treaty of Pilnitz.—Parliamentary proceedings.—Project for the gradual abolition of the Slave-trade.—Scotch Burgh Reform.—War in India.—Siege of Seringapatam.—Treaty of Peace with Tippoo.—Causes of the impending changes in Europe.-Royal Family of France.-Defects of the new French Constitution.—Society of Friends of the People.—Debate on Mr Grey's notice of a motion for Reform in Parliament. -Paine's Rights of Man.-Proclamation against Seditious Publications.—Its effects.—France menaced with invasion.—Russians invade Poland.—Duke of Brunswick's Manifesto.—Its effects.-The Prussians enter France.-Defeated at Valmy. Retreat.—Battle of Jemmappes.—Proceedings of the French Government.—Ferment in Britain.—Political Associations.—Friends of the People.—Constitutional and Corresponding Societies. Meeting of Parliament. Speech from the Throne. Debate on the Address.—Desertion from the ranks of Opposition .- Mr Fox's motion to treat with France .- The Alien Bill. -Correspondence between Lord Grenville and M. Chauvelin. The King's message announcing War.-Attempt by the French to re-open negociations.—Declaration of War.

During the preceding summer the eventful career of the French revolution had commenced. The extreme weakness into which the government of France had fallen, owing to the pressure of the public debts, and the embarrassment of the finances, had induced the king to call together the states general of the kingdom, which soon assumed the title of the national assembly. Their debates, which were held in public, diffused a love of innovation, and a desire to reform their ancient government, and establish a free constitution. The court became alarmed by the violence of their proceedings, and attempted to set bounds to their projects; but the populace of the capital rose in arms, and the military refused to act against them. Meanwhile the national assembly proceeded daily in the discussion of new plans of change. They seized the ecclesiastical property and tithes, resolving to limit the clergy for the future to fixed salaries; they put an end to the monastic institutions; they abolished the whole order of nobility, and limited the power of the crown. These, and other proceedings, which will be stated in their proper place, excited much attention in Britain; and accordingly allusions to them became not unfrequent in parliament during the present session; indeed general questions were debated with more animation, and excited a higher degree of interest, than they had for many years done.

The supplies for the navy and army, which were stated at the same amount as in the preceding session, produced some animadversions from Mr Marsham and Mr Pulteney, who alleged that, in the actual state of Europe, the military establishment of Britain might safely be reduced. Mr Fox observed, that if ever there was a moment in which he could be less jealous than at another of an increase of the standing army, the present was that moment. The example of a neighbouring nation had proved that the former imputations upon standing armies were entirely unfounded and calumnious; and it was now universally known throughout all Europe, that a man by becoming a soldier did not cease to be a citizen. He thought the new form which the government of France was about to assume, would render her a better neighbour than when her affairs were controlled by the intrigues of ambitious and interested statesmen. Mr Pitt acknowledged that the tumultuous situation of France afforded a prospect of tranquillity; but he thought that the opportunity ought to be seized to raise our army to such a state of respectability as would leave no hopes of future hostility. The present convulsions of France must sooner or later terminate in the re-establishment of order; but there was a probability, that while the fortunate arrangements of such a situation

might render her more formidable, they would also con- Reign of vert her into a less restless neighbour. As an Englishman George III. and as a man, he wished for the restoration of tranquillity in France, though that event appeared to him considerably distant. Whenever it arrived, and her inhabitants became truly free, they must be in possession of a freedom resulting from order and good government, and they would then stand forward as one of the most brilliant powers in Europe; nor could he regard with envious eyes an approximation towards those sentiments which were characteristic of every true British subject. But while Mr Pitt, who had commenced his public career as the champion of political reform, and still on important occasions represented himself as preserving his attachment to popular rights, was thus applauding the first revolutionary movements of the French, his friends considered themselves as at perfect liberty to give utterance to sentiments of a very different nature upon the subject. Viscount Valletort, who moved the address, expressed great compassion for the king of France, then almost a prisoner in his own palace, and for the families of distinction who had found it necessary to fly to foreign countries to avoid the unexampled barbarities which were committed with impunity at home; and Colonel Phipps declared that the praise bestowed by Mr Fox upon the conduct of the French military, was a poor compliment to the profession in general, and that, if he had wanted a subject for panegyric, he ought rather to have adverted to the conduct of the English army during the riots of 1780, when they were not led by false feelings to put themselves at the head of schemes leading to anarchy and cruelty.

On the 9th of February, when the vote of supply for the army came a second time under consideration, Mr Burke revived the subject of the French revolution. He declared himself, in decided terms, an enemy to the measures which had lately taken place in that country; and conceived that it would be the greatest of all calamities for Britain, if any set of men amongst us should represent the late transactions in France as fit objects of imitation. He, however, condemned the greatness of our military establishment, by reason of the weakness of France; and declared, that on looking over the geography of this part of the world, he saw a great gap, a vast blank, the space hitherto occupied by France, which had no longer any political existence. France had at different periods been as dangerous to us by her example as by her hostility. In the last age, we had been in danger of being entangled, by her example, in the net of a relentless despotism. Our present danger, from the example of a people whose character knew no medium, was that of being led, through an admiration of successful fraud and violence, to imitate the excesses of an irrational, unprincipled, proscribing, confiscating, plundering, ferocious, bloody, and tyrannical democracy. They had a good political constitution the day their states general assembled in separate orders; but this they had destroyed. They had now no other system than a determination to destroy all order, subvert all arrangement, and reduce every description of men to one level. It was absurd to compare a proceeding like this to the revolution in England, which neither impaired the monarchy nor the church, and merely drove away a legal monarch, who was attempting arbitrary power.

Mr Fox expressed great concern at differing in opinion from Mr Burke, for whom he avowed the highest reverence and esteem. He repeated his former opinion upon the subject of French affairs, but declared himself an enemy of all absolute forms of government, whether monarchical, aristocratical, or democratical. Mr Sheridan in more unqualified terms stated his disapprobation of Mr Burke's sentiments, expressed his surprise that any man

1790.

George III. horrence of the patriotic proceedings in France, and declared himself as ready as Mr Burke to detest the cruelties which had been committed. He complimented individually the Marquis de Lafayette, M. Bailli, and other French patriots, and expressed a hope that the despotism of France would never be restored; but observed that he ought not on that account to be considered as approving of a wanton persecution of the nobility, or an insult to royalty. Mr Burke answered Mr Sheridan with indignation, declared that Mr Sheridan had sacrificed his friendship for the applause of clubs and associations.

It is probable that Mr Pitt had now become aware of the difficulty of his situation with regard to the French revolution, which at this period was generally regarded with approbation in Britain, as an imitation of that spirit by which our ancestors had raised their country to a state of unexampled prosperity and happiness. Mr Pitt must already have known that the court regarded it in a very different light; and that, at no distant period, his ambition and his love of popularity might become incompatible. On the present occasion he undoubtedly saw with satisfaction a division likely to occur among those who had hitherto been his competitors for popularity; and with that dexterity in debate for which he appears to have been remarkable, he instantly endeavoured to widen the breach, and to attach to himself a man of so much intellectual power as Mr Burke, declaring that he agreed with the latter in almost every thing he had urged respecting the late commotions in France; that the sentiments Mr Burke had professed respecting the British constitution filled him with the sincerest satisfaction; and that the manner in which he had pledged himself to maintain it for ever inviolate, entitled him to the gratitude of his fellow-citizens and the admiration of posterity.

A new effort was made on the 2d of March to procure a repeal of the corporation and test acts. The dissenters had prevailed with Mr Fox to introduce the motion; but the clergy of the church of England, alarmed no doubt at the downfal of the ecclesiastical establishment in France, were anxious to diffuse a spirit of opposition to the intended attack. Mr Fox represented his whole argument as resting upon this principle, that no government has a right to animadvert upon the speculative opinions of its subjects, till these opinions produce a conduct subversive of the public tranquillity. It had been remarked that certain errors in religion tended to disturb the public tranquillity; but surely political errors must have this tendency in a much greater degree; yet such was the absurdity of the test laws, that a man who favoured arbitrary power in his sentiments, who considered the abolition of trial by jury as no violation of liberty, and the invasion of the freedom and law of parliament as no infraction of the constitution, might easily pave his way to the first situations in the state. Mr Pitt, as usual, supported the privileges of the established church; asserting, that though opinions might not be a warrantable ground for criminal accusation, yet they might afford a good reason for excluding particular individuals from the public service; and that to discover dangerous opinions a test might be highly expedient. Mr Burke was decidedly hostile to the measure. Mr Fox had stated the principles of toleration and persecution, but abstract principles he always disliked. Of all abstract principles, however, those of natural right, upon which dissenters rested as their stronghold, were the most idle and the most dangerous; they superseded society, and snapped asunder all those bonds which had for ages constituted the happiness of mankind. He adjured the house not to suffer the fatal incidents which had attend-

Reign of who valued the British government should feel such ab- ed the church of France, plundered and demolished in so Reign of disgraceful a manner, to abate their zeal in favour of our George III present happy and excellent establishment. Mr Fox in reply declared himself filled with grief and shame at the sentiment which Mr Burke had avowed, and asserted that all the principles he had stated had formerly received the sanction of his friend. He thought Mr Burke at present misled by his sensibility; his feelings had been shocked and irritated by a mistaken idea of the transactions in France, which were in reality nothing more than the calaand denied that he was the advocate of despotism; but mities to which every country was unavoidably subject at the period of a revolution in its government, however beneficent and salutary. The proposed repeal was of course rejected on a division.

A few days afterwards Mr Flood brought forward a motion for the reform of the representation of the people in parliament, and proposed to add a hundred members to the House of Commons, to be elected by the resident householders in every county. Mr Windham opposed the motion, on the ground that the country had prospered under the representation as it stood, and because innovations had become extremely dangerous. Where, said he, is the man who would repair his house in the hurricane season? Mr Fox, on the contrary, declared himself as much persuaded as ever of the necessity of reform; but he thought the majority of the nation of a different opinion, and was therefore of opinion that the motion ought to be withdrawn. Mr Pitt considered the proposal as brought forward at an improper time, and said he wished to wait for a more seasonable opportunity, when he would certainly again submit his ideas upon the subject to the considera-

tion of the house. Mr Flood accordingly withdrew his

proposition.

On the 5th of May a message from the king informed both houses of parliament of certain acts of hostility committed by the Spaniards in the seizure of three British vessels which had attempted to establish a foreign trade between China and Nootka Sound, on the west coast of North America. The Spaniards conceiving the whole of that part of the American coast to be their property, were the first to give information of what they had done, and required that steps should be taken by the British government to prevent future encroachments upon that coast. The British navy was instantly augmented; and as a war with Spain, unassisted by France, could not prove very formidable, the public seemed to regard the approach of hostilities with little concern. But the determination evinced induced the Spaniards to come to an accommodation, and the dispute ended without an appeal to arms. During the present session little progress was made in the trial of Mr Hastings; and both parties accused each other as the authors of the delay that had taken place, while the subject began to be neglected or forgotten by the public. On the 10th of June the king put an end to the session by a speech from the throne, and this parliament was dissolved.

At this period the Austrian Netherlands were in a state of great agitation. The people of these provinces had long been governed by a feudal constitution, which vested important privileges in the clergy, the nobles, and certain classes of citizens, but more especially in the clergy. Joseph II. had invaded these privileges, seized upon the greater part of the property belonging to the monasteries, and driven from the country all who opposed his innovations. At length, about the end of the year 1789, the exiles having united on the frontiers, entered the country, and being joined by others, formed a considerable army, which rapidly overran the whole of Austrian Flanders; while the emperor, engaged in a war with the Turks. was prevented from sending any considerable force against

Reign of them. In December, the states of Barbant having assem- sentiments, stimulated his eager mind to devote his prin- Reign of ary 1790 were formed the outlines of a federal constitu- to vilify the French national assembly, and to hold out tion, by which each of the Belgic provinces was to retain the revolution as a subject of alarm and of detestation its peculiar constitution, whilst the general defence of the to all Europe. The style of copious and popular elorepublic was to be intrusted to a congress. Meanwhile a considerable number of foreigners entered into the service of this new republic. But it soon appeared that the Belgic revolution would produce no lasting effects. The old aristocratical government, uncontrolled by the authority of a prince, was everywhere adopted; the power of the clergy was even increased; the very first step of the Belgian congress was a public declaration of religious intolerance; and the liberty of the press was prohibited, and state licensers appointed. The consequence was, that discontents speedily arose. But at this period the emperor Joseph died, and was succeeded by Leopold, archduke of Tuscany, who issued a proclamation, inviting the revolted provinces to return to their allegiance, and promising to restore their ancient political constitutions. And not trusting to peaceful measures alone, he sent an army against the insurgents, and at the end of the year the house of Austria had recovered its authority in the Netherlands.

The new parliament assembled on the 25th of November 1790. As no uncommon efforts had taken place at the preceding elections, nearly the same members as formerly were returned to the House of Commons; and Mr Addington was chosen speaker. On the following day the session was opened by a speech from the throne, in which his majesty informed parliament that the differences which had arisen with the court of Spain were brought to an amicable termination; that a separate peace had been concluded between Russia and Sweden; that, in conjunction with his allies, he had employed his mediation to negociate a treaty between Russia and the Porte; that he was endeavouring to assist in putting an end to the dissensions in the Netherlands; but that the peace of India had been interrupted by a war with Tippoo Sultan, son of the late Hyder Ali. The speech concluded with recommending to parliament a particular attention to the state of the province of Canada. Various debates, of little importance in a historical point of view, occurred respecting the negociations with Spain, the fur trade at Nootka Sound, and the expensive naval armament which had been fitted out to enforce the claims of Britain.

But in the beginning of March 1791 a bill was brought into parliament by Mr Pitt for regulating the government of the province of Canada in North America. This circumstance is chiefly worthy of notice on account of an altercation to which it gave rise between Mr Burke and Mr Fox. During the last session of the former parliament Mr Burke had declared his disapprobation of the French revolution, whilst Mr Sheridan and Mr Fox had expressed very opposite sentiments. Mr Pitt, as we have already seen, had dexterously laid hold of the opportunity to excite disunion among his antagonists, and had declared himself highly satisfied with Mr Burke's attachment to the British constitution. Mr Burke, on the other hand, had long been engaged in a career of fruitless opposition to the existing government; and during the king's illness, in the end of the year 1788, he had indicated such an indecent impatience when any expectation was expressed of his majesty's speedy recovery, as sufficiently demonstrated how eager he was to obtain possession of office. It is not improbable, therefore, that the approbation expressed by Mr Pitt, of his fears on account of the French revolution, suggested a decisive opposition to that great national movement, as a mode of ingratiating himself with admi-

George III. bled, appointed an administration, at the head of which cipal attention to the subject. Accordingly, in November George III was Henry Vander Noot, a popular advocate; and in Janu- 1790, he published a treatise, in which he endeavoured quence in which the book was written, together with the sentiments which it contained, produced a great impression; and replies to it were published by Dr Priestley and others; but that which proved most successful in gaining the attention of the public, was the production of Thomas Paine, who had formerly published in North America a pamphlet entitled Common Sense, which proved extremely prejudicial to the royal cause throughout the colonies. His present work contained a statement of the facts connected with the French revolution, together with satirical strictures upon what he accounted imperfections in the British constitution. He was not equal to his antagonist in copiousness of diction; but in shrewdness of remark and concise effective energy of style he was superior. Mr Burke's love of literary fame was great; and it had been highly gratified by the attention which his book had attracted, particularly among the higher orders. Hence, when he saw his reputation rudely assailed, his temper became ruffled; and he appears to have wished for an opportunity of separating himself from his former political associates. Accordingly, on the 6th of May, when the clauses of the Quebec bill were about to be discussed in a committee of the whole house, he rose, as he said, to speak to the general principle of the bill, and enlarged upon the importance of the act which they were about to perform, namely, that of appointing a legislature for a distant people. But he thought the first consideration ough to be the competency of the house to such an act. By what were called the "rights of man," a body of principles lately imported from France, all men are by nature free, and equal in respect to rights. If such a code were admitted, the power of the British legislature could extend no further than to call together the inhabitants of Canada to choose a constitution for themselves. But, rejecting this code, which was never preached without mischief, he assumed the principle, that Britain had acquired the right of legislating for Canada by conquest. The next question was, what model was to be followed in instituting a government for Canada; whether that of America, of France, or of Great Britain, which were the three great modern examples. In discussing this point, he diverged from the subject more immediately before the house, and took an opportunity to pronounce a vehement invective against the principles and enactments adopted by the French national assembly, in attempting to form a new constitution. He was called to order by some of his former friends, and an altercation ensued, in the course of which he asserted that a design had been formed by certain persons in this country against the constitution. Mr Fox accused Mr Burke of leaving the question before the house to seek a difference with him, and to fortify misrepresentations of something which he had said in a former debate concerning the French revolution; and he adhered to his former sentiments in approving the revolution, though not the new constitution of France. Mr Burke repeated his attack upon the French revolution, and declared that his friendship with Mr Fox was dissolved by that accursed event. Mr Fox, with much apparent agitation, endeavoured to soften the asperity of Mr Burke, but without effect. He had evidently resolved upon the part he was to act; and this may be considered as the first occasion upon which any member of the British legislature represented his own conduct as seriously influenced, to the extent of deserting nistration; and that this idea, concurring with his former his former political views and associates, in consequence

Reign of of an alarm originating in the example of the French re-George III. volution. had fallen under the influence of Austria; whilst the re- Reign of volution, or rather the weakness which preceded it, had George III

1791.

During the session, the question of the slave-trade was again brought forward by Mr Wilberforce, and was supported by Mr Pitt and Mr Fox; but his motion was nevertheless negatived by a considerable majority. The zeal of the nation in favour of abolition had however become very great; and as the evidence led before the House of Commons had represented the trade as the source of innumerable crimes and great misery, a company was established with the view of civilizing the natives of Africa, and of cultivating, by the hands of freemen, West India productions in that country; and having received a charter, they fixed on Sierra Leone as their principal settlement, and great expectations were entertained of the success of the project; expectations destined never to be realized.

On the 28th of March a message from his majesty announced that his endeavours to effect a pacification between Russia and the Turks having proved unsuccessful, he had judged it necessary to add weight to his representations, by making some further augmentation of his naval force. The point in dispute related to Oczakow, a town situated upon the Black Sea, at the mouth of the river Dnieper, which had been taken from the Turks, and was considered by Russia as a situation of great importance with reference to future operations against the Ottoman empire. The Turks, greatly exhausted by the contest, were reduced to the necessity of purchasing tranquillity at almost any price; but Prussia, alarmed at the growing power of Russia, had, in conjunction with Britain and Holland, offered to mediate a peace, with a view to procure the restoration of Oczakow to its former masters. Russia, however, refused the offered mediation, and also declined to renew any commercial treaty with Britain; though she had concluded one with France and another with Spain, and even entered into a quadruple alliance with these countries and with Austria, for the purpose of restraining the influence of Prussia, Britain, and Holland. In moving an address to his majesty on this message, Mr Pitt observed, that having entered into defensive alliances, which were admitted to be wise and politic, we ought to adhere to them; that Prussia was our ally, and any event calculated to affect that power, and diminish its influence on the Continent, would be injurious to us, as far as our mutual interests were concerned; and that the progress of the Russian arms against the Porte gave sufficient cause for alarm, since, if the power of the Porte were further humbled by its aspiring rival, Prussia would instantly feel it, and not Prussia alone, but all Europe. Mr Fox, on the contrary, expressed his conviction that Prussia could not be endangered by the progress of the Russian arms in Turkey, and that an alliance with Russia appeared to him the most natural and advantageous which we could possibly form. The address, however, was carried by a large majority. But the opposition, finding that they were supported by greater numbers than usual, and that a war with Russia was unpopular, brought the question repeatedly forward; and administration, perceiving the current of public opinion to run against them, abandoned their views, and refused to support Prussia in attempting to set bounds to the ambition of Russia.

On considering the state of Europe at the time, administration were probably guided, in their jealousy of Russia, by the maxims which had influenced the politics of Great Britain during the best periods of its history. The Spanish monarchy had long been in a state of debility, which rendered it of little weight or importance on the continent of Europe; and France had likewise suffered her armies to decline, and, by a sort of family compact,

volution, or rather the weakness which preceded it, had George III. incapacitated her for interfering in foreign affairs. In the mean time Austria and Russia, relinquishing all rivalship, had entered into a close combination, and acted in subserviency to their mutual ambition. Hence, to preserve some tolerable balance of power on the continent of Europe against these two great military empires, it became absolutely necessary for Great Britain and Holland to unite with Prussia and Sweden, and to protect the Turks, in order to prevent the further aggrandisement of these two great and warlike powers. The British ministry, however, finding a war with Russia likely to prove unpopular, consented that Great Britain should descend from her proud station of holding the balance of the Continent; and the consequences of this desertion speedily appeared; for Prussia, no longer backed by Britain, was under the necessity of joining Russia and Austria in their schemes of aggrandisement at the expense of the weaker powers, that she might strengthen herself by a share of the spoil, and maintain her position in relation to these powers. How far the British administration acted culpably in deserting what they accounted their duty, in compliance with the apparent wish of the nation, is a question which was never discussed, because the consequences of their conduct were soon overlooked and forgotten amidst the great events which speedily occurred. From the love of popularity, and the habit of resisting all the projects of administration, opposition at this time encouraged the pusillanimity of their countrymen; whilst the members of administration, fearful of losing their places, suffered their country to be degraded from its proper rank and influence in Europe, and prepared the way for the partition of Poland, the projected partition of France, the war of the revolution by which that project was resisted, and the immeasurable aggrandisement of the power which soon proved so dangerous to Britain and to all Europe.

An unsuccessful effort was made during this session of parliament by Sir Gilbert Elliot, to procure for the members of the church of Scotland an exemption from the test act. But the Roman Catholics in England were more fortunate in obtaining relief from certain penal statutes. As the Catholic church was the great object both of political and religious terror in the first stages of the reformation, the English statute book was loaded with the most rigorous edicts against the professors of that obnoxious faith; and though some of these were removed in the year 1780, yet in 1791 not less than seventy pages of Burn's Ecclesiastical Law were occupied with the enumeration of the penal statutes in force against the Roman Catholics. Amongst these were some of the most sanguinary nature. For example, it was high treason and death to make a convert to the Catholic faith; and severe penalties were enacted against papists for hearing mass by some statutes, whilst by others they were compelled to attend the established worship, however contrary to their consciences. A reform was therefore imperiously called for, and had become the more reasonable, as, in the year 1790, a body of Catholic dissenters had formally protested against the temporal power of the pope, and against his assumed authority to release men from their civil obligations, or to dispense with the sacredness of oaths. Mr Milford, therefore, brought forward a bill to relieve the protesting Catholics from the penalties and disabilities to which persons professing the Romish religion were subject by law; and the bill passed unanimously, excepting that Mr Fox wished to extend it, not merely to protesting, but to all Roman Catholics: upon the principle, that the state has no right to inquire into the opinions, either political or religious, of the people, but only to take cognizance of their actions. Reign or

The war now carrying on in India gave rise to some rather unfavourably by persons attached to the monarchi- Reign of in that quarter of the globe, it had been undertaken on disapprobation had hitherto appeared. our part for the purpose of aggrandisement, and on the frontier of Hyder Ali's kingdom of Mysore; that in the year 1780 Hyder had seized and garrisoned these forts, under in England. the pretence that they belonged to a vassal of his; that the British. Tippoo, resenting this mode of evading his claim, made war upon Travancore; but as the rajah had Thus the war was said on our part to have been entered into in defence of the just rights of our ally, the rajah of Travancore; whilst on the other hand it was contended that this was nothing more than an attempt to subdue the sovereign of Mysore, and extend our eastern empire, at a time when the power of France was annihilated, and our own forces in great strength in that quarter. In the trial of Mr Hastings little progress was made during the present session. As parliament had been dissolved during the dependence of the trial, a question occurred, whether that circumstance did not put an end to the impeachment. The friends of Mr Hastings adopted the affirmative side of the question, and were supported by Mr Erskine and the attorney and solicitor general, Macdonald and Scott; whilst Mr Pitt, Mr Burke, and Mr Fox contended that a dissolution could have no effect upon an impeachment. After much discussion, it was carried in the House of Commons that the impeachment was still depending, and the same decision was adopted by the House of 10th of June.

As the avowed object of the first leaders of the revolution in France was the establishment of a system of political freedom, or of a representative government, with a hereditary monarch at its head; and as one of the consequences which they expected to follow from the establishment of the new system was the complete abolition of wars, which they ascribed entirely to the ambition of kings; the progress of the revolution was regarded with much favour by many persons in Great Britain. The reform of the Gallican church, though it alarmed the English clergy, was favourably regarded by the English dissenters; and the abolition of titles of honour was not disliked in a country where they are only enjoyed by a few individuals, and are chiefly valued on account of the privilege of hereditary legislation by which they are accompanied. The English also had long been accustomed to boast of their political freedom, and of their superiority in this respect over their French neighbours; and hence, when the populace of Paris rose in arms, when the military refused to act against them, and when the state prison or fortress of the Bastille was taken and demolished, many persons in Great Britain regarded as an imitation of the efforts of our ancestors the attempts made by the French to shake off the ancient despotism, and to renovate the order of society. The public at large indeed had not yet given much attention to the subject; but of the speculative and enthusiastic there was a sufficient number to form numerous convivial parties in commemoration of the 14th of July, the day on which the Bastille had been taken. These meetings, it is true, were on the whole regarded

George III. debates during the present session. Like all other wars cal part of our constitution; but no public expression of George III 1791-

A festive meeting of this nature was to have been held part of our antagonist from a jealousy of the British power. at Birmingham on the 14th of July 1791; but several The ostensible cause of the war, however, was, that the days preceding it, some unknown person had left in a pub-Dutch had long been in possession of two forts upon the lic-house copies of an inflammatory handbill, representing the late transactions in France as proper to be imitated in England. The contents of this placard were very generally circulated, and produced much conversation in having speedily thereafter induced the Dutch and French the town; upon which the magistrates offered a reward to join him against the British, the forts were given up of a hundred guineas for discovering the author, printer, to the Dutch; that in 1789, Tippoo had again claimed the or publisher. Meanwhile the friends of the intended forts; and that the Dutch, dreading his power, had sold meeting disclaimed in the strongest terms the sentiments the forts to the rajah of Travancore, a vassal or ally of expressed in the seditious handbill; and finding their views misrepresented, they at first resolved that the meeting should not take place; but another determination was effected the purchase under secret instructions from the British government in India, he was defended by them. number of eighty. The party, however, had scarcely met when the house was surrounded by a tumultuous rabble, who expressed their disapprobation by hisses and groans, and by shouting "church and king." Upon this the meeting immediately dispersed. But in the evening the mob attacked and burned a Unitarian meeting-house belonging to the congregation of Dr Priestley; and although this distinguished person had not been present at the meeting, his house, from which he was compelled to fly with his family, was also attacked, and his library, his valuable philosophical apparatus, and his manuscripts and papers, were destroyed. During the three succeeding days they destroyed some other meeting-houses, together with the dwellinghouses of several eminent dissenters in the neighbourhood; and it was not till the night of the fourth day that some parties of light dragoons arrived. The damage done was very great; and the magistrates were accused of at first favouring and encouraging the mob, whose excesses they afterwards found it impossible to restrain. Five of the rioters were tried at Worcester, and one was convict-Lords. The session of parliament was concluded on the ed and executed. At Warwick twelve were tried, and four convicted of burning and destroying houses, three of whom were executed, and one was reprieved upon the application of the magistrates, as it appeared that his interference in the riot had been accidental.

> At this time a foundation was laid on the Continent for the most important political changes. The various nations of Europe had for some centuries owed their independence to the jealousies which they mutually entertained. Many petty states were altogether unable to contend in war against their powerful neighbours; but they owed their safety to the circumstance of their neighbours being held in check by other great powers, who resisted all attempts at aggrandisement. When one nation became dangerous by its ambition, the combination of a number of other states repressed its machinations; and thus the Spanish, and afterwards the French monarchies, were restrained within due bounds. But in the course of the century the power of Russia had become formidable in Europe; and its rulers sought rather to undermine than to overthrow that balance of strength to which the lesser states of Europe had owed their safety. A former Russian sovereign had entered into a close alliance with the head of the house of Austria; and, notwithstanding the talents of the great Frederick, this union had nearly proved fatal to the Prussian monarchy. Finding the advantage of such an alliance, the house of Austria attempted at the same time to attach itself to France, its ancient hereditary enemy, by the marriage of the archduchess Marie Antoinette to the dauphin, afterwards Louis XVI.; and this marriage fully produced all its intended political effects. French court, relinquishing its former policy of humbling

Reign of Austria, suffered its armies to fall into decay, and allowed the Swiss cantons, if they became parties to the coalition, Reign of George III. itself to be led on all occasions by this more active power; and the revolution, which wrought so radical a change in the government of the nation and the order of society, by subverting every existing establishment, and exciting jealousy and discontent in every quarter, reduced the nation, in the eyes of foreign powers, to a state of utter debility. The king and royal family, exposed to endless insults and humiliations, had been compelled to submit to a new constitution, which placed the royal authority on a very precarious footing; the principal nobility had emigrated, and the king himself had attempted to follow their example; but being seized at Varennes, he was brought back as a fugitive, and placed at the head of a form of government which he had neither the power nor the inclination to administer.

In this state of affairs Russia and Austria, acting in conjunction, saw nothing to resist their ambition. They had recently wished to seize upon and divide the richest provinces of Turkey; but the Austrians having met with unexpected resistance, desisted from the attempt. The Russians however were more successful. The king of Prussia, with the aid of Britain and Holland, had attempted to restrain their progress; but being deserted by Britain, he now found it necessary to keep on fair terms both with Russia and Austria; and for this purpose, as well as to avoid being left behind in the career of usurpation and aggrandisement, he was compelled to enter into all their ambitious schemes. Poland and France were at this time two of the weakest states in Europe. For the sake of erecting a barrier to his own states, the Prussian monarch had encouraged the king and the leading nobles to form a new political constitution for Poland, by which its government might be strengthened; but Russia and Austria had cast their eyes upon this country, with a view, in imitation of what had been done in 1772, of seizing its best provinces; and the king of Prussia now found it necessary to acquiesce in the project. And the state of France at this period held out strong temptations for the formation of a similar project respecting it. Leopold, emperor of Germany, had a fair excuse for interfering in French affairs, namely, to rescue the king from the state of thraldom to which he had been reduced by his subjects: and the other princes of Europe had become alarmed at the example set by France, of limiting the authority of the monarch, of destroying the privileges of the nobility, and of reducing to a level all classes of persons in the state. The united powers of the north, therefore, now resolved to restore the French king and his nobles, but at the same time determined to divide among themselves and their allies some of the provinces of France. Towards the close of the summer 1791 these points were adjusted, at a conference held at Pilnitz in Saxony, between the emperor Leopold and the king of Prussia. The treaty entered into was intended to be kept secret; but the substance of it soon transpired, and afterwards, by the hatred which it excited in the French nation, proved the cause of important events. Its general object is understood to have been the dismemberment of Poland, and also of part of France. Poland was to be divided among the three great military powers in different portions. With regard to France, the emperor was to obtain Bavaria in exchange for the French Netherlands, which he was to conquer, and transfer, along with the Austrian Netherlands, to the elector of Bavaria. The Archduke Charles was to obtain the duchy of Lorrain; Strasburg and Alsace were to be restored to the empire; the king of Sardinia was to receive Dauphiné, if he acceded to the coalition; Spain, on the same condition, was to be accommodated with the French portion of the island

were likewise to receive certain territories. This treaty George III. was publicly disavowed; but it was nevertheless universally believed throughout Europe to have been entered into, and was accordingly talked of under the appellation of the "Concert of Princes."

Parliament assembled on the 31st of January 1792, and a variety of uninteresting debates occurred, the principal of which related to the armament which had been fitted out on account of the dispute with Russia concerning the fortress of Oczakow. During the preceding autumn, the Duke of York, second son of the king, had married a daughter of the king of Prussia. This prince was believed to be a favourite son; and as the marriage in question had been contracted, not from political considerations, but the private choice of the parties, it gave general satisfaction. A provision of L.37,000 per annum was readily made by parliament for the royal pair. On the 17th of February Mr Pitt brought forward a statement of the public revenue, from which it appeared that nearly half a million might be applied towards the extinction of taxes, or the payment of the national debt; and this was accordingly done; the additional tax recently laid on malt, the taxes on female servants, on carts and waggons, and on houses under seven windows, and part of the duty on candles, being those repealed. On the 2d of April the question of the slave-trade was again brought under the consideration of the House of Commons by Mr Wilberforce. He disclaimed any project of emancipating the negroes, but contended that, by the abolition of the importation of new slaves, the state of those in the West Indies would be improved. The slavetrade was defended on this occasion by Colonel Tarleton and Mr Jenkinson; while Mr Wilberforce was supported by Mr Montague, Mr Whitbread, and Mr Milbank. Mr Dundas professed himself a friend to the abolition, but entertained doubts with respect to the mode of effecting it. Mr Addington agreed in opinion with Mr Dundas. He thought the trade ought to exist for some years longer, and therefore could not vote for an immediate abolition. Mr Fox deprecated every kind of deception or delusion practised upon the country, and reprobated in strong terms Mr Addington's views of the subject. Mr Dundas moved, as an amendment to Mr Wilberforce's motion, that the trade should be abolished gradually; and although Mr Pitt declared his disapprobation of the amendment, the motion for a gradual abolition was carried by a considerable majority. Soon afterwards Mr Dundas stated the regulations which he meant to propose for the gradual abolition of the trade. The chief of these consisted in increasing the duties upon the age of the negroes imported; abolishing the trade as far as not necessary for the supply of our own islands; limiting the tonnage to be employed in it; punishing British subjects guilty of crimes in carrying it on; and providing that the importation of negroes into the British colonies should cease on the first of January 1800. Mr Wilberforce disclaimed all acquiescence in these propositions; and Mr Fox ridiculed them, by asking where the baptismal register was kept on the coast of Africa, by which the age of those who were to be exported could be ascertained. A variety of amendments were now proposed; and it was at length agreed that the period of abolition should be fixed for the first of January 1796. In the upper house the advocates of abolition were less successful; and they were not a little provoked at finding one of the younger branches of the royal family, the Duke of Clarence, now William IV., declaring himself decidedly hostile to their wishes. It was ultimately resolved that evidence should be heard at the bar, which necessarily produced delay, and little or no progress was of St. Domingo, with Corsica, Rousillon, and Bearn; and made during the rest of the session. On the 18th of April

Reign of Mr Sheridan moved for an inquiry into certain grievances George III. complained of by the royal burghs of Scotland, fifty out of the sixty-six having concurred in the petition upon which Mr Sheridan grounded his motion. The motion was resisted by Mr Anstruther, Mr Dundas, and Sir J. St Clair Erskine, upon the general ground that no serious grievance existed; and the inquiry was refused by a large majority. Excepting some debates relative to the French revolution, nothing further of any importance occurred during the present session.

That we may not afterwards have occasion to interrupt the detail of the transactions connected with the state of affairs in France, we shall here notice the war in India, and western side of the peninsula of Hindustan consists of a level country for upwards of seventy miles inwards. Behind this tract, and parallel to the ocean, runs a chain of lofty mountains, presenting a front towards the west, broken into tremendous precipices, but on the other side consisting of an extensive plain, gradually descending eastward to the Bay of Bengal, and forming the territory of the Mahrattas, Mysore, Madras, the Carnatic, and other states. Now as Tippoo Sahib possessed territory on both sides of these mountains, which are denominated Ghauts, from the narrow paths or passes by which they are crossed, the army of the Carnatic, under General Meadows, was directed to attack this territory from the east; the Bombay army, under General Abercromby, was to reduce the country to the westward of the Ghauts; the Mahrattas, and the nizam of the Deccan, agreed to attack Tippoo's country on the north and north-east, where it bordered on their own territories; and Seringapatam, his capital, was fixed upon as the point towards which the whole of the hostile armies were to direct and concentrate their efforts. On the 15th of June 1790, General Meadows entered Tippoo's country. The grand army on this occasion amounted to fourteen thousand effective European troops, a body of men which no power in India could encounter in the field. A variety of operations occurred; but little appears to have been effected towards the subjugation of the enemy, except the capture of the country to the westward of the Ghauts, till the end of February 1791, when Lord Cornwallis assumed the command in person. His first operation was directed against Bangalore, which he reached on the 5th of March; and a practicable breach having been made in the walls, the fort was stormed on the 21st, with little loss to the British. Of the garrison not less than a thousand were bayoneted, and a small number taken. Being joined by above fourteen thousand of the nizam's troops, and seven hundred Europeans, with four thousand five hundred and eighty troops under Colonel Oldham, Lord Cornwallis proceeded towards Seringapatam, where he arrived on the 13th of May, after a difficult march in bad weather over a hilly and barren country. Tippoo lost no time in displaying a considerable force in the field, with the view of covering his capital; but being beaten, though with little loss, he was forced to retire within the walls of Seringapatam, which, defended by a river at this season swelled with the rains, seemed secure against attack. In fact, circumstances had completely defeated the object of the combined operation which had been so ably projected. Lord Cornwallis was in want of provisions for supporting his army during a protracted siege; and as General Abercromby had not been able to join him from the west, it was judged expedient to retire to Bangalore, after destroying the battering train. On his retreat Lord Cornwallis was joined by the Mahrattas to the number of about thirty thousand. General Abercromby also retired across the Ghauts with a fatigued and dispirited army; and thus for the present Tippoo escaped a siege in his capital.

After his retreat, Lord Cornwallis employed himself for Reign of some time in reducing various small forts in the neigh-George III. bourhood of Bangalore, some of them of such natural strength as, in any other hands but those of the feeble natives of that country, to be absolutely impregnable. Nundidroog, built on the summit of a mountain 1700 feet in height, three fourths of which are altogether inaccessible, fell after a siege which lasted from the 22d of September to the 18th of October; the place being assaulted by a breach at midnight, and taken, though not by surprise. The fortress of Savendroog, eighteen miles to the westward of Bangalore, was still more strongly situated. It stood on the summit of an insulated rock, rising about which was now brought to a fortunate termination. The half a mile in perpendicular height, from a table or base of eight or ten miles in circumference, and divided at its summit into two hills, each having its peculiar defences, capable of being maintained independent of the lower works; while the whole was surrounded by a strong wall, with cross walls and barriers in every accessible part. Yet this stupendous fortress was taken in ten days.

In December, General Abercromby once more crossed the Ghauts, and proceeded eastward towards Mysore; while Lord Cornwallis, in the beginning of February 1792, advanced from Bangalore, and arrived on the 5th within sight of Seringapatam. Tippoo Sultan occupied a position under the walls, and there resolved to make a stand in defence of his capital. On the 6th, at eight o'clock in the evening, the attack was made on the sultan's camp. After a sharp engagement at different points, parties of the British crossed the river, and established themselves in the island on which Seringapatam stands. This movement proved decisive. Tippoo, finding himself in danger of having his retreat intercepted, was compelled to retire; and being pressed by the invaders on all sides, while his palace and gardens were in their possession, and his power reduced within the narrow limits of a fortress, he found it necessary to endeavour to purchase peace upon almost any terms. With this view he released two prisoners, Lieutenants Chalmers and Nash, and requested the former of these gentlemen to present a letter from him to Lord Cornwallis. The operations of the siege, however, still continued, and, on the 19th of February, the trenches were opened; whilst the Bombay army, under General Abercromby, invested the western side of the capital. But a cessation of hostilities was agreed to on the 23d of February, and a treaty of peace concluded, by which it was stipulated, first, that Tippoo was to cede one half of his dominions to the British and Indian powers; secondly, that he was to pay in money three crores and thirty lacs of rupees; thirdly, that all prisoners were to be restored; and fourthly, that two of the sultan's sons were to become hostages for the due performance of the treaty. On the 26th, the two princes, each mounted on an elephant, richly caparisoned, proceeded from the fort to Lord Cornwallis's camp, where they were received by his lord-ship with his staff. The eldest, Abdul Kallich, was about ten, and the youngest, Mooza-ud-deen, about eight years of age; and they were dressed in long white muslin gowns, with red turbans richly adorned with pearls. Educated from infancy with the utmost care, the spectators were astonished to behold in these children all the reserve, politeness, and attention, of maturer years. The kindness with which they were received by the British commander appeared to afford them satisfaction; some presents were exchanged; and the scene is described by an eye-witness as in the highest degree interesting. It was the 19th of March before the definitive treaty was finally adjusted, and delivered by the young princes into the hands of Lord Cornwallis.

In the meanwhile scenes of unparalleled interest were

Reign of about to be exhibited in Europe. These were produced by Britain, and the pride of having recently contributed to Reign of George III. two causes; the ambition of the great military powers, and the French revolution. When, by an abuse of that policy which had once produced a vigilant attention to the balance of power, Russia and Austria had formed the project of extending their dominions, and when Prussia, probably nothing loth, found it expedient to concur in their policy, it became evident that the situation of Europe must speedily undergo great changes; whilst the French revolution, which had reduced that once powerful monarchy to a state of complete debility, seemed to afford an opportunity for the extension of the system of spoliation, by enabling the great powers to regard its ample territories as a further subject of partition. In another point of view, however, this revolution had now begun to be an object of no small alarm. The distinguished place which France had held among the nations of Europe rendered the late change of her government an object of universal attention; and there was a danger that it might come to be rewhich took place in her national assemblies, and in printed publications, were conveyed, through the medium of a language universally understood, to the most obscure corners of Europe; and kings, nobles, and priests, became apa general wish prevailed among the ruling classes that an effort should be made, before it was too late, to overwhelm the country from which so much danger to established governments was anticipated. Nor was this alarm altogether groundless. Men had almost everywhere outgrown their institutions; and whilst the former had been rapidly advancing, the latter remained stationary. The diffusion of wealth and of knowledge had created new interests, and led to the formation of new opinions; whilst a new class, formerly considered by rulers as of little or no importance whatever, except as subjects of taxation or instruments of ambition, was gradually and steadily rising into importance. The power of the nobility was rapidly passing away. The establishment of standing armies rendered them of little importance in war; and their wealth, as the great landholders of Europe, was daily more and more eclipsed by the opulence of the industrious classes; while, though titles of honour still remained, the estimation in which they were held was from various causes much diminished. But prodigious abuses remained. In those states which in former times had resisted the innovations produced by religious zeal, a wealthy priesthood and monastic orders still existed. The privileges of the nobles and of the clergy rendered taxation unequal; and commerce was embarrassed by restrictive laws and the privileges of old incorporations. There was therefore much to be reformed among the continental states of Europe, and the desire to obtain this reform was daily increasing.

In France, though the house of Bourbon had supported the Roman Catholic religion, yet, upon the whole, they were of a much more liberal spirit than any other royal family in Europe, and had given greater encouragement to letters, and to every kind of improvement. It is not wonderful, therefore, that the desire for improving the condition of mankind, and simplifying the arrangements of society, which had been so successfully pursued in other countries, should have become extremely prevalent in France. Unfortunately, however, though the character of the reigning monarch led him to encourage such projects, yet his undecided and inactive spirit, together with the embarrassed state of the finances, prevented him from taking the lead in these changes, or from repressing them when inordienjoyed under the free constitution of Great experiments; and that he saw with concern, gentlemen who

the establishment of a republican government in North George III America, fixed the character of any changes of a political nature, which at this period originated in France, whether among men of letters, the army, or the people at large. But in forming a political constitution, the vanity of the French, which induced them to avoid the appearance of servile imitation, had unhappily led them to differ in one most essential point from the British constitution. Their legislature consisted only of a king and a single house of representatives; whereas in Britain, by means of an intermediate estate, that of the peerage, naturally jealous of popular innovation, laws injurious to the royal prerogative are prevented from being enacted without the king being involved in dispute with the Commons. But in France the king himself was under the necessity, in such cases, of preventing the passing of the law, by personally interposing a negative; that is, he was placed in the unpopular and absurd situation of opposing his single garded as an object of imitation. The public discussions judgment to the united will of a nation, and that too in perilous and critical times, when he could not fail to be suspected of disliking a constitution by which his power was taken away. Still, however, the representative government of Britain had been the model on which the prehensive that the contagion of innovation might not be French proceeded; and there is no doubt that they exconfined to the country in which it had originated. Hence pected, during any contest in which they might be involved with the powers of the Continent, that they would enjoy, if not the support, at least the neutrality and favourable countenance of the British nation. But, on the other hand, the passion for innovation which seized the French nation, had in many instances proceeded to extravagant lengths; and there was reason to anticipate, on the part of the court of London, some alarm lest this passion might communicate itself in an inconvenient degree to Britain, where, though political abuses were less flagrant, and the passion would consequently find less food for its exertion, enough might yet exist to kindle disturbances and produce anxiety.

1792.

In the month of April 1792 a society was instituted in London, at the head of which appeared Mr Grey, Mr Baker, Mr Whitbread, Mr Sheridan, Mr Lambton, Mr Erskine, and several other distinguished members of parliament, for the purpose of obtaining a reform in the representation of the people. The association assumed the title of "The Friends of the People;" and it was speedily joined by some respectable characters in the commercial and literary world. Similar societies had, at former periods, existed in Great Britain; and the Duke of Richmond, Mr Pitt, and others, while they zealously advocated parliamentary reform, had attended meetings, not merely of persons acting in their individual capacity, but of persons appearing as delegates from other societies. At the present period, however, government appears to have regarded any association of this kind as unusually dangerous. The society had resolved that, early in the ensuing session, a motion should be brought forward in the House of Commons for a reform of parliament, and that the conduct of the business should be committed to Mr Grey and Mr Erskine; and, in conformity with the intentions of the association, Mr Grey, on the 30th of April, gave notice in the house of a motion which he intended, next session, to submit to their consideration, for a reform in the representation of the people. Its necessity, he said, had been admitted both by Mr Pitt and Mr Fox. The times were indeed critical, and the minds of the people agitated; but his object was to tranquillize them, by removing every cause of complaint. Mr Pitt declared, with unusual vehemence, that he objected both to the time and the mode in which this business was brought mately pursued by others. Meanwhile the example of forward; that the present was not a time to make hazardous

Reign of might only desire an amelioration of our institutions united sinister designs. The plan of the persons to whom he Reign of George III. in an association with others who professed not reform only, but direct hostility to the very form of our government, and who threatened the extinction of monarchy and every thing which promoted order and subordination in a state. Mr Fox declared himself satisfied concerning the necessity of a reform in the representation, but that he never entertained very sanguine hopes of its accomplishment. Had his honourable friend consulted him, he should have hesitated in recommending the part he had taken; but having taken it, he could not see why the period was improper for the discussion. He professed a strong attachment to the British constitution, but did not regard this as the only free country in the world. After a tumultuous debate, in which Mr Burke and Mr Wyndham opposed Mr Sheridan and Mr Erskine, the subject was dropt. In the mean time a variety of political pamphlets daily appeared, the most remarkable of which was a publication by Thomas Paine, entitled The Rights of Man. This being a direct and inflammatory attack upon the whole principles and practice of the British constitution, administration thought fit to issue a royal proclamation against the publishing and dispersing of seditious writings; enjoining the magistrates to exercise vigilance in attempting to discover the authors of such writings, and exhorting the people to guard against all attempts which aimed at the subversion of regular government. It is not easy to perceive what precise purpose government intended to serve by this proclamation. The authors of the seditious publications alluded to did not conceal themselves; and the publications were openly sold without any attempt to suppress them by prosecutions. Perhaps it was intended to prepare the minds of men for future measures of direct hostility against France; perhaps it was only meant to rouse in the friends of government a spirit of opposition to the schemes of innovation which were at this time afloat. But whatever object administration might have in view, the effect of their proclamation was to excite general curiosity, and to serve as a public advertisement to the dangerous writings of Thomas Paine and others. In all parts of the island multitudes of persons, who had not hitherto interrupted their ordinary occupations to attend to the transactions of the Continent, or the speculative discussions which the present state of France had excited, were now seen crowding to the shops of booksellers inquiring for the treatises, the names or titles of which they knew not, against which the king's proclamation had issued; every printing press in the kingdom was occupied, and copies could scarcely be supplied in sufficient abundance to satisfy the demand. Nor did the folly of government stop here. On the 25th of May the master of the rolls moved an address to his majesty, in pursuance of the proclamation, the object of which he admitted to be Mr Paine's works; and having read an extract from one of the pamphlets of that writer, importing that all kings were tyrants, and their subjects slaves, he complained of the circulation of such publications. Mr Grey asserted that the minister, apprehensive of the effects of the asso- north, a very different fate awaited their efforts against ciation of the friends of the people, had concerted this measure with an insidious view of separating those who had long been connected; and alleged that such sinister practices were delighted in by a gentleman whose political life was a tissue of inconsistency, and who never proposed a measure without intending to delude his hearers. Mr Fox disapproved of the proclamation, because it was insidious and ambiguous, tending to propagate vague and unnecessary alarm. Mr Pitt did not impute any improper design to the new association; but it might be taken ad-

alluded was evidently to overturn the monarchy, and con-George III. vert the kingdom into a republic. The address to the throne was agreed to without a division. In the House of Lords, on the 31st of May, a similar address was voted after some debate; and parliament was prorogued a short time afterwards.

The eyes of all Europe were now turned towards France; and the combination which the continental monarchs were known to have formed against that country was expected speedily to issue in action. The king of Sweden, who was fond of war, having now settled all disputes with Russia, offered to lead in person the armies of the combined powers, to destroy in France those new institutions and opinions which threatened to subvert the whole ancient system of public order in Europe. But continuing at variance with his nobility, he was assassinated at a masquerade on the 16th of March, by an enthusiast of the name of Ankerström, who boasted, on being seized, that he had liberated his country from a tyrant. In the meanwhile Leopold, emperor of Germany, had also died, and been succeeded by his son Francis II. Leopold had chosen to temporize with France; but his successor thought it unnecessary to observe any measures of caution with that country. On some remonstrances being made by the French government against his permitting troops to assemble on the frontiers, he avowed the concert of princes against the constitution of France, and stated it to be one of the conditions necessary to the preservation of peace, that the neighbouring powers should have no reason for the apprehensions which arose from the present weakness of the internal government of France. This acknowledged intention to interfere in the internal affairs of the French nation produced a proposal on the part of the French king to the national assembly, which was readily acceded to, for declaring war against the king of Hungary and Bohemia; and in a short time war was in like manner declared against Prussia and Sardinia.

In the meanwhile, though the combined princes had not probably as yet completely adjusted their respective shares of the spoils of France and Poland, yet, that the latter might be kept in a state of weakness, and that all traces of the new principles might as far as possible be obliterated, the empress of Russia gave notice of her determination to invade Poland with an army of a hundred and fifty thousand men, for the purpose of overturning the new constitution. No provision had been made by the king to resist such a force; but an attempt was made by Kosciusko, a Polish nobleman, who had served under General Washington in America, to defend the independence of the country; and some battles were, in consequence, fought. But the Russians continued to advance; and on the 23d of July the king, despairing of the result of the contest, submitted without reserve to Russia, and consented to the restoration of the old constitution, with all its weakness and anarchy.

While the combined princes were thus successful in the France. The French king and his ministry caused the Austrian Netherlands to be invaded; and four different detachments under Lafayette and other generals were directed to enter that country at different points. They made some progress, but their raw troops were speedily repulsed; and when Prussia and Austria, who had undertaken the extinction of the revolution in France, had completed their preparations, the Duke of Brunswick was appointed commander of the combined armies. In a long manifesto issued by the emperor and the king of Prussia. vantage of by ill-disposed persons, who, under the shelter they thought it necessary to disclaim all views of aggranof a respectable body, might push forward their own disement, or interference in the internal administration of

Reign of France; but they declared themselves resolved to re- course of his march, while the French army under Du- Reign of George III. establish in that country public security, meaning the ancient order of things, and to protect the persons and property of all loyal subjects; threatened to punish as rebels all who resisted them; and declared their determination to give up the city of Paris to the most terrible vengeance if the least insult were offered to the king, the queen. or the royal family. The Duke of Brunswick also issued a manifesto, in his own name, dated from his head-quarters at Coblentz, in which he declared that the two allied courts had no intention to make conquests in France, and that they intended merely to deliver the king from captivity, and to restore his authority; he promised protection to all who submitted to the king, required the national guards to protect the public safety till further orders, and threatened to treat those who resisted him in arms as rebels to their king; enjoined the officers and soldiers of the French regular troops to submit to their legitimate sovereign; declared the French magistrates responsible, on pain of losing their heads and estates, for every disorder which they should not have attempted to prevent; menaced with death the inhabitants of towns and villages who should defend themselves against his troops, but promised protection to those who should submit; called upon the city of Paris to yield instantly to the authority of the king; declared the members of the national assembly, and the magistrates and national guards of Paris, personally responsible for disobeword of the emperor and king, if the palace of the Tuilleries were forced, or the least outrage offered to the king, queen, and royal family of France, or if they were not immediately placed in safety and set at liberty, to inflict the most exemplary punishment, by giving up the city of Paris to military execution; and declared that no other laws could be acknowledged in France, excepting those derived from the king, who was invited to repair to a fronorder, and the regular administration of his kingdom.

This fatal manifesto had no sooner been published than all France was in commotion. The insolent language employed by two foreign powers, one of which had for ages been regarded with a sort of hereditary hostility, wounded the pride and the patriotism of every Frenchman; many who were enemies of the revolution could not brook an open attack upon the national independence; the zeal of those who had been enthusiastic promoters of freedom was kindled into absolute frenzy; and multitudes from all quarters hastened to the frontiers to share the danger of protecting the independence of their country. Unhappily for the monarch, the enemies of the nation had loudly declared themselves as his friends; and the restoration of absolute power was made the excuse for a hostile invasion of France. The king, therefore, and all who were attached to him, became objects of public hatred. The republican party had previously been small, but every hour now procured it a fresh accession of strength; and as it appeared dangerous to intrust the national defence to the hands of the king, it was resolved to get rid of his authority altogether. He was therefore dethroned on the 10th of August, and a republic proclaimed; and soon afterwards the capital became the scene of a sanguinary massacre of those persons who had been imprisoned on suspicion of adhering to his cause.

The Duke of Brunswick was, in the mean time, advancing into the heart of the country at the head of the combined army. Verdun and Longwy had surrendered to his arms in the end of August, and by this time he had reached the neighbourhood of Chalons. But he had met with opposition at every step of his progress; and the people of

mouriez was supplied with every necessary. At length, as George III. the French daily acquired discipline, General Kellerman was able to sustain at Valmy, with sixteen thousand men, an attack which, though made by a superior force, and persevered in for fourteen hours, effected nothing. able to make any serious impression on the raw levies opposed to it, the combined army also suffered by disease, which thinned its ranks; whilst the French were rapidly augmenting in numbers and courage; so that the advance to Paris, which seems to have been regarded as a sort of holiday promenade, became an achievement beyond the power of the invaders to execute. The king of Prussia was personally present with the army, and enabled to judge of the difficulties as well as dangers of his position. A war of the people revealed itself to his astonished view; and he perceived, that before he could accomplish the object of the coalition, he must not only conquer an army animated with an enthusiastic spirit of patriotism, but subdue a whole nation, ready to rise in mass to resist the aggression on its territory. The prospect was abundantly gloomy; and his Prussian majesty was appalled by it. Accordingly a retrograde movement was commenced without any attempt being made to penetrate farther into the country; and some suspicions were at this time entertained by discerning men, that France would not have much to dread from the obstinate hostility of the king of Prussia. After his dience, and amenable to military law; threatened, on the retreat, the French, with wonderful activity, commenced offensive operations. In October General Custine reduced Mentz; in the same month Dumouriez invaded the Netherlands; on the 4th of November he fought the celebrated battle of Jemmappes, in which the Austrians were defeated; and as the emperor Joseph II., trusting to his alliance with France, had demolished the fortifications of the towns in the Netherlands, excepting Luxembourg and the citadel of Antwerp, the whole of that country, as tier town, where he might provide for the restoration of far as the frontiers of Holland, now fell into the hands of the French. After the victory of Jemmappes, the government of the French republic, in order to conciliate the inhabitants of the Austrian Netherlands, resolved to open the navigation of the river Scheldt, which for some centuries had been kept shut by the jealousy of the Dutch, and thus to revive the trade of Antwerp, anciently one of the first commercial cities in Europe; and at the same time, in order if possible to counteract the combination of princes which had been formed against them, and which was now rapidly extending itself, the convention endeavoured to represent theirs as the cause of the people in every country, in opposition to that of their princes or hereditary rulers, who were denominated tyrants. Accordingly, on the 19th of November, the convention passed a decree, declaring, that they would give assistance, by means of their armies and otherwise, to every people who should attempt to establish a free government for themselves; and two months afterwards, the same body, by a majority of votes, ordered their imprisoned monarch to be put to death upon an accusation of having betrayed the cause of the nation.

The important transactions which were now taking place on the Continent produced a powerful impression upon the British nation, where the minds of men, as already remarked, had been directed to political questions by the royal proclamation against seditious publications. According as the sentiments of individuals varied, they perused with terror or with satisfaction the Duke of Brunswick's manifesto. Men of a patriotic character, however, whatever their political opinions might be, were not dissatisfied to see a nation capable, even amidst great public confusion, of repelling an invasion by the best disciplined armies, conducted the country had removed all kinds of provisions from the by the most experienced commanders in Europe. But the

George III. with the treatment of the royal family, excited very different sentiments, and were justly regarded as instances of unparalleled barbarity and wanton bloodshed; and the general result was, that by the months of August and September the whole British nation was in a most agitated state. In all companies, questions as to the comparative merits of monarchical and republican government, together with the propriety of a reform in the British House of Commons, formed the subjects of conversation; and persons of every rank entered into these discussions with singular eagerness. At the commencement of the revolution, very few had any idea that a republican government would be found practicable in France; and with regard to Britain, which enjoyed a sound administration of justice and much internal prosperity, no change whatever seemed necessary. But, in proportion as the French proved victorious, a republican government seemed less and less impracticable; and, as the subject of political abuses was canvassed, new ideas concerning the state of government in Britain began to be entertained. The scenes of tumult and corruption which occurred at elections, the inattention of parliament to the petitions for the abolition of the slave-trade, the memory of the coalition, and the reproach under which the House of Commons since that time had fallen, induced many to think a reform in the representation of the people absolutely necessary. New notions were daily broached at home, or imported from the volcanic region of France; and one in particular, that of the boundless perfectibility of the human mind, which is so true in theory, but so false in fact, became extremely prevalent, and gained singular favour. Men of science or benevolence, who judged of others from the rectitude of their own intentions; men of ardent imaginations, who believed every thing practicable to their unbounded zeal; and the young and inexperienced, who were unacquainted with the imperfections of the human character; all imagined that the period had arrived when mankind, become rational and just, were no longer to engage in wars of ambition,—when good sense alone was to rule the world,-and when the public business of society, reduced to the narrow limits of administering justice, and constructing high roads, harbours, and other works of internal improvement, might be conducted with little trouble, and without the establishment of different ranks and orders of men, or the display of military force for the preservation of public tranquility. In short, a species of delirium upon political subjects prevailed; and mankind were led to believe that the greatest changes in the order of society might be accomplished with facility and safety.

Besides the society called the Friends of the People, other associations of less distinguished persons, called the Constitutional and Corresponding Societies, were established in London; and during the autumn societies assuming the name of Friends of the People were established in most towns and villages throughout the country, for the avowed purpose of bringing about a reform of parliament. In proportion, however, as the character of the French revolution began to display itself, in the sanguinary scenes which were daily enacted, and in the extravagant projects and sentiments which were entertained, persons of rank and property became alarmed. In the month of November an association was instituted at the Crown and Anchor tavern in London, the avowed object of which was the protection of liberty and property against the attempts of republicans and levellers; and similar associations for the support of government were set on foot in other parts of the metropolis, and throughout the country.

Parliament assembled on the 13th of December 1792. The speech from the throne intimated that his majesty

Reign of horrid massacres which took place in September, together had judged it necessary to embody a part of the militia, Reign of heorge III. with the treatment of the royal family, excited very difthat purpose; and stated, as the causes of these measures, the seditious practices which had been discovered, and the spirit of tumult and disorder, shown in acts of riot and insurrection, which required the interposition of a military force in support of the civil magistrate. His majesty asserted, that he had observed a strict neutrality in regard to the war on the Continent, and had uniformly abstained from any interference with respect to the internal affairs of France; but that it was impossible for him to see, without the most serious uneasiness, the strong and increasing indications which had appeared there of an intention to excite disturbances in other countries, to disregard the rights of neutral nations, to pursue views of conquest and aggrandisement, and to adopt towards his allies, the Statesgeneral, measures which were neither conformable to the law of nations, nor to the positive stipulations of existing treaties. Under these circumstances he felt it his duty to have recourse to the means of prevention and internal defence with which he was intrusted by law, and to take the necessary steps for augmenting the naval and military force of the kingdom.

When the usual address was moved in the House of Commons, Lord Wycombe opposed it, on the ground that the speech from the throne had calumniated the people of England; that, so far from any spirit of insurrection existing, the kingdom was on the contrary overflowing with loyalty; that speculative political opinions had always been agitated under the free constitution of Britain; and that the persons who were thought most disaffected wished merely to reform that constitution. Mr Fox declared that the present was the most momentous crisis that he had ever read of in the history of this country; and that on the conduct of parliament depended, not merely the fate of the British constitution, but that of doctrines affecting the happiness and well-being of all human kind. He affirmed, that there was not a fact stated as such in the speech from the throne which was not false; he denied the existence of any insurrection; he justified the exultation which many persons had expressed on account of the retreat of the Duke of Brunswick; he described the calling out of the militia as a fraud, intended to induce the people to believe that cause of alarm existed, and thereby to bring them more completely under the influence of government; he treated the opening of the Scheldt as no just cause of war; and he recommended the removal of acknowledged grievances, as the certain means of appeasing the discontent of the people. Mr Windham now deserted the opposition, and joined administration in contending that there existed great danger to the constitution. He also declared his approbation of the march of the combined armies into France. Mr Dundas asserted, that under the pretext of reform, the example of France had been held out for imitation to the people of this country; and that the object of the French was evidently the aggrandisement of their dominions. Mr Sheridan denied the existence of any just cause of alarm, and declared that he would vote for the impeachment of any English minister who should enter into a war for the purpose of re-establishing the former despotism in France, or who should dare, in such a cause, to spend one guinea, or shed one drop of blood. From the commencement of Mr Pitt's administration a considerable number of members of parliament, the remnant of the coalition, had remained in opposition to his measures. But in consequence of the alarm which had at this time diffused itself among persons of high rank, and perhaps also as a plausible excuse for deserting a fruitless and unprofitable opposition, a great number of the members of the party hitherto hostile to administration now joined

Reign of in supporting those measures which they perceived to be George III. agreeable to the executive power. Accordingly, on a division there appeared for the address two hundred and seventy, and for the amendment only fifty. In the House of Lords similar debates took place upon the address, and opposition also experienced a desertion of part of its members. The Duke of Norfolk, the Marquis of Lansdown, Lord Rawdon, afterwards Earl of Moira and Marquis of Hastings, and Earl Stanhope, declared themselves averse to war; whilst Lord Grenville, Lord Stormont, the Marquis Townshend, and others, supported the sentiments expressed in the king's speech.

After the French king had been dethroned, Earl Gower the British ambassador was recalled; but the French ambassador, M. Chauvelin, still continued to reside in London. On the 15th of December Mr Fox moved that a minister should be sent to Paris to treat with the provisional executive government of France; declaring, that by this motion he meant not to approve of the conduct of the French government, but simply to record it as his opinion, that it was the true policy of every nation to treat with the existing government of every other nation with which it had relative interests, without regarding how that government was constituted; and that we could have no stronger objection to the existing government of France, than to the governments of Algiers and Morocco, in both of which countries we had resident consuls. This motion gave rise to a very animated debate, in which the opposition were accused of desiring to encourage discontent and sedition, and were defended by Mr Taylor, Mr Grey, and Colonel Tarleton. But Mr Fox's motion was negatived.

On the 19th of December Lord Grenville introduced into the House of Lords what has been called the alien bill, authorizing government to dismiss from the kingdom such foreigners as they might think fit, and which passed after some opposition from the Earl of Lauderdale and the Marquis of Lansdown. On the 28th of December Mr Secretary Dundas urged the House of Commons to adopt the alien bill, on account of the extraordinary influx of foreigners into the country, and the dissatisfaction of persons at home. Sir Gilbert Elliot, in supporting the bill, expressed his regret at being under the necessity of differing from his former political associates; and Mr Burke, as usual, spoke with very great vehemence on the subject. I vote. said he, for the present bill, because I consider it as the means of saving my life, and all our lives, from the hands of assassins. When they smile, I see blood trickling down their face; I see their insidious purposes; I see that the object of all their cajoling is blood. I now warn my country to beware of those execrable philosophers, whose only object is to destroy every thing that is good here, and establish immorality and murder by precept and example. While the alien bill was under consideration, another measure allied to it in principle was introduced; namely, a bill to prevent the circulation of assignats and other paper money under the authority of France. During the month of December an order of council was also issued for preventing the exportation of corn to France, and some ships which had grain on board were compelled to unload. On the 26th of December an act of indemnity passed upon the subject.

Affairs were now fast hastening to an open rupture with France. On the 17th of December M. Chauvelin transmitted a note to Lord Grenville, one of the secretaries of state, in which, in the name of the executive council of the French republic, he demanded to know whether his Britannic majesty was to be considered as a neutral or a hostile power. No wish, he said, existed on the part of France to entertain any doubt upon the subject; and they

might be thrown out against them. With regard to the de- Reign of cree of the French convention of the 19th November, it had George III been misinterpreted. The French republic did not intend to favour insurrections in neutral or friendly states; and the decree applied only to those people who, after having acquired their liberty, might request the assistance of the French republic by a solemn and unequivocal expression of the general will. As to the neutrality of Holland, it would be respected while that power confined itself within the bounds of strict neutrality; and with regard to the opening of the Scheldt, it was a question irrevocably decided by reason and justice. It was added, that on the fatal supposition of a war being resolved on, whilst the intentions of France were thus peaceful and conciliatory, the whole weight and responsibility of it would sooner or later fall on those who had provoked it.

Lord Grenville's answer to this note, which bears date 31st December 1792, disclaimed considering M. Chauvelin in any other public character than that of minister from his most Christian majesty. It denied that the decree of the 19th November was satisfactorily explained, as the promoters of sedition in every country might still have in view the case in which they might count beforehand on the support of France. It affirmed that the neutrality of Holland had already been violated; and that the unimportance of the Scheldt would only render the opening of its navigation a clearer proof of the existence of an intention to insult the allies of England by violating their rights.

which were guarded by the faith of treaties.

An official note from the executive power of France was transmitted through M. Chauvelin in reply to Lord Grenville's answer, in which another effort was made to explain the obnoxious decree of the 19th November. In this document all intention of effecting a conquest of the Netherlands was disclaimed; and it was added, that if the Belgians, from any motive whatever, consented to deprive themselves of the navigation of the Scheldt, France would not oppose it. In an answer to this note by Lord Grenville, these explanations were declared to be unsatisfactory. On the 17th of January M. Chauvelin sent to Lord Grenville his credentials as ambassador from the French republic; but on the 20th of the same month Lord Grenville sent him a letter refusing to receive his credentials, or to consider him in any other character than as one of the mass of foreigners resident in England; and on the 24th his lordship sent M. Chauvelin a passport for himself and his suite, declaring that, after the fatal death of his most Christian majesty, he could no longer be considered as holding any public character in Britain.

In consequence of this correspondence the French convention declared war against England and Holland on the first of February; three days previous to which Mr Secretary Dundas presented to the House of Commons a message from the king, announcing that copies of the papers now mentioned were laid before the house. It was added, that his majesty thought it necessary to make a further augmentation of his forces by sea and land; and that he relied upon the zeal of the House of Commons to enable him to take the most effectual measures for maintaining the security of his dominions, supporting his allies, and opposing the ambition of France, at all times dangerous, and peculiarly so when connected with the propagation of principles utterly subversive of the peace and order of civil society. And thus Britain became a party in the most sanguinary and eventful war that ever desolated Europe or afflicted humanity. In the month of April the French government made another attempt to enter into negociations, and the minister, Le Brun, transmitted to England by a private gentleman letters to Lord Grenville, even desired to answer previously all those reproaches which in which he requested passports for M. Maret to repair

Reign of to Britain in order to negociate peace; but no public no- sibly held out to the world. It was for some time customary Reign of George III. tice whatever was taken of the application.

1793.

## CHAP. XVI.

## REIGN OF GEORGE III .- WAR WITH FRANCE.

Remarks on the Causes of the War .- Doubts as to its necessity. -Mr Pitt's absence from Parliament.-Debates on the French declaration of War.—Great failures in the Commercial world.-Mercantile Loan.—Government Loan.—Traitorous Correspondence Bill.—Parliamentary Reform.—Board of Agriculture instituted.—Relief of the Scottish Catholics.—Renewal of the East India Company's Charter.—Incidental Details.—Political Trials in Scotland .- Mr Muir and Mr Fysche Palmer convicted of sedition...British Convention...Foreign Treaties...The War...Defection of Dumouriez...Favourable opportunity of making Peace lost.—Defective nature of the general plan of the War.—Opening of Parliament in 1794.—Debates on the Address.—Sources of Alarm.—Dread of Invasion, and of Plots and Conspiracies.—Secret Committee appointed.—Finance.—Policy of Prussia.—Maritime successes of Britain.—Victory of the 1st June 1794.—Continental Campaign.—Conquest of Holland by Pichegru.—Desertion of the Allies by Prussia.—Trials for Trea-son.—Acquittal of Hardie and Horne Tooke.—Trial of Watt and Downie.—Pop-gun Plot.—Meeting of Parliament.—Changes in the Cabinet.—Motion for entering into negociations with France. Mr Pitt's Amendment.
 Duke of Bedford's Motion for Peace.
 Mr Hastings' Trial concluded.
 Debts of the Prince of Wales.
 His Marriage.
 War with Holland.
 Expedition to Quiberon Bay.—Campaign in Germany.—Riots at the Meeting of Parliament.—Two Gagging Bills.—Pacific Message from the King.—Futile attempts at Negociation.—Continental Campaign.—Maritime events.—Lord Malmesbury's Negociation.—Bank Restriction.—Supplies.—Loyalty Loan.—War with Spain.—Mutiny in the Fleet.—Maritime operations.—Duncan's Victory.—Preliminaries of Peace signed at Leoben between the Emperor and the French Republic.- Treaty of Campo Formio.—Meeting of Parliament, and secession of the Opposition.-Relative situation of France and Britain.-Alarm of Bill.—Duel between Mr Pitt and Mr Tierney.—Rebellion in Ireland.—Negociations at Rastadt.—Switzerland seized by the French.—Importance of this country.—French Expedition to Egypt.—Battle of the Nile.—Its political results.—Russia joins the confederacy against France.—Minorca taken.—St Domingo abandoned.—Meeting of Parliament.—Income Tax.—Its Defects.—Union with Ireland proposed.—Fall of Tippoo Sahib.—Continental War.—Suwarof's brilliant Campaign in Italy.— Attempt to drive the French from Switzerland.—Russians defeated by Massena at Zurich.—Invasion of Holland by the British .- Bonaparte declared First Consul .- Meeting of Parliament.—King's Speech.—Letter of Bonaparte to King George III.—Lord Grenville's Answer.—M. Talleyrand's Reply.—Rejoinder of the British Minister.—Debates in Parliament on the subject of this Correspondence.—Union with Ireland effected.—Debates on this subject.—Discussion respecting the expedition to Holland —Mr Dundas's defence of that enterprise.— War in the East.—Treaty of El Arish disavowed.—Events in Egypt.—Campaign on the Continent.—Bonaparte enters Italy by the Great St Bernard, at the head of the Army of Reserve. Battle of Marengo.—Operations in Germany.—Battles of Schauffhausen, Moskirch, Biberach, Augsburg, and Hochstet.— Continental truce.—Renewed.—Scarcity in Britain.—War with the Northern Powers.—Campaign in Germany.—Battle of Hohenlinden.—Peace of Luneville.—Change of Ministry and resignation of Mr Pitt.—Ostensible cause of Mr Pitt's retirement from office.-Probable real cause.-Character of his Administration.—New Ministry.—Royal indisposition.—Imperial Parliament.—Speech from the throne.—Debates on the Address.— Motion on the State of the Nation.—Conduct of the War defended by Mr Dundas .- Mr Pitt's account of the Change of Ministry.—Attack upon Copenhagen by Lord Nelson.—Death of the Emperor Paul.—Convention with Russia.—Naval engagement off the coast of Spain.—Attack on Boulogne.—Campaign in Egypt.—Death of Sir Ralph Abercromby.—Cairo taken. Surrender of Alexandria.—Preliminaries of Peace.

stility are often very different from those which are osten- cause; and the associations on the side of government

in Great Britain to dispute with great eagerness the ques-George III. tion as to who were the aggressors in this war; and in such disputes the friends of administration laboured under considerable difficulties, in consequence of the narrow ground upon which government had thought fit to rest the grounds or causes of hostility. The French government had been willing to explain away the offensive decree of the 19th November; the question about the Scheldt they were prepared to give up; and their ignorance of the nature of the British constitution, and of the elements which influence it in practice, prevented them from entertaining any idea that they were likely to encounter hostility from this country arising out of their revolution Hence they not only neglected their navy, but had already in some measure ruined it, by sending their seamen to the frontiers in the character of soldiers. But though the French had not originally entertained hostile designs against this country, and though the ostensible causes of war on the part of Great Britain were weak, if not futile, it does not therefore follow that the motives which actually influenced the conduct of the British government on this occasion partook of the same character. France had been the ancient and dangerous enemy of England. She had suddenly fallen into a state of anarchy and consequent debility. All Europe was now leagued against her. Within she was divided by faction, and without she was assailed by immense hosts of the best disciplined soldiers in Europe, conducted by the most skilful leaders, to whom she had nothing to oppose but an undisciplined multitude, led on by inexperienced chiefs. In this state of things it seemed a safe measure to make war against her. To do so was only to retaliate the conduct she had herself pursued when she effected the dismemberment of the British empire, by assisting our revolted colonies. And the moment seemed to have arrived when, by dismembering France, she might be rendered for ever incapable of becoming dangerous to Bri-

But the most powerful incitements to this war undoubtedly arose from the example of political innovation, which it was so much the interest of every government in which there existed any mixture of hereditary authority, completely to defeat and overwhelm. To comprehend the full force of this motive for going to war, it is necessary to recollect the ferment which universally prevailed in the minds of men, and to imagine the situation and the feelings of a prince, who, though still safe, yet saw in his immediate vicinity the first of European monarchs hurled from his throne to a prison, and from the prison to a scaffold, and his power assumed by subjects who represented their conduct as the triumph of reason and of freedom; while the contagion of their sentiments, extending itself into neighbouring kingdoms, threatened to break out into actions not less violent than those of the revolutionists of France. In such a state of things, and under the influence of such sentiments, a war against France seemed to be a war in defence of the whole arrangements of society; and princes and nobles considered themselves as engaged in the protection, not merely of their power and station, but even of their personal safety.

Still, however, there were not wanting at this time some individuals who thought the war altogether unnecessary for the support of the British constitution and government. The great amount of the national debt, the influence of the crown, and the general happiness and good feeling of the people at large, gave powerful assurances of stability to government and safety to property. Even before the war commenced, the crimes committed by the French re-In the quarrels of nations the real causes and motives of volutionists had greatly diminished the popularity of their

1793.

It was therefore thought by many to be perfectly practicable to weather the storm without having recourse to hostilities; and there were even some who doubted the prudence of the war, notwithstanding the strength of the combination formed against France, and suspected, that in a sanguinary and desperate contest, armies conducted by princes, brought into power by the casualty of birth, might prove no match for French enthusiasm in the first instance, and far less ultimately for the superior tactics and enterprise which must speedily be introduced by men rising to command from the admiration produced by their talents and success. Lastly, if Great Britain, instead of assailing, had actively protected the independence of France, this would have secured such an ascendency over her councils as might have enabled us to protect Holland, and to preserve the life, perhaps even the crown, of Louis XVI.; and, at all events, it would have placed us in a condition speedily to terminate the contest, without any important changes being suffered to take place in the relative strength of the continental states of Europe.

At the close of the year 1792 Mr Pitt did not attend parliament when it first assembled; nor did he make his appearance in the House of Commons till the alien bill was passing through its last stages in January, the discussion ended, and the relative strength of parties ascertained. The ostensible cause of his absence was, that having, on the death of the Earl of Guildford (Lord North), obtained the place of warden of the Cinque Ports, and thereby vacated his seat as a member of the House of Commons, he had gone down to Cambridge to secure his re-election. But the length of his absence suggested to some a suspicion that he was hesitating about engaging to support the court in its design of going to war; and in the mean time Mr Dundas stood forward in the House of Commons as the leading servant of the crown in support of the proposal for engaging in hostilities. On his return, however, Mr Pitt resumed his station in the debates of the house, and supported the measure with the utmost ardour. At this period Lord Thurlow was removed from the office of lord high chancellor, and succeeded by Lord Loughborough, who had originally owed his preferment to the support given by him to Lord North's administration and measures, and who, though hitherto an adherent of opposition, had in the recent debates defended the plans of administration.

On the occasion of a message from the king announcing the declaration of war by France, Mr Pitt stated that his majesty had always declined taking any part in regard to the internal government of France; that during the summer, while France was engaged in war with Austria and Prussia, he had in no way departed from his neutrality; but that as the French seemed now determined to subjugate other nations to their principles, he was under the necessity of interfering for the protection of his allies the Dutch, who had not indeed made any formal requisition for assistance, but to whose government the French had at all times been notoriously hostile. Mr Pitt also represented the language of the men in power in France as intolerably menacing towards the government of Britain, and as pre-eminently dangerous, from its tendency to introduce anarchy. He also adverted in strong terms to the death of the French king as a calamitous event; an outrage to every principle of religion, justice, and humanity; an act which, in this country and in the whole of Europe, had excited but one general sentiment of indignation and abhorrence, and could not fail to produce the same sentiments in every civilized nation. It was, he said, in all its circumstances, so full of grief and horror, that it must be a wish, in which all united, to tear it if possible L.6,210,000, the interest of which, to be paid by the pub-

Reign of which were forming throughout the kingdom demonstrat- from their memories, to expunge it from the page of his- Reign of George III. ed the superiority of its adherents in wealth and numbers. tory, and to remove it for ever from the observation and George III. comments of mankind. All the members who remained in opposition concurred in reprobating the conduct of the French revolutionists. Mr Fox, however, asserted, that the general maxim of policy was, that the crimes committed in one independent state could not be cognizable by another; he alleged that the topics adverted to by Mr Pitt were introduced into the debate to blind the judgment by exciting the passions; and he contended that the opening of the Scheldt, and the decree of the 19th of November, which were stated as the causes of the war, could never justify such a measure. He censured our past neutrality as unfair. While the French were invaded we remained quiet spectators; but on their becoming invaders in their turn, we said Europe was in danger, and interfered against them. He asserted that the real cause, always disavowed by our government, but ever kept in mind, was the internal government of France. The destruction of that government was the avowed object of the combined powers; but, though about to join them, we were ashamed to own that Britain was engaging to aid the restoration of despotism, and therefore the Scheldt and Holland were collusively had recourse to as pretexts. In the House of Lords, when the same subject was discussed, the Marquis of Lansdown contended, that, by sending an able and experienced minister to Paris, our government might have saved the life of Louis XVI. He declared that the war would be wanton on our part, and without provocation on the part of France; and he highly disapproved of the insulting manner in which M. Chauvelin had been dismissed.

At the period of which we are now treating, British commerce had become extremely extensive, and, owing to the commercial treaty, British and French merchants had become closely connected in their transactions. But from the sudden stagnation of trade which the war now produced, added to the alarms which had been excited upon political subjects, a sort of paralysis appeared to seize the country, and the number of bankruptcies exceeded all that had ever happened in the most calamitous times. A general stoppage of commercial credit took place, and no bank would venture to advance money to merchants or manufacturers; the consequence of which was, that many of them, with large quantities of goods in their possession, were unable to make the smallest payment. To apply a remedy to this alarming evil, several of the principal traders and merchants having waited upon Mr Pitt, requested the interference of government; and a select committee of the House of Commons was accordingly appointed to investigate the subject. After consulting with a variety of bankers, manufacturers, and merchants, the committee, on the 29th of April, gave in a report favourable to the solicitation of the merchants for relief; and a bill was introduced on the 1st of May, authorizing government to issue five millions by exchequer bills, in loans to such merchants and manufacturers as should deposit goods in security for the sum advanced. This measure proved extremely salutary. When it was found that the traders could obtain money from government, the bankers and other persons immediately evinced a willingness to advance them funds, or to give credit to their bills; trade gradually revived; and new channels were by degrees found out for the disposal of the productions of British industry.

On the 27th of March, Mr Pitt, in a committee of the House of Commons, stated, that he had borrowed for the service of the year the sum of L.4,500,000. The terms of the loan were, that for every L.72 advanced to the public the lenders should be entitled to L.100 stock, bearing an interest of three per cent., which would make a capital of .

Reign of lic, would amount to L.186,000 a year. But there was brought into parliament in the month of April for the re-Reign of appropriating a surplus million to a sinking fund, it was provided, that whenever a new loan should be made, a fund equal to one per cent. on the whole of it must be provided, and applied to the liquidation of the principal. This, therefore, required an annual charge of L.62,100, and made the whole, including interest, L.248,400 per annum.

On the 15th of March the attorney general brought forward a bill for preventing traitorous correspondence with the king's enemies. The object of this bill was to prohibit the sale to the French government or the French armies, of arms, military stores, provisions, or clothes, under the penalty of high treason. The purchase of lands in France was also prohibited. No one was allowed to go from Britain to France without a license, under the penalty of a misdemeanour; and persons, though subjects of this country, coming from France, were prohibited from entering the kingdom without a passport, or presenting to the master of the vessel a declaration that, in the mean time, they would not quit the place where they had landed without the permission of a justice of peace, or finding security for their good behaviour. Lastly, the insurance of vessels either coming from France or going thither was prohibited. And this bill passed through both houses, supported by great majorities.

During the present session a very great number of petitions were presented to the House of Commons from different parts of the country, praying for a reform in the representation; and on the 6th of May Mr Grey brought forward the question, after presenting a potition which had been framed by the association called the Friends of the People in London. He asserted that the number of petitions now brought forward demonstrated that the House of Commons were not the real representatives of the people, and he gave a detailed statement of the various defects in the representation. The proposal of reform was chiefly resisted on account of the hazard attending it from the example of France, and on account of the extent to which its more ardent partizans out of doors wished it to be carried. Mr Pitt explained his motives for being formerly friendly to a parliamentary reform, and also his objections against it at the present moment. If the principle of individual suffrage, pointed at in several of the petitions, was to be carried to its utmost extent, it would subvert the peerage and depose the king, and, in fine, extinguish every hereditary distinction and privileged order, and establish that system of equalizing anarchy announced in the code of French legislation, and attested in the blood shed in the massacres at Paris. Mr Fox, on the contrary, represented in strong terms the inconsistency of Mr Pitt's present conduct with his former professions. As to the time of attempting a reform, he said, it had been proposed at all periods, in war and in peace; but they had all been represented as improper. The present was not a more dangerous period than the year 1782, when Mr Pitt himself had brought forward a similar proposal. These dangers he ascribed to the councils, generally unwise, and often wicked, by which the country had recently been governed. Mr Grey's motion was rejected upon a division by a majority of two hundred and eighty-two against forty-

During the present session several popular measures were adopted. On the recommendation of Sir John Sinclair, L.3000 per annum was voted by the House of Commons for the establishment of a board of agriculture; an institution which has been the means of collecting and conveying to the public much useful information respecting the most valuable of all arts. On a motion by the lord advocate of Scotland, Mr Robert Dundas, a bill was

George III. another charge attending the loan; for by the act for lief of the Roman Catholics of Scotland. The persons of George III. that proscribed sect were still incapacitated by law from holding or transmitting landed property, and were liable to other severe restrictions; but these were removed by a bill which now passed without opposition. The passing of this bill was a popular measure, although a dozen years had scarcely elapsed since the people of Scotland had almost universally, and with the utmost violence, combined to oppose any relaxation of the penal laws affecting the Catholics. By the assistance of Mr Dundas, the inhabitants of the north of Scotland also obtained a repeal of the duty on coals carried coastwise, as far as respected that part of Great Britain; but the cities of London and Westminster were less fortunate in an attempt to procure a repeal of the taxes paid by them on the same article.

At this period the exclusive charter of the East India Company being within a year of its expiration, that body presented a petition for a renewal of it; and on the 23d of April the subject was considered in the House of Commons. Mr Dundas observed that the proposal which he was about to make of a renewal of the charter was undoubtedly attended with difficulties. No writer upon political economy had as yet supposed that an extensive empire could be administered by a commercial association; and no writer on commerce had thought that trade ought to be shackled with exclusive privileges. In deviating from these principles, which had been admitted and admired, he was sensible that his opinions had popular prejudices against them; but he was supported by successful experience; and when the house adverted to the peculiarities of the subject before them, they would at once see that he was not attempting to overturn theories, though he was unwilling to recede from old and established practice. It would be idle, and a proof of ignorance, to maintain that all the advantages which Great Britain possessed from its connection with India arose out of the present exclusive privilege of the Company; but it would be impossible to say what might be the political or commercial effects of a deviation from the present system. He then stated, that the shipping employed by the East India Company amounted to eighty-one thousand tons; that the seamen navigating those ships were about seven thousand men, who had constant employment; that the raw materials imported from India for the use of home manufactures amounted annually to about L.700,000; that the annual exports of British produce and manufacture to India and China in the Company's ships amounted to upwards of a million and a half sterling; and that great difficulties would attend any alteration of the present system of government in India, especially from the effects which the innovation might produce on the minds of the natives. He therefore proposed a variety of resolutions, the most material of which was, that it appeared fit and proper to continue to the East India Company their exclusive trade, within the limits now enjoyed by them, for a further term of twenty years, to be computed from the 1st of March 1794, but liable to be discontinued at the end of such a period, if three years' notice should previously be given by parliament. The resolutions proposed by Mr Dundas having been carried, a bill for renewing the East India Company's charter was brought in, and passed through both houses with little opposition. The trial of Mr Hastings still proceeded, though very slowly. It was now totally disregarded by the public.

During this year government sought to strengthen itself by erecting barracks in the vicinity of the great towns, in order that, by residing apart from the citizens, the soldiers might be removed beyond the contagion of popular opinions. But a considerable degree of political fermentation still prevailed in the minds of the people. In Eng-

George III prisonment, for selling the second part of Paine's Rights of Man; and one or two individuals of humble rank were committed for seditious publications. In Scotland the public attention was much excited by the prosecution of two gentlemen, Mr Thomas Muir of Hunter's Hill, a member of the faculty of advocates; and Mr Fysche Palmer, a member of the university of Cambridge, who officiated as unitarian minister at Dundee. Mr Muir had been extremely active during the autumn of the preceding year, when the political agitation was at its height, in promoting associations in Glasgow and its neighbourhood, for the purpose of procuring a reform of the representation in the House of Commons. In point of talents he was not above mediocrity, but he possessed the faculty of unpremeditated elocution in a surprising degree, and appeared to be actuated by the vanity of haranguing without end, which the daily meetings of these societies afforded him an opportunity of gratifying. In other respects he was not formidable, possessing little knowledge of the world, and still less discernment of the human character. He injured the cause which he meant to promote, by collecting assemblages of people, first at Glasgow, and afterwards at Edinburgh, and thus creating an appearance of disorder and turbulence, which alarmed the government, and intimidated persons who were otherwise disposed to favour the political sentiments which he professed. Mr Palmer was a man of eminent literary talents, and attended political societies, but without making any remarkable efforts to distinguish himself in these assemblages. He was tried before the circuit court of justiciary at Perth, on the 17th of September, some months after Mr Muir's conviction at Edinburgh, and found guilty of publishing a political libel, which had been written by some other person, but which he had corrected and ordered to be printed. Both of these gentlemen were sentenced to transportation, Mr Muir for fourteen, and Mr Palmer for seven years; and they were accordingly shipped off, among common felons, for Botany Bay. The disproportionate severity of these sentences excited general sympathy, and produced considerable discussion. The crime of which they were convicted was that of sedition or leasing-making, which by the law of Scotland is is a rule in law, that penal statutes are to be strictly interpreted, it was doubted how far the punishment of transportation could be inflicted under a statute which points out, in general terms, banishment as the punishment of the offence. Not intimidated by these trials, a few persons of no public or political importance whatever met at Edinburgh in the month of November, and thought fit to call themselves a British Convention. They mimicked the proceedings of the French national convention as closely as possible, saluting each other with the title of citizen, holding public sittings, admitting strangers to the honours of the sittings, and mingling the solemn with the ludicrous in a singular style. At any other period their conduct would have excited nothing but ridicule; at this time it was considered in another light, for some of the members were brought to trial, and punished with the same severity which had been exercised towards Messrs Muir and Palmer.

To promote the success of the war, a convention had of Petersburg, stipulating for the prosecution of hostilities till the French relinquished all their conquests. A treaty was soon afterwards entered into with the landgrave of Hesse Cassel, for a subsidiary body of eight thousand men, which, by a subsequent agreement, was extended to twelve thousand; and the king of Sardinia engaged, for L.200,000

Reign of land, a bookseller was prosecuted, and punished with im- in general service against the enemy. Compacts of alliance Reign of were also adjusted with Spain, Naples, Prussia, Austria, and George IIL Portugal; and besides the stipulation of vigorous hostility, it was agreed that the conduct of other powers should be watched with extraordinary circumspection, lest they should abuse their professed neutrality by protecting the

commerce or property of the French.

The detail of the military transactions of this eventful contest will be given under another head. But we may observe here, that during the present campaign the independence of France seemed at one time to be in considerable hazard. The faction which had overturned the monarchy, assembled a convention of national representatives, and endeavoured to establish a republican form of government, soon divided itself into two parties, those of the Gironde and the Mountain. The leading party, when the republic was first proclaimed, consisted chiefly of men of letters, who were led by speculative considerations to expect a wonderful amelioration of the human character, and of the state of society, from the changes they were producing. They wished to avoid sanguinary measures at home, and to restore tranquillity to their country as speedily as possible; but being equally deficient in energy and in knowledge of the character of their countrymen, they were successfully opposed by a turbulent and ferocious minority, led by Robespierre, Danton, and other men of the most unprincipled and sanguinary temper. The moderate and ruling party were also deceived by many of those whom they had employed; and at last their favourite commander, Dumouriez, having been repulsed in the Netherlands by the united forces of Austria, Prussia, and England, entered into a negociation with these powers for the restoration of monarchy in France. But the treacherous project was rendered abortive by the fidelity of his army, which almost to a man deserted their general, and refused to bring the independence of their country into hazard by allowing foreign armies to interfere in the arrangement of its internal government. The defection of Dumouriez, together with the repulse of their armies, brought the moderate party. which still ruled in the French convention, into great difficulties; and it is an unfortunate circumstance that the British government did not then seize the opportunity of makpunishable by fine, imprisonment, or banishment; but as it ing peace with them. The hazard of innovation was now past. One of the maxims of the first French republicans was the love of peace and hatred of war; and the unsuccessful issue of the attempt made to penetrate into other countries must have added force to this sentiment. The tranquillity of Europe might thus have been insured; a mild party would have been preserved in power; Great Britain might have obtained an influence over their councils; and the sanguinary scenes which afterwards occurred in the interior of France, and upon the frontiers, might have been prevented. But this opportunity was unhappily disregarded; and from the distraction within, and the immense combination of force assailing France from without, the complete subjugation of that country was confidently anticipated. Meanwhile the failure of the military operations of the Girondists encouraged the wild party to attempt the overthrow of the more moderate French republicans, by exciting an insurrection of the populace in Paris; an attempt which unhappily proved but too successful. The been concluded in the spring between our court and that national representatives were subdued, ninety members of the convention were imprisoned, and the minority were enabled to convert themselves into an apparent majority. By this event all France was thrown into confusion. The authority of the convention, thus impaired, was utterly rejected by the south of France; and the town and harbour of Toulon, with its fleet and stores, were surrendered by per annum, to keep up an army of fifty thousand men, to be negociation to the British admiral, Lord Hood, as trustee employed in the particular defence of his dominions, and for the next heir of the monarchy. In the western parts of

France the standard of royalty was reared, and joined by measures. But Lord Mornington, on the other hand, con-Reign of George III. immense multitudes, who adhered to it with the most obstinate bravery, and were not subdued till after a greater expenditure of blood than was found necessary for the repulse of the combined armies of Europe.

On the part of Britain the general plan of the war does not seem to have been well contrived or properly carried into effect. A great part of the western coast of France was in full possession of the royalists, whilst the British navy at the same time commanded the ocean. It would therefore have been comparatively an easy enterprise to land an army on the French coast for the assistance of the royalists, and to advance through an open country, destitute of fortified towns, to the capital, and against a convention whose authority was scarcely acknowledged by a third part of the nation. Instead of this, the combined armies were directed against the French Netherlands, where they wasted the summer, as well as their own strength, in the siege of a few of the fortresses which defend that frontier; and thus the attack upon France was made upon its strongest side, at a distance from the centre of its power, and where the means of protracted resistance were the greatest; whilst leisure was afforded to the convention to establish its authority, to call out immense levies for the defence of the country, and before the close of the year to turn the tide of success in its favour. Toulon was retaken under the masterly direction of Bonaparte, who then first appeared on the revolutionary stage; and the Spaniards were beaten in the south; whilst, on the northern frontier, the British army was repulsed before Dunkirk, and the commander in chief of the allies, the prince of Cobourg, before Maubeuge. The Duke of Brunswick and General Wurmser were also driven across the Upper Rhine near Mentz, in the last two weeks of the year, after a succession of sanguinary conflicts, in which the French, by daily bringing forward fresh troops, at last succeeded with their raw levies in wearing down the strength and the courage of their veteran enemies.

The British parliament assembled on the first of January 1794. In the speech from the throne his majesty called the attention of the two houses to the issue of the war, " on which depended the support of our constitution, laws, and religion, and the security of all civil society;" to the advantages which had attended our arms both by sea and land; and to the expectation of ultimate success, founded on the circumstance that the efforts of the enemy, proceeding on an arbitrary system, which enabled them unjustly to dispose of the lives and properties of the people, must eventually introduce internal discontent and confusion. His majesty further stated the impossibility of making peace consistently with the permanent safety of the country, and the tranquillity of other nations; he noticed the treaties and conventions into which he had entered with foreign powers; and he mentioned the general loyalty which prevailed amongst all ranks, notwithstanding continued ef-

forts to mislead and seduce the people.

As usual, the topics introduced into the king's speech became the subject of debate, both in the House of Lords and in the House of Commons; but they excited little attention throughout the nation. Men of property were generally so much alarmed by the events which had occurred in France, that they reposed implicit confidence in the government; and as administration seemed resolved not to despair of success, they derived great support from the approbation of the public. A minority, indeed, existed throughout the country, by whom the war was openly disapproved of; but as they consisted in general of persons of little influence, they were unable seriously to embarrass the measures of administration. When the king's speech was taken into consideration, Lord Wycombe moved an amendment to the address, recommending pacific

tended that the alternative of war or peace did not at George III present exist. Before we could relinquish the principles on which the war had commenced, proof was necessary either that the opinions which we had conceived of the views of France were erroneous, that the war had become desperate and impracticable, or that, from some improvement in the system and principles of the French, the necessity which had prompted us to commence the war no longer existed. Nothing of this sort had occurred. France entertained unlimited views of aggrandizement and ambition, connected with principles subversive of all regular government. Mr Sheridan entirely dissented from these views, and affirmed that Britain had acted with as little regard to the independence of neutral states as the French; that she had endeavoured to compel Genoa, Switzerland, and Tuscany, to join the confederacy against France, by the most insulting menaces; and that, as far as prudence would permit, she had assumed the same language towards Sweden and Denmark. If the French system of fraternization with other nations who wished to overturn their own internal government formed a just cause of war, their dereliction of that system ought to be a reason for making peace. He denied that the French were the original aggressors. I am astonished, said he, that the minister who sits near the Noble Lord does not himself feel it necessary to his own dignity to oppose this paltry argument of the act of aggression having come from them, instead of leaving that task to us, to whom comparatively the fact is indifferent. When he hears this called a war of necessity and defence, I wonder he does not feel ashamed of the meanness which it spreads over the whole of his cause, and the contradiction which it throws among the greater part of his arguments. Will he meet the matter fairly? Will he answer this one question distinctly? If France had abstained from any act of aggression against Great Britain and her ally Holland, should we have remained inactive spectators of the last campaign, idle, apart, and listening to the fray, and left the contest to Austria and Prussia, and whatever allies they could themselves have obtained? Does he then mean to say that he would have sat still; that Great Britain would have sat still with arms folded, and, reclining with luxurious ease on her commercial couch, have remained an unconcerned spectator of this mighty conflict, and have left the cause of civil order, government, morality, and religion, and its God, to take care of itself, or to owe its preservation to the mercenary exertions of German and Hungarian barbarians; provided only that France had not implicated Great Britain by a special offence, and forced us into this cause of divine and universal interest by the petty motive of a personal provocation? Mr Sheridan admitted that enormities had been committed in France, which disgusted and sickened the soul. This was most true; but what relation had these to England? And if they had, what did it prove? What, but the eternal and unalterable truth, that a long-established despotism had so far degraded and debased human nature, as to render its subjects, on the first recovery of their rights, unfit for the exercise of them? That we and all the powers of Europe had reason to dread the madness of the French, he agreed; but was this difficulty not to be accounted for? Wild and unsettled as they must necessarily be from the possession of such power, the surrounding states had goaded them into a paroxysm of madness, fury, and desperation. We called them monsters, and hunted them as monsters. The conspiracy of Pilnitz, and the brutal threats of the abettors of that plot, had to answer for all the additional horrors that had since disgraced humanity. We had covenanted for their extermination, and now complained that they turned upon

George III. hope of success existed upon which we ought to proceed. What was the state of our allies when we entered into the confederacy? The force of Austria unbroken, though compelled to abandon Brabant, and the power of the veteran troops of Prussia absolutely untried, though the seasous and disease had induced them to retire from Champagne. What was their state now? Defeat had thinned their ranks, and disgrace had broken their spirit. They had been driven across the Rhine by French recruits, like sheep before a lion's whelp, and that not after the mishap of a single great action lost, but after a succession of bloody contests of unprecedented fury and obstinacy. Where now was the scientific confidence with which we were taught to regard the efforts of discipline and experience, when opposed to an untrained multitude and unpractised generals? The jargon of professional pedantry was mute, and the plain sense of man was left to its own course. Mr Windham combated the opinion, that the enormities committed in France were the effects of the war. Mr Dundas defended the management of the war, and the activity which had been employed by government in conducting it. Our seamen in the beginning of the year were only fifteen thousand; in the course of the war fifty-four thousand men had been added. At the commencement of the war we had only thirteen ships of the line and thirty frigates fit for service; at the present time we had eighty ships of the line and a hundred frigates in actual employment, which, with the armed vessels now in the service of the public, made the whole above three hundred sail. In augmenting the army, the most effectual and economical system had been pursued; besides the militia, thirty thousand men had been added to the army. Mr Fox repeated that we were the aggressors in the war; contended that every state had a full right to regulate its internal government; and asserted, that the manifesto of the Duke of Brunswick had occasioned all the excesses of the French. He denied that the prodigal manner in which the French government conducted their affairs, and the confusion and ruin into which their finances were hastening, afforded any prospect of success to the allied powers. He remembered, that during the American war there was much talk of a vagrant congress, which was nowhere to be found, of their miserable resources, and their wretched paper money at three hundred per cent. discount, of which, with any few halfpence you had in your pocket, you might purchase to the amount of a hundred dollars. The Americans were represented as exercising on each other the most intolerable tyranny, on the royalists the most unheard-of cruelty; and it was then said, that if such principles were suffered to exist, if the cause of America were ultimately successful, there was an end of all civilised government, and England must be trodden in the dust. Yet then, said this statesman, I recommended negociation, and lived to see Great Britain treat with that very congress so often vilified and abused, and the monarchy remain in sufficient vigour. Mr Pitt recapitulated the arguments formerly employed to prove that the aggression had certainly taken place on the part of France. The system adopted by the French, their usurpation of foreign territory, their hostile intentions against Holland, and their unprecedented views of aggrandisement and ambition, were subversive of all regular government; and unless it could be proved that we had mistaken these principles, we were bound to continue the war, even supposing that difficulty and disappointment. had occurred in the prosecution of it. He conceived there was not the least probability of the continuance of the present government of France. The efforts of the people had been merely the result of terror, and were supported by desperate resources, which could not possibly continue.

Reign of us with the fury which we had inspired. No reasonable He admitted that a safe and advantageous peace ought to Reign of be concluded, as soon as it could possibly be obtained; but George III. the security and benefits of peace with France must depend upon the establishment of a government essentially different from the present. After a lengthened discussion, the address was carried by an overwhelming majority. In the House of Lords a similar debate took place, and similar arguments and views were respectively urged by the adverse parties; but ultimately the address was carried by a majority as decisive as that in the Commons.

It is one of the characteristics of the British nation, to be at all times easily thrown into a state of anxiety and alarm, by any object which government for the time thinks fit to represent as dangerous. The two greatest objects of political terror to Englishmen have at all times been the fear of a foreign invasion, and the dread of secret conspiracies by a disaffected party. During many ages Britain has not been successfully invaded; and, since the time of the Spanish Armada, no such attempt has been made by any of those governments with which Britain has engaged in hostility; but this circumstance, which leads reflecting persons to regard such a project as extremely unlikely to occur, seems to produce a contrary effect upon the people at large. The evils attending invasion having never been felt, lay hold of their imaginations, in the wildest and most exaggerated forms; and from the terror thus produced, they are prevented from reflecting upon the difficulties attending the project, which deterred Louis XIV. from attempting it while in the height of his power, and with the advantage of a disputed succession to the crown. Yet such is the credulity of the British nation upon this head, that administration can at any time throw them into a state of the utmost consternation, by expressing an apprehension of a French invasion; and from this apprehension ministers usually derive very considerable advantages. The voice of faction is for a time silenced by patriotic terror, and all parties hasten to arrange themselves under the banners of government for the defence of their country. The dread of plots and conspiracies produces effects somewhat similar. It is true that no conspiracy of Englishmen was ever productive of danger to the government whilst it remained even tolerably popular; but this never prevents the nation from being thrown into consternation, by intimations, on the part of government, that some desperate conspiracy is secretly carrying on, and ready to burst forth, to the utter destruction of the public tranquillity.

During the war of which we are now treating, Mr Pitt's administration derived incredible strength from these two sources of terror; the fear of invasion, and the dread of conspiracies by disaffected persons. Nor did he want skill to profit by them. At the commencement of the war it had been believed by most persons, and perhaps by government, that it would be of short duration, the state of anarchy which succeeded the overthrow of the monarchy in France seeming to render that country an easy prey to the powerful armies by which it was invaded; and when any doubt of success was expressed, it was answered, that after making trial of the war for a year, we might desist in case we were unsuccessful. But although the original state of affairs had been considerably altered by the successes of the French, yet the British government still resolved to persist in the war, which, however, was now daily becoming less popular. On the other hand, the French leaders were greatly irritated by the persevering hostility of the British ministry, and in the pride of victory menaced England with invasion. It is evident that they had still too much business upon their hands on the Continent to be able to make the slightest attempt to carry their threats into execution; but the British administration, taking advantage

Reign of of the threat, expressed their fears that it might be suc- ing the resistance of a party in Poland, headed by the Reign of lunteers, both cavalry and infantry, throughout the island, for the defence of the nation against foreign invasion, and the efforts of disaffected persons at home. They also en-couraged the raising of subscriptions to defray the expense of these armed associations; and although the measure was disapproved by the minority in parliament, as an unconstitutional mode of raising money, it was supported by the majority. An act was passed authorizing the embodying and training of volunteers, and the measure was carried to a considerable extent throughout the country. In like manner, though the political ferment occasioned by the French revolution had now considerably subsided, administration, aware of the strength derived from keeping the country in a state of anxiety upon political subseditious practices had been carried on by certain societies in London, with a view to overturn the constitution, and introduce the system of anarchy which prevailed in France; and that their papers had been seized, and were submitted to the consideration of the house. On the same day Thomas Hardie, a shoemaker in Piccadilly, who had acted as secretary to the London Corresponding Society, and Daniel Adams, the secretary to the Society for Constitutional Information, were apprehended for treasonable practices, upon a warrant from Mr Dundas. Mr Horne Tooke, well known for his ingenious philological writings, as well as for the political part he had formerly acted in the turbulent days of Wilkes, the Reverend Mr Jeremiah Joyce, Mr Holcroft a dramatic writer, Mr Kyd a barrister, and Mr John Thelwall, who had for some time entertained the town in the character of political lecturer, were also in a few days arrested and committed to the Tower on a charge of high treason.

For the sake of giving solemnity to the inquiries made Commons was chosen by ballot, the members of which were the friends of the minister. The report of the committee concerning the alleged conspiracy amounted to little more than a recital of a number of advertisements from societies, or accounts of their debates, which had served as a pretext for suspending the Habeas Corpus act, and thereby enabling ministers to prevent any political movement, or avowed disapprobation of their measures, from being rashly exhibited out of parliament. In the meanwhile the dread of invasion, added to the political alarm which had previously diffused itself throughout the country, and which was thus artfully maintained, conferred upon ministers a degree of strength which, for a century and more, no British administration had possessed. Almost all men of property were their adherents; whilst their antagonists sunk into utter discredit, and suffered a species of persecution in every department of society; so that it became dangerous to a man's prospects in the world, and in ordinary business, to express the slightest doubt of the propriety of any measure approved by government.

In the early part of his administration, Mr Pitt had endeavoured to rest his reputation, in a considerable degree, upon the improvement of the finances, and the hope which he held out of paying off the national debt. He now deserted all such views; and taking advantage of the uncontrolled power he possessed at home, and the pliability of parliament, he engaged in a career of unexampled expenditure, in corrupting successive parties in France, or in the management of the war.

From its first rise to eminence as a European power, Prussia considered France as its protector against the ambition of Austria. During the present year, notwithstand-

George III. cessful; and proposed the arming of associations of vo- brave Kosciusko, that country was partitioned, and Prus-George III. sia obtained an ample share of its territory. But the partition of France was an object from which Prussia had every thing to fear, as it would destroy the only power by which Austria, the inveterate enemy of Prussia, had at all times been kept in awe. When the Prussian monarch found it necessary, in conjunction with his allies, to invade France in 1792, he retired upon the first appearance of a tolerably firm opposition, and gave the republic a respite of another winter, during which to arrange its strength, and call into action its resources. In the year 1793 the Prussians remained extremely inactive till towards the close of the campaign, when at last, in consequence of repeated remonstrances from their allies, they advanced against Alsace; but being there repulsed, and jects, announced to parliament, by a royal message, that the republic beginning to exhibit on all sides a firm military front, the king of Prussia declared that the expenses of the war were more than his finances could sustain, and required the other German states to supply him with money, threatening in case of refusal to abandon the common cause; and on their declining to comply with his demands, he actually began to withdraw his troops. But by this time the British ministry had engaged in the war with a degree of eagerness which induced them to make every sacrifice to obtain success; and therefore, to avoid losing the assistance of Prussia, they offered a subsidy, which was finally adjusted, upon the condition that his Prussian majesty was to furnish sixty-two thousand troops, or thirty thousand beyond his contingent; for which his Britannic majesty was to pay him L.50,000 a month, L.100,000 a month for forage, L.400,000 to put the army in motion, and L.100,000 on their return, or in all, for the remaining nine months of the year, L.1,350,000. At this rate the expense of the whole year would amount to L.1,800,000, of which the states general were to pay into this conspiracy, a secret committee of the House of L.400,000; and the forces thus subsidized were to be commanded by an officer to be named by the king of Prussia. By this treaty the king of Prussia was enabled to keep his army upon the war establishment with little additional expense to himself, and with the power of claiming a share of whatever conquests were made from France; previously been inserted in the public newspapers; but it whilst, by retaining the appointment of the general of the subsidized army, he preserved a complete command over it, and might prevent his troops from being worn out by active service, or restrain them from doing greater injury to the French republic than he should judge prudent or expedient in the circumstances.

> All Europe looked forward with great anxiety to the approaching campaign as decisive of the contest; in which its whole powers, excepting Russia, Sweden, and Denmark, were actively engaged. At sea, where her strength could be most effectually exerted, Great Britain was eminently successful. An expedition under Sir Charles Grey and Sir John Jervis was sent to the West Indies, where Martinique, St Lucie, and other islands, were taken. In the Mediterranean the French were driven from the island of Corsica, and the inhabitants acknowledged the king of Great Britain as their sovereign. But the most signal victory was that gained by Lord Howe over the French fleet on the first of June near Brest. During the first years of the revolution France had suffered much distress from a scarcity of grain; and such was the inveteracy with which the present war was conducted, that the British government had formed a plan of subduing that nation by famine, by preventing their obtaining supplies of provisions from any foreign country. In their distress the French rulers had applied for assistance to the United States of America, which still owed a considerable debt to France, contracted during the war by which their own re-

George III. accept payment of this debt in corn, a commodity abounding in America. The Americans, accordingly, delivered the grain in their own ports, and a hundred and sixty sail of vessels laden with grain set out for France. As soon as this became known, Lord Howe was dispatched, in order, if possible, to intercept this valuable convoy; while the French admiral, Villaret-Joyeuse, sailed from Brest to hazard an engagement with the British fleet, for the sake of preserving the convoy. The force of the hostile fleets French twenty-five sail of the line; but the French line their ships were taken, and two sunk. Before the battle, however, the French admiral had detached a considerable force for the protection of the convoy, which was thus enabled with safety to reach its destined port. This victory produced very great exultation in Britain; and the fear of invasion which had been previously excited was abated

by so decided a proof of naval superiority.

On the part of the French, however, these colonial and freedom or independence. naval losses were greatly overbalanced by the general result of the campaign. The allies still concentrated their sia perceiving France restored to more than her ancient principal force against the Netherlands, and with that view, at the commencement of the campaign besieged and took Landrecies; but the fortune of the war was speedily changed. General Pichegru advanced into maritime Flanders, and in a variety of engagements defeated Count Clairfayt, an Austrian general of great activity, who ruined his army by incessant and sanguinary efforts to drive back a superior enemy. An attempt made by the grand army to cut off the retreat of Pichegru proved unsuccessful; and the latter having in turn manœuvred to intercept the communication of the imperialists with their magazines at Ghent, was in like manner repulsed; but the obstinate conflict which he maintained, and the steady fire of his troops, during a succession of conflicts, which lasted from daybreak till sunset, convinced the allied armies that the invasion of France had become a hopeless project. At last the French advanced, under General Jourdan, from the eastward, and at Fleurus gained a victory which cost the Austrians nearly fifteen thousand of their best troops. Mutual disgust, as well as discouragement, now prevailed among the allies. The Austrians retreated, leaving the Duke of York at the head of the British and Hanoverian forces in considerable peril; but, with the assistance of the Earl of Moira, his royal highness made good his retreat. This nobleman, who had distinguished himself in the American war, was opposed to the present war, which he had reprobated in his place in parliament. But having nevertheless been sent by administration with a feeble armament to assist the royalists on the western coast of France, and finding himself too weak to effect any thing of importance in that quarter, he had brought back his troops; and was afterwards sent with them to defend Ostend, where, learning the difficult nature of the Duke of York's situation, and perceiving that Ostend could not long be protected after the rest of Flanders had been deserted, he marched across the country, and in the face of much danger, and under great hardships, effected a junction with the principal British army, to which this reinforcement afforded seasonable aid.

The French were no less successful on the Upper Rhine, and on the frontiers of Italy and of Spain. At the end of the campaign, an intense frost having set in, they reinforced their armies, and Pichegru invaded Holland. After a variety of engagements the British and Hanoverians, together with some Austrian auxiliaries, whom Britain had subsidized, were repulsed, and found it necessary to abandon Holland to its fate. Many Dutch families sought and Mr Vicary Gibbs, and the prosecution was conducted

Reign of volution had been accomplished; and they now offered to refuge in Britain. When Utrecht had submitted to the Reign of enemy, the stadtholder, knowing that Amsterdam would George IIL not be defended, left his country, and escaped in a fishingboat to England, where he and his family became immediate objects of royal liberality, and were treated with the respect due to their rank and misfortunes. The Dutch, who had viewed the English with a very unfriendly eye since the revolution of 1787, appeared to be highly pleased with this change in their affairs. They had treated our soldiers with great illiberality, and refused to alleviate by was nearly equal, the British having twenty-six, and the kindness or compassion the sufferings of the wounded, or the distress of the fugitives, who at length effected their was broken, and, after an obstinate engagement, six of retreat to Bremen, after a long and severe trial of their patience and fortitude. The United Provinces were now revolutionized on the French model. Liberty, equality, and the rights of man, were proclaimed; representatives of the people were chosen; and the regenerated state was named the Batavian Republic. But the pretended friends of the Hollanders, in rescuing them from what they termed a disgraceful yoke, did not suffer them to enjoy real

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energy, and capable of humbling his enemy and her ancient rival, the house of Austria, deserted the coalition, refused to accept of any further subsidy from Britain, and took under his protection, as neutral states, the whole princes of the north-west of Germany; thus becoming the ostensible head and guardian of a large division of the empire, which was enabled to recover its tranquillity, and to become a calm spectator of the prolonged contest, which the rest of the empire under Austria continued to carry on against France. Spain was also under the necessity of imitating the example of Prussia, though upon less favourable terms, being constrained to relinquish, as the price of peace, her half of the island of St Domingo; and the Duke of Tuscany also deserted a contest in which he

had reluctantly engaged.

In the meanwhile administration pursued their system of alarming the friends of internal tranquillity, by the dread of conspiracies and attempts against the constitution. The persons who in the month of May had been imprisoned on a charge of high treason were brought to trial in the end of October. The first was Thomas Hardie. His indictment stated nine overt acts of high treason; first, forming an intention of exciting rebellion and insurrection, and conspiring to subvert the government and depose the king; secondly, writing various books, pamphlets, letters, and addresses, recommending delegates to a convention; thirdly, consulting as to the means of forming such a convention; fourthly, agreeing to form themselves into a society for the purposes aforesaid; fifthly, causing arms to be made in order to subvert the government and depose the king; sixthly, conspiring to levy war within the realm; seventhly, conspiring to aid the king's enemies; eighthly, composing and publishing certain books, pamphlets, letters, exhortations, and addresses, for the purposes aforesaid; and, lastly, procuring arms for the purpose of levying war against the king, and exciting rebellion and insurrection. The written evidence consisted chiefly of advertisements and addresses, published in the newspapers, many of which were expressed in a very intemperate style; and of the proceedings of the societies, which were all public. With regard to the alleged charge about arming the people, it appears to rest upon no solid foundation; and the accusation and defence, therefore, turned chiefly upon the question of treasonable intention upon the part of the accused and his associates. Hardie was ably defended by the Honourable Thomas Erskine

Reign of by the attorney and solicitor general; but after the pro- tention to so riciculous a story as this; but such is the well- Reign of George III. ceedings had been protracted to the eighth day, the jury, after some deliberation, brought in a verdict of not guilty. The next trial was that of Mr Horne Tooke, who endeavoured to prove that he had merely followed the example of Mr Pitt, in recommending a plan of parliamentary reform. The minister was examined on the occasion, chiefly regarding the proceedings of the popular party, before the close of the American war, with a view to establish this point; but he evaded most of the questions by alleging a want of recollection. The acquittal of Mr Tooke was followed by that of Mr Thelwall; and a despair of convicting any one of the supposed traitors led to the abandonment of the other indictments.

these persons, which tended to discredit the alarms kept up by the friends of administration, was felt by them as an additional misfortune. Had the indictments been laid for sedition only, the prosecutions would probably have proved successful; but ministers were led to carry matters the length of an accusation of treason, by their success in a similar charge at Edinburgh in the preceding month of September, against two persons named Robert Watt and David Downie. Watt had been a spy, employed by government to attend political societies, and discover the designs of the leaders; but as he was a needy person, and had been unable to communicate intelligence of much importance, he had received little pay. To earn more money, he thought fit to contrive a plot, which he communicated to Downie and some others, for seizing the castle and the public offices at Edinburgh, with a view no doubt of afterwards holding out his associates to government as criminals. Neither he nor they had any means of carrying such a plan into effect. But Watt having procured some pikes, deposited them in a cellar in his own house, where they were accidentally discovered; the spy was apprehended; and the persons to whom he had communicated his plan having come forward as witnesses against him and Downie, they were both found guilty of high treason. Downie, who had done little more than appear to approve of Watt's plan, was recommended to mercy, and afterwards pardoned; but Watt was executed.

Another source of encouragement to proceed with measures of severity arose at this time out of a plot brought to light by some informers, and by way of ridicule termed the Pop-gun Plot. The persons implicated in this charge were, John Peter Le Maitre, a native of Jersey, and apprentice to a watch-case-maker in Denmark Street, St Giles; William Higgins, apprentice to a chemist in Fleetmarket; and a man of the name of Smith, who kept a book stall in the neighbourhood of Lincoln's-inn. Their accuser was one Upton, an apprentice or journeyman to a watchmaker. Le Maitre, Higgins, and Smith, were apprehended on Saturday the 27th of September, by a warrant from the Duke of Portland, as secretary of state, and examined on Sunday the 28th, before the privy-council, the lords of which were summoned again to attend on Tuesday upon the same important business. The charge, supported by the testimony of Upton, bore in substance, that an instrument was to have been constructed by the informer Upton, in the form of a walking stick, in which was to have been inserted a brass tube of two feet long; that through this tube a poisoned dart or arrow was to have been blown by the breath of the conspirator Le Maitre at his majesty, either on the terrace at Windsor, or in the playhouse; and that the poison was to have been of so subtle a nature, that if the point but glanced upon the king, it would produce instantaneous death. Nothing short of the most consummate ignorance of the state of human science could, on any ordinary occasion, have procured a moment's at-

known credulity of the English nation regarding political George IIL dangers, that administration and their friends appear to have regarded this plot as an affair of some importance.

Parliament assembled on the 30th of December. In the speech from the throne his majesty urged the necessity of persisting in the war, however unfortunate it had been; and noticed the rapid decay of the resources of the The Dutch had, he observed, from a sense of present difficulties, entered into a negociation for peace with the prevailing party in France; but no established government could derive security from such a negociation. The most effectual means had therefore been employed for the further augmentation of the forces, on whose va-As the war was becoming unpopular, the acquittal of lour, as well as on the public spirit of the people, he placed the utmost reliance. This speech also mentioned the accession of the sovereignty of Corsica to the British dominions; a treaty of amity and commerce with America; and the conclusion of a treaty of marriage between the Prince of Wales and the Princess Caroline of Brunswick.

When an address to his majesty in similar terms with the speech was moved in common form, very animated debates took place in both houses of parliament. The war was attacked and defended upon the usual grounds, with this additional circumstance, that the events of the late campaign gave considerable countenance to the assertions of opposition, that all hope of ultimate success was irrational. Administration, however, were no less powerful than formerly. On the last day of the preceding session they had received into official situations some of those supporters of the war who in former years had opposed their measures. Earl Fitzwilliam had been appointed president of the council; the Duke of Portland became one of the secretaries of state; Earl Spencer was declared keeper of the privy seal; and Mr Windham was appointed secretary at war. But notwithstanding these official changes, Mr Pitt, with the aid of his friend Mr Dundas, and his relation Lord Grenville, was understood to retain the efficient power of the state. Mr Dundas still retained the management of the war with France; and, as a kind of third secretary of state, he performed a considerable part of the business which would otherwise have devolved upon the Duke of Portland; while at the same time he continued, as president of the board of control, to superintend the affairs of India, and to hold the office of treasurer of the navy. Earl Fitzwilliam was soon got quit of, being sent to Ireland as lord-lieutenant, under an agreement that he was to have full power to promote the repeal of the penal statutes against the Catholics, and to concede certain privileges which had been withheld in 1793. But ministers having altered their sentiments about some of these points, prohibited him from proceeding; and as he insisted upon the terms on which he had accepted his situation, he was recalled and dismissed from office. By joining ministers for a time, he was prevented from acting along with opposition in reprobating the war, and thus he was left insulated and separated from both parties.

Among the debates of the present session, one of the most remarkable was that which occurred upon the motion of Mr Grey in the House of Commons on the 26th of January 1795, that the existence of the actual government of France ought not to be considered as precluding a negociation for peace. After two years of war, which had drained this country of its blood and treasures, we did not appear to be one point nearer the object for which it was undertaken. From certain words of the minister on a former occasion, Mr Grey inferred that this was a war of extermination, a mortal strife, to be carried on till one of the parties should be destroyed. He wished, by the motion, to put the question to issue whether this opinion was

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George III. large, and even the enemy with whom we were contending, had a right to know the length to which the contest was to be carried, and the terms upon which peace was to be obtained. He endeavoured to show that there existed no prospect or chance of success in overturning by force of arms the republican government of France, and that a war persisted in with that view must necessarily be absurd; that the people of France were too firmly attached to their new arrangements to be likely to give them up, however they might change their leaders; that a dependence upon a decay of their finances was equally ill founded; and that, both in the American war and in this, the affairs of the British nation were unfortunately intrusted to persons unable to distinguish between the fallacy of imperfect calculations and the energy of a people struggling for independence. Our own resources were, he doubted not, equal to every thing to which they ought to be applied, but not equal to the conquest of France, or to a war of aggression. The exhausted state of the emperor's finances was evinced by a memorial he had recently addressed to the circles of the Upper Rhine. Was it then from him, from the Italian states, the kings of Sardinia, Naples, and Spain, or from our disgraceful alliance with the empress of Russia, that we expected assistance? Or was it from our good German ally, who had taken L.1,200,000 of our money, who had not brought into the field the sixty-two thousand men for which he stipulated, who had denied our right to command any of the Prussian troops, and contended that they ought not to march against the French, but to remain to defend Germany? The strongest reason which a great nation could have for war, was the defence of its honour; and this, he contended, we had so fully vindicated, as to secure us from future insult. The decree of the convention in November 1792 now formed no bar to a negociation, as that declaration had been repealed, and followed by a contrary declaration. As additional reasons, Mr Grey noticed the capture of Holland, and the debates in the diet at Ratisbon, in which all parties agreed for overtures to the enemy, except the elector of Hanover and the landgrave of Hesse. Mr Pitt, in reply, asserted that the motion was utterly inconsistent with the sentiments formerly expressed by his majesty and by parliament, and therefore proposed an amendment, importing that it was the determination of the house to prosecute the war, as the only means of procuring a permanent and secure peace. Mr Pitt contended that no nation at war with another ought to treat for peace with a government which could not give security; that this last was the great object by which alone the war could be terminated; that nothing but a series of revolutions had been generated under the system and principles now prevalent in France; that the agriculture and commerce of France were in the most disastrous situation, and justice almost unknown; that the house would never willingly consent to treat with a nation of atheists; that in April 1793, the French had enacted the penalty of death against any person who should propose peace with any country which did not acknowledge the French republic one and indivisible; that the admission of these principles amounted to a confession of the usurpation and injustice of every other government; and that treating with France would involve an acknowledgment of those principles which condemned the usurpation of all other governments, and and after some discussion in the House of Commons, his denied the very power which they were exercising. Fox accused the minister of tergiversation, and contended, that he had in fact found it necessary to alter his conduct; and that the impolitic speech which he had put into ing to L.13,000, were also set apart for the extinction of had made a serious impression upon the public. What, penses of the marriage, he asked, would have been the feelings of Englishmen, if tions of Carlton House.

Reign of countenancea by the House of Commons. The public at the convention had determined never to treat with them Reign of until there was a reform in the English government? He George IIL recalled to the recollection of Mr Pitt the declaration of his father, that they should die in the last breach before they granted the independence of America; yet the first act of the political life of the son had been to sign the very independence which his father had deprecated. Necessity had dictated that act; and he must now, on the same account, retract his declaration respecting France. The motion was opposed by Mr Dundas, on the ground that it would fetter the executive government in their negociations for peace; and ultimately the motion was

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negatived, and the amendment adopted.

On the following day the Duke of Bedford brought forward, in the House of Lords, a motion similar to that which Mr Grey had introduced into the House of Commons; and Lord Grenville moved an amendment precisely similar to that which had been proposed by Mr Pitt and carried in the House of Commons. A great deal of discussion followed; but ultimately a large majority voted in favour of the amendment. The victories of the French during the last campaign, and the despair of ultimate success in the war, which now began to be entertained throughout the country, encouraged opposition to renew the subject under a variety of forms, and to urge ministers to enter into a negociation; but on every occasion the motions made by them were negatived by a similar superiority of numbers.

The number of seamen and marines voted during the present session amounted to a hundred thousand, whilst a. hundred and nineteen thousand three hundred and eighty men were voted to form the guards and garrisons. In order to procure the requisite number of seamen, the parliament required the merchants to give up a part of the crews of their shipping, in proportion to the tonnage, and ordered every parish to furnish one man for the service. A loan of L.18,000,000 was found necessary, together with a large issue of exchequer bills, as the supplies voted amounted to no less than L.29,307,000. The new taxes were made payable on wine, spirits, tea, coffee, stamps on deeds, insurance on ships and cargoes, timber, and on persons wear-

ing hair-powder.

During the present session the trial of Mr Hastings was at length brought to a conclusion. The subject was discussed in a committee of the House of Lords. The lord chancellor and the Earl of Carnarvon considered Mr Hastings as criminal; but he was ably defended by Lord Thurlow, who was supported by the Marquis of Lansdown, the Bishop of Rochester, and others. When every part of the accusation had been disallowed by the committee, the report was reviewed by the house; and after some debates on the mode of proceeding, it was resolved that the question should be put separately on sixteen points. greatest number of peers who voted the defendant guilty in any one respect did not exceed six, whilst the votes of not guilty on some of the charges were twenty-six, in others twenty-three, and in one nineteen. The lord chancellor then intimated the decision of the court to Mr Hastings, who received it in silence, and withdrew.

At this time the debts of the Prince of Wales amount ed to L.630,000; but it had been arranged at court that these debts should be paid, and that the prince should marry his cousin, the daughter of the Duke of Brunswick; establishment was fixed at L.125,000, out of which he was required to pay L.65,000 a year until his debts were liquidated. The rents of the duchy of Cornwall, amountthe mouth of his majesty, at the opening of the session, the dehts; and further sums were voted to defray the expenses of the marriage, as well as the repairs and decora-

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Reign of 1795.

Parliament was prorogued on the 27th of June by a milder course of conduct, the military operations languish- Reign of

The incidents of the war during the year 1795 were less memorable than those of the preceding years. Lord Bridport, with an inferior force, attacked a French fleet near Port l'Orient, and took three of their ships. Viceadmiral Hotham pursued to the Genoese coast a fleet which had sailed from Toulon to attempt the recovery of Corsica, and had captured one of his detached ships; and having brought the enemy to a partial engagement, he took two sail of the line; but he afterwards lost one of his own ships in consequence of damage sustained in the conflict. On the western coast of France, the enemy, with thirteen sail of the line and fourteen frigates, avoided coming to an engagement with Vice-admiral Cornwallis, who had only eight ships including frigates. These events occurred early in summer. But notwithstanding the vigilance of the British navy, the French captured, in the month of July, thirty sail of a valuable convoy returning from the Mediterranean, and also made prize of part of a Jamaica fleet; but, on the other hand, their own commerce had sunk so low as to present few objects of attack to our cruizers and privateers.

As the Dutch, though nominally the allies of the French, had, in fact, become subject to them, letters of marque were issued against them by Great Britain, and directions given to seize their colonial territories, under the professed intention, however, of restoring them when the stadtholder's government should be re-established. The Cape of Good Hope was taken, together with Trincomalee and the other Asiatic settlements of the Dutch, excepting only Batavia. Their territories in the West Indies were not attacked during the present year, on account of the difficulties which the British experienced in that quarter in keeping in subjection the islands captured from the French, where various insurrections were incited by their ancient masters. Jamaica was also kept in a state of great alarm by a small tribe of independent negroes, called Maroons, who had long existed in the mountainous parts of the island. These people, having quarrelled with the white inhabitants, committed many cruel ravages, and were not subdued till Spanish hunters and blood-hounds were procured from the island of Cuba, and employed against them, which induced them at last to submit to deportation from the island.

The British ministry resolved, when it was too late, to give assistance to the royalists in the western parts of France; and an expedition, planned by Mr Windham, and guided by French emigrant officers, with troops, many of whom consisted of prisoners of war, relieved from confinement on condition of bearing arms against their native country, set sail for the French coast, and landed upon the extremity of the narrow peninsula of Quiberon. Here they fortified themselves; but many of the troops proving unfaithful, and the expedition being otherwise ill conducted, they were speedily overpowered by the republicans, who put to death such of their countrymen as they found in arms fighting against them. By this feeble and ill-timed invasion of the French territory, nearly ten thousand men were killed or taken prisoners.

The continental campaign on the side of Germany was of little importance during this year, but upon the whole it proved unfavourable to the French. The convention had shaken off the yoke of that sanguinary faction which, under Robespierre and his frantic associates, had deluged the interior of France with blood, but had nevertheless the merit of calling forth with astonishing energy the powers present leaders possessing less activity, and affecting a the evils they had suffered from the continuance of war;

George III. speech from the throne, in which ministers thought it pru- ed; and the French army remained inactive till autumn, George III. dent to hold out to the public some prospect of negocia- when it crossed the Rhine near Mentz under General Pichegru, but was speedily repulsed, and an armistice concluded for the winter. The convention, however, established a new form of government, consisting of an executive directory of five persons, elected by two representative bodies, to which the powers of legislation were intrusted, and it was expected, that if the war continued, the new executive power would endeavour to distinguish itself by some important operations.

> The British parliament was again assembled at an early period, namely, on the 29th of October. The state of public affairs wore at this period an unfavourable aspect. The French armies had been inactive during the summer, but they had lost nothing; for the new republic retained possession of the territory extending from the Pyrenees to North Holland, and consequently of an immense length of coast opposite to Great Britain. Meanwhile, a dearth of provisions began to prevail at home. The winter, which had set in with extreme severity at the close of the year 1794, and had enabled the French to conquer Holland with little difficulty, was followed by an ungenial summer, during which the crop failed in consequence of almost incessant rains. This state of things was productive of discontent among the lower orders, and the war was blamed as tending to aggravate the distress which they thus suffered. Previous to the assembling of parliament some meetings were held by the London Corresponding Society, for the purpose of petitioning the king and parliament in favour of peace and of parliamentary reform; and as the meetings were held in the open fields, they were very numerously attended, but the persons composing them dispersed without disturbance. At the opening of parliament, however, some riots took place.

His majesty proceeded from the palace to open the session of parliament at the usual hour; and the crowd in St James's Park, which is always considerable on these occasions, was certainly much greater than usual. A fine day, and a rumour which had been circulated that a riot was likely to take place, contributed greatly to increase the multitude of the spectators. As the royal carriage passed along the park, the predominant exclamations uttered were "Peace, peace! Give us bread: No Pitt; no famine; no war !" and a few voices were heard to exclaim, " Down with George," or words to that effect. In the park and the streets adjacent to Westminster, stones and other missiles were thrown, some of which struck the state coach, and one of them, supposed to have been thrown from a house in Margaret Street, perforated a window of the carriage by a small circular aperture. From this circumstance it was alleged to have been a bullet discharged by an air-gun, or by some similar engine; but no bullet was found; and happily it neither touched the king nor the noblemen who attended him. As his majesty returned from the house through the park, the gates of the horseguards were shut to exclude the mob; yet even this precaution was not sufficient to prevent a renewal of the outrages, and another stone was thrown at the carriage as it passed opposite to Spring Garden Terrace. After the king had alighted at St James's, the populace attacked the state-carriage, and, in its way through Pall-mall to the Mews, it was almost entirely demolished. The speech from the throne stated that the general situation of affairs, notwithstanding many events unfavourable to the common cause, was materially improved; that the French had been driven back in Italy, and checked on the side of Germany; that their successes, and the treaties of peace of the country for the support of its independence. The which they had entered into, were far from compensating

Reign of that the unparalleled embarrassment and distress of their George III. internal situation had produced an impression that their only relief must result from peace and a settled government; that the crisis in which they now were must probably produce consequences important to the interests of Europe; and that if this crisis terminated in any thing affording a reasonable expectation of security in any treaty, the appearance of a disposition to treat for peace on just and suitable terms would be met, on the part of the British government, with an earnest desire to give it the speediest effect. In the speeches for and against the usual addresses little novelty occurred, the expediency of continuing the war having been so often discussed before.

Meanwhile administration took advantage of the attack upon his majesty's person to issue a proclamation, connecting the meetings of the Corresponding Society with the insults offered to his majesty, and also to bring forward two new penal statutes. The first was introduced into the House of Lords by Lord Grenville, and entitled an act for the preservation of his majesty's person and government against treasonable and seditious practices. One clause enacted capital punishment against every one who should express, utter, or declare, by the publication of writings, or by any overt act, such imaginations, devices, or intentions, as were calculated to injure the king, impair his authority or that of the parliament, or promote an invasion of his dominions; another provided, that all declarations tending to excite hatred or contempt of the king should be considered as high misdemeanours; and a third, that a second offence might be punished, either in the ordinary mode, or by banishment from the realm for a term not exceeding seven years. The other bill, introduced by Mr Pitt into the House of Commons, provided, that no meeting of any description of persons, exceeding the number of fifty, except such as might be called by sheriffs or other officers or magistrates, should be holden for political purposes, unless public notice had been previously given by seven housekeepers; that if such a body should assemble without notice, and twelve or more individuals should continue together, even quietly, for one hour after a legal order for their departure, they should be punished as felons, without benefit of clergy; and that the same rigour might be exercised, if any person, after due notice of the meeting, should use seditious language, or propose the irregular alteration of any thing by law established. With regard to the delivery of lectures or discourses, or the exercise of debate on topics connected with the laws and government of the country, a license was declared to be necessary. Very animated discussions took place upon these bills in both houses of parliament, and many petitions were presented against them; whilst, on the other hand, various corporations and public bodies petitioned for their enactment. But the result nevertheless was, that the bills were passed by great majorities.

Still, however, administration were sensible that it would become necessary, for the sake of preserving their popularity, to assume an appearance of willingness to put an end to the war; and accordingly, whilst the bills were under discussion, each house received a message from the king, in which, alluding to the new constitution, and the directorial government of France, he stated that such an order of things had arisen as would induce him to meet any desire of negociation on the part of the enemy with a full readiness to give it the speediest effect. An address of thanks having been moved, Mr Sheridan suggested an amendment, tending to promote immediate negociation, and Mr Fox also wished that the first advances should pro-

tion to negociate. Similar observations were made in the Reign of House of Peers. A species of advance towards negocia-George III. tion was nevertheless made soon afterwards on the part of Britain, though in a very oblique and indirect mode. Mr Wickham, his majesty's minister to the Swiss cantons, transmitted, on the 8th of March 1796, a note to M. Barthélemi, the French ambassador at Berne, stating that he himself was not authorized to enter into any negociation, but requesting information in writing on the part of the French court about three points; first, whether France was disposed to send ministers to a congress to negociate a general peace with his Britannic majesty and his allies; secondly, whether the French government were willing to state the general grounds upon which they would consent to conclude a treaty; and, thirdly, whether the French government would think fit to propose any other mode of arriving at a general pacification. M. Barthélemi returned an answer on the 26th of the same month, stating that the executive directory doubted the sincerity of these overtures of peace, from the proposal of a general congress, which would lead to endless negociations, and from Mr Wickham not having received powers to negociate; asserting the willingness of France to make peace; but declaring that the executive directory had no power to relinquish any of the territories which the constitutional act had declared to form an integral part of the French republic. With regard to the other territories occupied by the French armies, these might become objects of negociation. But as the Netherlands and the island of St Domingo had been declared by the new French constitution to form part of the territory of the republic, the British government immediately published a note intimating that these pretensions on the part of France were totally inadmissible; and that while they were persisted in, nothing was left but to prosecute a war equally just and necessary. This first attempt towards negociation for peace gave rise to various debates in the British parliament, in all of which administration were supported by their usual majorities.

Supplies were voted during this session to the amount of L.37,588,000, and upwards of twenty-five millions and a half were borrowed. As no prospect existed that British armies could be employed on the Continent, the guards and garrisons were reduced to forty-nine thousand men; the forces in the colonies were increased to seventy-seven thousand; and the sailors and marines amounted to a hundred and ten thousand. Taxes were imposed on legacies to collateral relations, and on horses, and dogs, and hats; the assessed taxes were increased, and also the duties on wine, tobacco, salt, and sugar. Parliament was dissolved on the 20th of May, and new elections immediately took

An extremely active campaign was now opened by the French upon the Continent. Their generals, Moreau and Jourdan, penetrated into Germany; but they were ultimately repulsed by the Archduke Charles, though not till they had reached the vicinity of Ratisbon. The retreat of Moreau, amidst hostile armies, and through the difficulties and entanglements of the Black Forest, formed one of the principal events of the war, and has been much lauded by some military writers, though severely criticised by Napoleon. On the side of Italy the French obtained. greater success. Their new general in that quarter, Bonaparte, turned the Alps by the Col di Tende, and gaining in rapid succession the victories at Montenotte, Millesimo, and Dego, compelled the king of Sardinia to desert. the allies, and to purchase peace at the expense of a conand to remove all obstacles to the attainment of peace; siderable portion of his territory. He next descended into the Milanese; obliged the Italian states to surrender their ceed from our court; but Mr Pitt and Mr Dundas thought finest paintings, statues, and other curiosities, together with it advisable to wait until the enemy manifested a disposi- large sums of money, as the price of peace; and after a

Reign of multitude of sanguinary conflicts at Lodi, Arcole, Lonato, But although these were reported as prosperous, yet each Reign of out to attempt the re-capture of the Cape of Good Hope, but which was itself made prize of by the British admiral Sir George Elphinstone, afterwards Lord Keith. On the other hand, the British were under the necessity of abandoning Corsica, in consequence of the conquests of Bonaparte in Italy, and the mutinous spirit of his countrymen the Corsicans. The result of the campaign was, that the necessary to send Lord Malmesbury to Paris on the pretence of attempting to negociate a peace; but it was afterwards admitted by Mr Pitt that they had no wish to conclude a treaty, and that the measure was adopted merely in compliance with the wishes of the public. Accordingly, as the French still refused to relinquish their hold of the Netherlands, this was accounted a sufficient reason for persevering in the war.

In the early part of the session of parliament, which met on the 6th of October, there occurred few debates, on account of the intention to attempt an immediate negociation, which had been announced in the king's speech, and afterwards from expectation of its issue. But at the close of the year the French directory, in consequence of an invitation from a disaffected party in Ireland, sent an expedition of seventeen ships of the line and many smaller vessels, having on board an army of eighteen thousand men under General Hoche, to invade that country. The violence of the weather prevented this armament from assembling at the rendezvous in Bantry Bay, and no landing was in consequence attempted; so that the fleet returned home with the loss of two ships of the line and two frigates, which perished in a tempest, and of one frigate taken by the English. Shortly afterwards the French disembarked on the coast of Pembrokeshire twelve hundred and fifty criminals, whom they had sent as soldiers upon the Irish expedition, and knew not how to dispose of after the failure of that attempt.

At this period the first instance of serious difficulty occurred in the management of the British funding system. The large sums of money sent abroad as subsidies to foreign princes by government had diminished the quantity of gold and silver in Great Britain, whilst administration, through the medium of the Bank of England's paper, had issued immense sums for the public expenses, and in payment of the additional interest of the national debt. The alarm occasioned by the Irish invasion coming in addition to these circumstances, produced a run upon the bank to exchange its paper for specie; and as their coffers were soon drained, they found themselves under the necessity of giving a premium for bullion, which they paid with their paper. This made matters worse, as certain persons secretly melted down the guineas which the bank had caused to be coined and issued, and sold the gold to the bank as bullion for the sake of the premium. A ruinous traffic was thus carried on by the bank, which purchased bullion at a high rate, while they gave out their guineas at par. The directors, therefore, were under the necessity of laying their case before the privy council, which, after considering the circumstances of the case, issued an order authorizing the bank to discontinue the payment of their notes in cash. Considerable alarm was occasioned by this step; and committees of both houses of parliament were appointed to inquire into the state of the bank's affairs.

George III. Castiglione, Rivoli, and other places, he succeeded in sub- committee recommended a continuance of the restric- George IIL duing, by famine, Mantua, the only fortress that remain- tion; and an act was therefore passed for confirming it, ed to the Austrians in Italy. Few maritime events of much while, to render it less inconvenient, bank notes for one importance occurred. The Dutch were deprived of their and two pounds were put into circulation. As the bank whole intertropical possessions, with the exception of the of England is the medium through which the British gounhealthy but rich settlement of Batavia, in the island of vernment issues all payments, and as these payments were Java; and they also lost a squadron which they had sent made in the bank's paper, which administration might induce the directors to augment indefinitely, many persons feared and predicted that this paper would speedily sink in value when compared with gold and silver, as the French assignats and the American paper currency had done when rendered inconvertible at pleasure into specie. The stability of the British funding system, however, speedily displayed itself. The credit of the bank's paper British ministry, in order to appease the nation, found it remained unshaken, because government received it in payment of all taxes; and although depreciation soon followed, and prices necessarily rose, yet, from confidence in our resources, and a conviction of the immutability of the national faith, this depreciation was confined within narrower limits than it would have reached in other countries not so favourably circumstanced, and the credit of the paper continued unaffected by an operation which would have utterly ruined it anywhere else.

During the preceding year the emperor had received a subsidy, under the name of a loan, from the British government, and a new subsidy was now given him under a similar denomination. To supply this and the rest of the national expenses, L.27,647,000 were voted early in the session, and afterwards above fifteen millions additional were thought necessary, and voted. Two loans were negociated by government; one of sixteen millions and a half, in the usual way, from money-brokers; and another of eighteen millions, called the Loyalty Loan, from the nobility and gentry being requested to fill it up, which they did with great eagerness. The troops voted consisted of a hundred and twenty thousand seamen; sixty thousand seven hundred and sixty-five soldiers for European service, and above sixty-four thousand for the dependencies of Great Britain. As the threat of invasion was now revived, a large supplementary body of militia was levied, together with a considerable force consisting of cavalry. The interest of the two loans was provided for by taxes upon houses, stage-coaches, horses, auctions, stamps on agreements and newspapers, ornamental plate, spirits, tea, coffee, and other articles. Towards the close of the session the opposition brought forward motions to address the king to dismiss his ministers, resume the negociation with France, and repeal the two acts introduced in the preceding session, by Lord Grenville and Mr Pitt, for extending the treason laws, and imposing restrictions upon popular meetings for political purposes. They were encouraged by a variety of addresses which were presented to his majesty at this time from different parts of the country, advising him to dismiss the present ministry; but, as usual, their efforts proved unavailing.

The French had now acquired such an ascendency over the Spanish monarchy, as to induce the government of that country to declare war against Britain; and soon afterwards the Spanish fleet, amounting to twenty-seven sail of the line, attempted to join a French armament; but they were attacked by Sir John Jervis on the 14th of February, near Cape St Vincent, with only fifteen sail of the line; and four of their ships, of from seventy-four to a hundred and twelve guns, were made prizes by the British fleet. This victory may be regarded as the first of that mighty series of naval triumphs with which the name of Nelson is indissolubly associated. The British force consisted of two ships of a hundred guns, two of ninetyeight, two of ninety, eight of seventy-four, and one of

1797.

George III. Spaniards had one four-decker of a hundred and thirtysix guns, six three-deckers of a hundred and twelve, frigates and a brig. The disparity of force was therefore prodigious. The British were formed in two lines in the most compact order of sailing; and, by carrying a press of canvass, Sir John Jervis came up with the enemy's fleet at half-past eleven on the 14th, before it had time to collect and form a regular order of battle. Not a moment was to be lost; so, departing from the regular system, the British passed through their fleet, in a line formed with the utmost celerity, tacked, and thereby cut off nine ships, or one third, from the main body. The vessels thus separated attempted to form on the larboard tack; but only one of them succeeded, under cover of the smoke, which prevented her intention being discovered till she had reached the rear; whilst the others were so warmly received that they put about, and did not again appear in the action till towards its close. The admiral now made a signal to tack in succession; but Nelson, whose station was in the rear of the British line, perceiving that the Spaniards were bearing up before the wind with an intention of forming their line, going large, and joining their separated ships, or avoiding a close engagement, disobeyed the signal, without a moment's hesitation, and ordered his ship to be wore. This at once brought him in contact with the Santissima Trinidad of a hundred and thirty-six guns, the San Josef of a hundred and twelve, the Salvador del Mundo of a hundred and twelve, the San Nicolas of eighty, the San Isidro of seventy-four, another seventy-four, and another first-rate; but Trowbridge, in the Culloden, immediately joined, and nobly supported him; and for nearly an hour did the Culloden and the Captain, Nelson's ship, maintain the most terribly unequal contest recorded in the annals of naval warfare. At length the Blenheim, passing between them and the enemy, gave them a respite, while she poured in her fire upon the Spaniards. The Salvador del Mundo and San Isidro now dropped astern, and were fired into in a masterly style by the Excellent, Captain Collingwood. San Isidro struck, and the Salvador also hauled down her colours; but Collingwood, disdaining the parade of taking possession of beaten enemies, pushed on, with every sail set, to save his old friend and messmate, Nelson, in the Captain, which was at this time fired upon by three first rates, by the San Nicolas, and by a seventy-four; whilst the Blenheim was ahead, and the Culloden, crippled, astern. Ranging up in the noblest style, and hauling up his mainsail just astern, Collingwood passed within ten feet of the San Nicolas, and giving her a tremendous fire, passed on to the Santissima Trinidad. The San Nicolas then luffed up, when the San Josef fell on board her, and Nelson resumed his station abreast of them, and close alongside. But the Captain being now incapable of further service, either in the line or in chase, Nelson directed the helm to be put to starboard, and the boarders to be called up. His orders were instantly obeyed; the San Nicolas was boarded, and, after a short but sharp contest hand to hand, carried in the most brilliant manner. But a fire of pistols and musketry having been opened on the victors from the stern gallery of the San Josef, Nelson, directing his captain to send more men into the prize, gave orders for boarding that ship from the San Nicolas; and, leading the way himself, exclaiming "Victory or Westminster Abbey!" the thing was executed in an instant, with an energy and enthusiasm which rendered all resistance hopeless. But the Spaniards had still eighteen or nineteen ships which had suffered little or no injury; and as the part of the leet which had been separated from the main body in the

Reign of sixty-four, with four frigates, a sloop, and a cutter. The morning was now coming up, Sir John Jervis made signal Reign of to bring to. If the enemy had chosen at this moment to George III avail themselves of their great superiority of force, the two eighty-fours, and eighteen seventy-fours; with ten situation of the British admiral would have been most critical. His ships could not have formed without abandoning those which they had captured, and running to leeward; the Captain was lying a perfect wreck on board her two prizes, with her fore-topmast shot away, and not a sail, shroud, or rope left, while her wheel was smashed; and many of the other ships were so shattered in their masts and rigging as to be wholly unmanageable. But the Spanish admiral, Don Josef de Cordova, having inquired of his captains whether they judged it proper to renew the action, and nine having answered in the negative, whilst others gave their opinion in favour of delay, abandoned all idea of recommencing the battle, and drew off, leaving the British in possession of the prizes which they had so gallantly won. For this victory the commander-in-chief was rewarded with the title of Earl St Vincent, and Rearadmiral Nelson had the order of the Bath given him. It was his skilful and daring disobedience of orders which rendered the battle decisive.

> At the commencement of the summer an event occurred which, had the French been prepared to attempt an invasion of this country, might have been productive of serious evils. This was a mutiny in the fleet. Gross impositions had for some time been practised upon the seamen, both as to the quantity and quality of the provisions allowed them; and they had made an anonymous application for redress to Earl Howe. But the application was disregarded, because the strictness of discipline prevented the open avowal or appearance of discontent, which his lordship inconsiderately supposed had no existence; and the seamen, disappointed of the expected relief, resolved to enforce the consideration of their claims. Accordingly, when orders were given to prepare for putting to sea, the crew of the Queen Charlotte, and other ships lying at Spithead, refused to act; and treating with contempt the remonstrances of the officers, they made choice of delegates, who after a formal consultation drew up petitions to the board of admiralty and the House of Commons. Earl Spencer, first lord of the admiralty, dreading a dangerous mutiny, and not thinking the demands of the seamen unreasonable, promised compliance; and the king readily offered full pardon to all who should immediately return to their duty. But the seamen would not be satisfied till the parliament had confirmed the promises of the admiralty; and as some delay thus ensued, the irritation of their minds led to a contest with Vice-admiral Colpoys, in which some lives were lost. An act, however, was passed for the gratification of the seamen in point both of pay and provisions; and subordination was restored at Spithead and Plymouth. The concession of these claims encouraged the seamen at the Nore to insist on a more punctual discharge of arrears, a more equal distribution of prize-money, and a general abatement of the severity of discipline. A council of delegates was elected, at the head of which was a seaman named Richard Parker, who took the command of the fleet, and prevailed upon the men to reject repeated offers of pardon. He robbed two merchant ships of provisions, obstructed trade by the detention of other vessels, and fired on some ships of war which refused to accede to the mutinous combination. An act of parliament was passed in the beginning of June, denouncing capital punishment against all who should hold intercourse with the rebellious ships, or voluntarily continue on board; and as the public strongly disapproved of this last mutiny, for which no excuse could be offered, the seamen gradually returned to their duty. Parker was apprehended, and, along with several other mutineers, punished with death; and a

George III. the greater part of them were pardoned.

During the summer the port of Cadiz was blockaded by the British fleet under Sir John Jervis, now Earl St an end to all dread of invasion. Vincent; and an attempt was made against the Spanish island of Teneriffe, but without success. Meanwhile another fleet under Admiral Duncan watched the Texel; but the blockading force having retired for a short time, the Dutch fleet, under Admiral De Winter, put to sea. Intelligence of this event having been brought to Admiral Duncan at Yarmouth, he instantly proceeded in quest preliminaries of peace at Leoben, on the 18th of April, of the enemy; and about eleven o'clock in the forenoon of the 11th October 1797 he got sight of the squadron which had been left to watch their motions, and which displayed signals of an enemy to leeward. Admiral Duncan immediately made signal for a general chase, and soon got sight of the Dutch, forming in a line on the starboard tack to receive him, the land between Camperdown and Egmont being then about nine miles to the leeward. On making this discovery, he shortened sail to connect the squadron; and finding there was no time to be lost in making the attack, he made signal to bear up, break the enemy's line, and engage each ship her opponent to leeward, without waiting to form the line of battle. The order was promptly and gallantly obeyed; Vice-admiral Onslow, in the Monarch, bore down on the enemy's rear, his division following his example; and about forty minutes past twelve o'clock the battle commenced. Admiral Duncan, in the Venerable, also passed through the enemy's line, at the head of his division, and began a close action with the enemy's van, which lasted two hours and a half, when all the masts of the Dutch admiral's ship were observed to go by the board, and she not long afterwards struck to her opponent. The Dutch vice-admiral's ship being also dismasted, surrendered to Vice-admiral Onslow, and nine others became the prizes of the conquerors. The battle was obstinate and sanguinary; but its decisive results may be ascribed to the bold manœuvre of instantly pushing between the enemy and the land, to which they were fast approaching. Had Admiral Duncan waited to form line of battle, in the ordinary way, there either would have been no action at all, or if the British had attacked, the Dutch admiral, by getting nearer to the shore, would probably have drawn both fleets on it, which would have been a victory to him. The force on both sides was nearly equal, each squadron consisting of sixteen ships of two decks; but of the British not more than ten ships were seriously engaged, and these captured eleven of the enemy. Had Admiral Duncan's fleet been composed of the same materials as Lord St Vincent's, every Dutch ship would have been taken; and the same result would have followed had all the ships followed the example set them by the Venerable. The fact is, however, that the British squadron was composed of very indifferent and inadequate vessels, many of them having been intended for Indiamen; and that it was otherwise in many respects ill conditioned and deficient; but there was no want of gallantry on the part of the crews, and

Reign of considerable number were also condemned after trial, but away, a seaman of the name of Crawford nailed the flag Reign of to the top-mast head. This victory excited the most George III lively joy in the British nation, from its tendency to put 1797.

While their allies, or rather subjects, were suffering these disasters by sea, the French armies triumphed on the Continent. Bonaparte advanced from Italy against the centre of the Austrian dominions, and, after several sanguinary conflicts, crossed the Alps where they approach the frontiers of Hungary, and forced the emperor to conclude which were followed by a definitive treaty, signed at Campo Formio, near Udine, on the 17th of October. The emperor acquired the city of Venice; but he relinquished the Milanese and the Netherlands, and, by secret articles, consented that the Rhine should form the boundary of France. Britain being now left alone in the contest into which she had originally entered as an auxiliary to Austria and Prussia, the government opened a negociation towards the close of the summer; and as both the French and British nations eagerly wished for a termination of this sanguinary contest, it is probable that administration seriously wished to conclude a treaty; but at this time a party, headed by the director Barras, had gained the ascendency in France, and resolved to continue the war. A demand was therefore made that Britain should renounce every conquest as a preliminary to negociation, whilst France reserved a right to make further demands; and on this being refused, the British ambassador, Lord Malmesbury, was dismissed from Lisle, where the negociations had been opened.

Parliament assembled on the 2d of November. In the speech from the throne his majesty stated his concern that his endeavours to restore peace had been rendered ineffectual, and expressed the fullest reliance on the magnanimity and courage of the people. During this session of parliament few or none of the members of opposition attended. At the close of the preceding session they had declared it to be their intention to retire from parliament; and they justified their conduct by alleging that, in times when every man who censured the measures of administration was regarded as in league with the enemy, it was equally painful and useless to incur such odium; that if they declared their sentiments, they were proclaimed as the enemies of the king, and if they tacitly acquiesced in the measures of the minister, they voluntarily took upon themselves a share of the responsibility; that they had done their utmost to prevent the war, and had urged repeatedly the necessity of bringing it to a speedy termination, without persuading their opponents; that events must now take their natural course; and that as they could not aid by their counsel, it should not be said that they embarrassed by their opposition. This retirement of opposition was much resented, and spoken of with great bitterness, by the friends of administration, as it suggested to the nation the idea that government was conducted by the power of the crown alone, unchecked by any discussion of its measures in the two legislative assemblies.

The inability of the bank of England to pay upon dewhen the main-top-gallant mast of the Venerable was shot mand its notes in specie, according to ancient custom and

¹ The following characteristic anecdote has been related of an officer who distinguished himself by his gallantry in this action. Captain Inglis of the Belliqueux of sixty-four guns, owing either to long absence from the service, or to an inaptitude not very uncommon among naval officers of the old school, had neglected to make himself master of the signal-book; and on the morning of uncommon among haval officers of the old school, had neglected to make himself master of the signal-book; and on the morning of the day of battle, when it became necessary to act with promptitude, in obedience to the signals, he found himself more puzzled than enlightened by it. After poring over it for some time, without being in any degree benefited by the perusal, he threw it with contempt upon the deck, exclaiming in broad Scotch, "Damn me, up wi't he hellem and gang into the middle o't." These words are instinct with the true spirit of battle, and show that Captain Inglis bravely anticipated the remedy in such cases provided by Nelson, who, in his celebrated memorandum on the eve of the mighty combat of Trafalgar, observes, that "if a captain should be at a loss, he cannot do very wrong if he lay his ship alongside of the enemy." In strict conformity with this doctrine, the Belliqueux lost no time in "ganging into the middle o't," by attacking the enemy's van, which she contributed to throw into confusion, although she got rather roughly treated by them before she could be supported.

Reign of the terms of the obligation contained in these notes, ap-George III. pears now to have created in Mr Pitt's mind some dread respecting the funding system, and an apprehension, that from the immense sums annually borrowed, and the corresponding quantity of paper-money necessarily issued to pay the interest of the loans, the system might be carried so far as to discredit the paper-money issued in the name of the bank of England. And this apprehension was strengthened by a fact, of which everybody was daily becoming more sensible, namely, that the money price of all kinds of property in Great Britain had rapidly risen during the war; and this rise of price was justly ascribed to a gradual sinking in the value of money, or of paper, the only money used in Britain, in consequence of its too great abundance. Mr Pitt therefore proposed, instead of borrowing the whole sum necessary to defray the expense of the war, and imposing no more taxes than were requisite to pay the interest of the loan, that heavier taxes should be imposed, in order to defray a portion of the extraordinary expenditure. Accordingly an act was passed for raising seven millions within the year; and this was to be effected by augmenting the assessed taxes, but so as not to compel any individual to pay more than one tenth of his income. The leading members of opposition attended to oppose this extraordinary measure, but without effect.

> As the French were now disencumbered of all other adversaries, it was naturally expected that they would turn their arms in a more direct manner than formerly against the British empire. The result of the combination of the states of Europe for the partition of France had been extremely disastrous, and had left the new republic in possession of an extent of territory which the ablest and most ambitious of the French monarchs had in vain aspired to possess. The command which they had now obtained of Holland rendered France more dangerous than formerly, by the superior means of invasion which an additional extent of coast and the possession of a large quantity of shipping might afford; and had the French navy been less weak, or the French rulers possessed of greater ability, a dangerous crisis in the history of Great Britain might at this period have occurred. It never was the interest of any British administration to conceal from the public at large the possibility of a foreign invasion; and as the French government at this time boasted of their intention to make such an attempt, and ordered a considerable army to advance to the sea coast, it became the duty of ministers in Great Britain to make preparations to resist any such effort. Accordingly they came forward in parliament to propose measures of defence; and the danger with which the nation considered itself as threatened obliged all men in some measure still to adhere to an administration which in other respects might have lost their popularity from the ill success of their late measures. On the 8th of February 1798 Mr Dundas introduced into the House of Commons a bill to enable the king to incorporate in the regular militia a portion of the supplementary militia. And this bill being passed with little debate, the same minister, on the 27th of March, moved for leave to bring in another, to enable his majesty to provide for the security and defence of these realms, and to indemnify persons who might suffer injury in their property by the operation of such measures. The object of this bill was to provide for every possible emergency, by giving a power to his majesty to discover what persons were prepared to appear in arms and to be embodied for the public defence; and also to ascertain what number of the inhabitants of certain districts would be able to act as pioneers, or in other laborious situations. The other provisions were, that in the event of its being necessary to employ persons as pioneers to remove stock, or assist in facilitating the carriage of

military stores, proper compensation would be made; and Reign of the bill was also intended to give a power of embodying a George III. portion of the regular militia, and employing them in the defence of the country. This bill was passed into a law after some unimportant debates, the principal members of opposition not usually attending.

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As it was supposed that the war, on the part of Britain, would occasion greater expense than when all Europe had been engaged in it along with her, the supplies were augmented to L.35,000,000; and, with a view to draw resources from distant parts of the country, instead of raising large loans for the public service, which were negociated in London alone, Mr Pitt brought forward a scheme by which proprietors of land were enabled to redeem the land-tax; in other words, the owner of land, and, failing him, any other person, was to be permitted to purchase this tax, by a transfer of stock, which produced a dividend greater than the amount of the impost. The measure became law, but produced little immediate effect.

On the 25th of May Mr Pitt brought forward a bill in the House of Commons, with a view to increase the navy, and to resist with greater success the threatened invasion. On this occasion an event occurred, which indicated, that by the long possession of power, and the support he had received from the nation, Mr Pitt had suffered to grow upon him a certain haughtiness of manner and impatience of contradiction, which, in former times, would have proved extremely inconvenient to a British minister. On the subject of his proposed bill, he observed, that the object he had in view was to suspend, for a limited time, the protections which various descriptions of persons enjoyed, to prevent them from being impressed into the service of the navy; and he stated it as his wish that the bill should that day pass through its different stages, with a suitable pause at each if required, and that it should be sent to the Lords for their concurrence. Mr Tierney remarked on the very extraordinary manner in which Mr Pitt called upon the house to adopt this measure. He had imagined that the augmentation of the navy was to be provided for in the usual way; or, if any very uncommon mode was to be resorted to for the attainment of that object, that notice would have been given to the house. He had heard no arguments that proved its propriety; and even if he had, some time ought to have been allowed to weigh the force of such arguments, before proceeding to give three or four votes on a measure, of which no notice of any kind had been given. If the ministers persisted in hurrying the bill through the house in the manner proposed, he must give it a decided negative; and, indeed, from what he had already seen, he must view all their measures as hostile to the liberties of the subjects of this country. Mr Pitt replied, that if every measure adopted against the designs of France was to be considered as hostile to the liberty of this country, then indeed his idea of liberty differed widely from that of the honourable gentleman. He observed that he had given notice before of the present motion, and that if it were not passed in a day, those whom it concerned might elude its effects. But if the measure was necessary, and if a notice of it would enable its effects to be eluded, how could the honourable gentleman's opposition be accounted for, except from a desire to obstruct the defence of the country? Mr Tierney called Mr Pitt to order; and the Speaker observed, that whatever had a tendency to throw suspicion on the sentiments of a member, if conveyed in language that clearly marked that intention, was certainly irregular. Mr Pitt replied, that if the house waited for his explanation, he feared it must wait a long time. He knew very well that it was unparliamentary to state the motives that actuated the opinions of gentlemen; but it was impossible to go into arguments in favour of a

Reign of question, without sometimes hinting at the motives that gociation carried on at Rastadt, between the French di-Reign of George III. induced an opposition to it. He submitted to the judgment of the house the propriety of what he argued; and he would not depart from any thing he had advanced, by either retracting or explaining it. The result of this altercation was a duel on the following Sunday between Mr Pitt and Mr Tierney. They went to Putney Heath, attended by seconds, and, standing at the distance of twelve paces, fired two shots each; but Mr Pitt discharged his second pistol in the air, upon which the seconds in-

terfered, and thus the affair terminated.

During the summer of this year a rebellion broke out in Ireland, the particulars of which will be stated in their proper place. The enthusiasm which the French revolution had kindled in so many quarters of Europe extended itself to Ireland. There, some men of ardent imaginations, chiefly Protestant dissenters, persuaded themselves that they could regenerate their country, cast off the dominion of Great Britain, heal the unhappy divisions among the inhabitants of Ireland, and convert it into an independent republic. As early as the year 1793 these persons formed themselves into a society, under the name of the United Irishmen, and were gradually joined by a very large proportion of the population of the country. They applied for aid from France; and it was in consequence of their urgent invitation that the unsuccessful expedition under General Hoche was undertaken. From that period the country remained in a state of the greatest alarm. On the one side rigorous laws were enacted, and every effort was made, by severity of punishment, to repress all appearance of opposition to the existing government; whilst, on the other, the common people busied themselves in the fabrication and concealment of pikes, or broke into the houses of country gentlemen, to seize whatever fire-arms they could discover. The schemes of the disaffected party were greatly disconcerted by the discovery and apprehension of their principal leaders. A rebellion, however, actually broke out; but, though attended with considerable destruction of human lives and of property, it was of a partial nature, and speedily suppressed. During its existence some circumstances occurred which completely demonstrated of how visionary a nature had been the schemes of those persons who hoped to establish in Ireland an independent government upon any basis that could afford a tolerable hope of national prosperity. The disaffected party among the Protestants, too weak to be able of themselves either to shake off the dominion of Great Britain, or to assume the ascendency in Ireland, were under the necessity of calling in the aid of the Roman Catholics, who constitute the great mass of Irish population; and they were the more readily induced to do so, from a notion, which of late years had very generally gained ground in Europe, that religious sentiments form no proper ground of distinction in civil society, and from perceiving the facility with which the Catholics of France had set at defiance the religion of their fathers, when placed in competition with what they accounted the interests of freedom, or the means of aggrandisement to their country. But it speedily appeared that these new maxims of conduct could not be adopted by the superstitious and illiterate peasantry of Ireland. The Catholics were no sooner in arms than their chief animosity came to be directed, not against the dominion of Britain, nor against any form of civil government, but against their own countrymen of the Protestant faith, who must thus ultimately have fallen a sacrifice to the success of their own schemes. In short, it became evident that Ireland could not possibly exist in tranquillity, or with safety to the Protestant part of its inhabitants, independent of the supremacy of Great Britain.

Upon the Continent, the world was amused with a ne- ambition was already accounted dangerous, formed a de-

rectory and the German empire. It was conducted with George III. much slowness, and ultimately proved ineffectual. But whilst it was in progress, the French government, having contrived to quarrel with the Swiss cantons, invaded and seized their country, and converted it into a new republic, under their own influence. Austria, however, had been so much humbled by recent losses, that she did not venture, on this occasion, to assert the independence of Switzerland, although it must have been evident that her own independence was ultimately connected with that object. Switzerland consists of a vast assemblage of lofty and precipitous mountains, situated in such a manner as to divide the most important countries of Europe from each other. On one side these mountains look down upon the fertile territory of Italy; to the north they command the very centre of Germany; and to the west they are bounded by France. For ages they have been inhabited by a virtuous and fearless race of people, divided into petty communities, who contented themselves with maintaining their own independence; and though, as individuals, they entered into the military service of the neighbouring princes, yet, as a people, they had long ceased to take any part in the wars of Europe. For some centuries the independence of Switzerland proved the chief basis of the independence of the neighbouring nations. All parties respected and avoided any dispute with the Swiss, in a war against whom much might be lost, but nothing could be won. Accordingly, when the French attacked the Austrians, and when the Austrians attacked the French, the assailing party was under the necessity of sending its armies to a great distance from the centre of its own power. If defeated, the march homewards was long and difficult; whilst, even if tolerably successful, the attack never proved seriously dangerous, in consequence of its having been made in a remote quarter with limited means Hence, in 1796, when the French generals Moreau and Jourdan marched through Suabia and Franconia to invade Austria, the length of their march afforded many opportunities of attacking them with success; and the invaded country had full leisure to call forth its whole resources against them. The result was, that when Jourdan sustained a defeat, the retreat of the other army became almost impracticable; and hence arose the unbounded reputation acquired by Moreau for accomplishing it with success. Had the French at that period occupied Switzerland, the retreat of Moreau would have been attended with little or no difficulty; because, by retiring into that rugged country, he could easily have made a stand against a very superior force for a considerable time, till he had received reinforcements. For the future, therefore, by commencing a war of invasion against Austria, not upon the frontiers contiguous to France, but at the eastern extremity of the Swiss mountains, the French, if successful, might reach the gates of Vienna in a few weeks. The independence of Switzerland, by placing these nations at a distance from each other, had hitherto prevented such an enterprise from being carried into effect; and the present removal of that barrier by the French directory, during a period of peace with Austria, displayed, upon their part, a correct knowledge of the cause which had at all times set bounds to the ambition of France, and at the same time evinced a determined spirit of hostility against the independence of the surrounding states.

Meanwhile the weakness of the French navy rendered it impossible for them to engage in any serious attack against the European part of the British empire. The French government, however, with the double view of attacking the rich empire which Britain had acquired in Asia, and of removing a successful military chief, whose

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George III. and colonize Egypt. To accomplish this scheme with the greater safety, the threats of invading England were loudly renewed; the troops stationed on the coast were denominated the Army of England; and Bonaparte being now appointed their commander, visited them in person. But suddenly departing, he embarked at Toulon with a powerful army, before his intentions were suspected in Great Britain; Malta was surrendered to him on his passage; and departing thence, he landed in safety in the vicinity of Alexandria, and soon made himself master of all Egypt. Here, however, his successes terminated. He was closely pursued by a British fleet under Admiral Nelson; and the French admiral, Brueys, having remained at anchor near the shore in the Bay of Aboukir, afforded an opportunity for the British navy to earn one of its proudest and most decisive triumphs.

Why Bonaparte, having effected a landing in Egypt, should not have suffered the fleet to return, has never been explained. He accused Admiral Brueys, after that officer's death, of having lingered on the coast, contrary to orders; and the same charge is repeated in the memoirs which he transmitted from the place of his exile. But it is scarcely credible that any officer, situated as Brueys was, would have incurred the heavy responsibility which such disobedience incurs; and the more probable supposition therefore seems to be, that the fleet was detained by Bonaparte's orders. It arrived at Alexandria on the first of July; and Brueys, not being able to enter the port which time had ruined, moored his ships in Aboukir Bay, in a strong and compact line of battle; the headmost vessel being close to the shoal on the north-west of the bay, and the rest of the fleet forming a curve along the line of deep water, so as not to be turned by any means in the south-west. He had in fact made the best of his situation, and chosen the strongest position which he could possibly take in an open roadstead; so much so, indeed, that the commissary of the fleet thought they were moored in such a manner as to bid defiance to a force double their own. Besides, the advantage of numbers, in ships, guns, and men, was in favour of the French. They had thirteen ships of the line and four frigates, carrying eleven hundred and ninety-six guns, and eleven thousand two hundred and thirty men. The English had the same number of ships of the line, and one fifty-gun ship, the Leander, carrying only a thousand and twelve guns, and eight thousand and eighty-six men. The French had one threedecker of a hundred and twenty guns, and three eightygun ships; whilst the English ships were all seventy-fours. The moment Nelson perceived the position of the enemy, his intuitive genius suggested to him the decisive conception, that where there was room for a French ship to swing, there was room for an English ship to anchor; and the plan he accordingly adopted was to keep entirely on the exterior side of the French, and station his ships, as far as he was able, one on the outer bow, and another on the outer quarter of each of the enemy's, thus doubling on them in the way which had been projected by Lord Howe when he intended to attack the French fleet at their anchorage in Gourjean road.

As the British squadron advanced the enemy opened a fire from the starboard side of their whole line into the bows of the leading ships. It was received in silence and with stern composure; whilst the men on board of every ship were employed aloft in furling the sails, and below in tending the braces, and making ready for anchoring. Captain Foley led the way in the Goliath, outsailing the Zealous, which for some minutes disputed the post of honour with him; and intending to fix himself on the inner bow of the Guerrier, kept as near the edge of the

Reign of sign of sending Bonaparte, with an army, to seize upon shoal as the depth of water would admit; but his anchor Reign of hung, and having opened his fire, he drifted to the second George III, ship, the Conquérant, before it was clear, then anchored by the stern inside of her, and in ten minutes shot away her masts. Captain Hood in the Zealous took the station which the Goliath intended to have occupied, and in twelve minutes totally disabled the Guerrier. The Orion, Sir James Saumarez, next passed to windward of the Zealous, discharging her larboard guns as long as they bore on the Guerrier; and running inside the Goliath, sunk a frigate which annoyed her, hauled round towards the French line, and anchoring inside between the fifth and sixth ships from the Guerrier, took her station on the larboard bow of the Franklin and the larboard quarter of the Peuple Souverain, receiving and returning the fire of both. The Audacious, Captain Gould, pouring in a heavy fire into the Guerrier and the Conquérant, fixed herself on the larboard bow of the latter, and, when that ship struck, passed on to the Peuple Souverain. The Theseus, Captain Millar, followed, and having brought down the Guerrier's main and mizzen masts, anchored inside the Spartiate, the third ship of the enemy's line. The sun was now nearly down; but Nelson's decisive manœuvre had already been completely executed in its most critical parts.

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The Vanguard, bearing the admiral's flag, and leading his division, now anchored on the outside of the enemy's line, within half-pistol-shot of the Spartiate, and veering half a cable, instantly opened a tremendous fire, under cover of which the Minotaur, Bellerophon, Defence, and Majestic, passed ahead to occupy their several stations. On this side the French were completely prepared; and in a few minutes every man stationed at the first six guns in the fore part of the Vanguard's deck was either killed or wounded. The Minotaur anchored next ahead of the Vanguard, and took off the fire of the Aquilon, the fourth in the enemy's line. The Bellerophon passed ahead and anchored by the stern on the starboard bow of the Orient of a hundred and twenty guns, Brueys' own ship, and the seventh in the line, "whose difference of force was in proportion of more than seven to three, and whose weight of ball from the lower deck alone exceeded that from the whole broadside of the Bellerophon." The Defence took her station ahead of the Minotaur, and engaged the enemy's sixth ship, the Franklin, by which judicious proceeding the British line remained unbroken. The Majestic having got entangled with the main rigging of one of the French ships astern of the Orient, suffered severely from the heavy fire of that three-decker; but she at length swung clear, and engaging the Heureux, or ninth ship, on the starboard bow, received also the fire of the Tonnant, which was the eighth in their line. The remaining four ships of the British squadron, having been detached previous to the discovery of the French, were at a considerable distance when the action commenced, which was at half past six; and as night closed about seven, they had no other light to guide them in going into action than the fire of the contending fleets.

Trowbridge in the Culloden, the foremost of the remaining ships, being two leagues astern, came on sounding as the others had done; but as he advanced the darkness increased the difficulty of the navigation; and suddenly, after having found eleven fathoms water, and before the lead could be hove again, he was fast aground; nor could all exertions get off the ship in time to bear a part in the action. This accident, however, proved in some degree fortunate, since the Culloden served as a beacon to the Alexander and Swiftsure, which would otherwise have gone upon the reef, and thus enabled them to enter the bay and take their stations in the darkness. As the Swiftsure was bearing down she fell in with what at first

Reign of seemed to be a strange sail, but proved to be the Belle- vereignty of the Roman empire was decided, no naval vic- Reign of George III. rophon, which, overpowered by the Orient, was now drifting out of the line towards the lee side of the bay, with her sails hanging loose, her lights knocked overboard, nearly two hundred of her crew killed or wounded, and all her masts and cables shot away. Suspecting how it was, Captain Hallowell, with great judgment, abstained from firing; and occupying with the Swiftsure the station of the disabled ship, he opened a heavy fire on the quarter of the Franklin and the bows of the French admiral; whilst Captain Ball, in the Alexander, passed under the stern of the Orient, and anchoring within side on her larboard quarter, raked her, at the same time keeping up a severe fire of musketry on her decks. Lastly, the Leander, finding nothing could be done to get off the Culloden, advanced with the intention of anchoring athwart hawse of the Orient; but the Franklin being so near ahead that there was not room for him to pass clear of the two, he took his station athwart hawse of the latter.

This description will serve to convey an accurate idea both of the plan of attack and of the mode in which it was carried into execution. Though fiercely contested and sanguinary, the issue of the battle was never for an instant doubtful. The first two ships of the French line had been dismasted within a quarter of an hour after the commencement of the action, and the others had suffered so severely that victory was already certain. At half past eight o'clock the third, fourth, and fifth, were taken possession of; and about nine a fire broke out in the Orient, which soon mastered the ship, illuminating the contending fleets with the light of the conflagration. About ten o'clock the ship blew up with an explosion so tremendous that the firing immediately ceased on both sides, and for a time no sound was heard to break this awful pause, except the dash of her shattered yards, masts, and timbers falling into the water from the great height to which they had been projected. The firing recommenced with the ships to the leeward of the centre; and at daybreak the Guillaume Tell and the Généreux, the two rear ships of the enemy, formed the only portion of their line which had colours flying. Not having been engaged, these ships cut their cables in the forenoon and stood out to sea, accompanied by two frigates, being the only portion of the enemy's fleet which escaped. It is needless to add that the victory was complete. Of thirteen sail of the line, nine were taken and two burnt; and of four frigates one was burnt and another sunk. The British loss in killed and wounded amounted to eight hundred and ninety-five; while of the French three thousand one hundred and five, including the wounded, were sent on shore by cartel, and five thousand two hundred and twenty-five perished. About two hours after the commencement of the action, Nelson received a severe wound on the head from a piece of langridge shot; and Captain Westcott of the Majestic fell. Brueys was killed before the fire broke out which destroyed his noble vessel. He had received three wounds, yet would not leave his post; but a fourth cut him almost in twain, and he died like a hero on the deck. From the description of this battle, or rather naval conquest, it must be obvious that its triumphant success was owing to a skilful repetition, with necessary variations, of the manœuvre which had decided the victory at Camperdown; and in fact Nelson, although not acquainted with Lord Duncan, wrote to him, soon after the battle, to tell his lordship how "he had profited by his example."1

From the time of the battle of Actium, by which the so-

tory was ever attended with consequences so immediately George III and obviously important as this. The French directory had concealed their intended enterprise from the Ottoman Porte, which lays claim to the sovereignty of Egypt, but has never been able to make its claim fully effectual. The grand signior, however, considered the present attempt as an act of hostility against himself; and the maritime victory above mentioned encouraged him to declare war, in the name of all true Mahommedan believers, against that host of infidels which had invaded the land from which the sacred territory of Mecca is supplied with bread. In Europe similar consequences took place. The irresistible career of Bonaparte had compelled Austria to submit to peace, upon terms which left France in a state of most dangerous aggrandizement. But as this victorious chief, with the best part of his veteran army, was now held under blockade by the British fleet in a distant country, the hopes of Austria began to revive, and there seemed reason to expect, that by renewing the contest, her ancient rank in Europe might be recovered. The king of Naples entered into these views with great eagerness, and rashly declared war against France, without waiting for, and following, as he ought, the movements of the greater powers. The empress of Russia was now dead, and her son Paul had succeeded to the throne of the Czars. The empress had never contributed more than her good wishes towards the war which the other powers of Europe had waged against France; but her son, a man of a furious and passionate character, had not the sense to follow the same cautious policy, or to remain a quiet

spectator of the issue of a contest against the French

republic; and, encouraged by the naval victory of the Nile,

which seemed to insure the absence of Bonaparte and his

army, he declared his willingness, as far as his finances

would permit, to join in a new combination against France. Thus, by the victory of the Nile, Great Britain was enabled to procure allies, willing to send abundance of troops against her enemy, provided she consented to defray the necessary expense. In the mean time, the acquisitions and losses of Britain were nearly equally balanced in other quarters. An armament sailed towards the island of Minorca, and a descent was effected near the creek of Addaya. Here a body of Spaniards threatened to surround the first division of the invading army; but they were soon repulsed, and our troops gained a position from which they might have attacked the enemy with advantage, if the latter had not retired in the evening. The army seized the post of Mescadal, and a detachment took the town of Mahon and Fort Charles. It was expected that the principal stand would have been made at Civadella, where new works had been added to the old fortifications; but the approach of the English drove the Spaniards within the walls of the town, and General Stewart summoned the governor to surrender it without delay. Intimidated by the movements of the troops and the appearance of the squadron, the garrison capitulated, and thus the whole island was reduced without the loss of a single man. But towards the end of the same year, the British troops, which during a considerable length of time had occupied a great number of positions upon the coast of the island of St Domingo, found it necessary to abandon the whole. The power of the French government there had nearly been annihilated by a negro commander, Toussaint-Louverture, to whom the British surrendered Port-au-Prince and St Marc. The losses incurred in consequence of the un-

¹ Ekins' Naval Battles, pp. 234, 237. Southey's Life of Nelson, vol. i. p. 220 et seqq. We beg here, once for all, to acknowledge our obligations to this admirable and authentic biography for the principal materials of our condensed accounts of the battle off Cape St Vincent, the attack on Copenhagen, and the mighty crowning achievement of Trafalgar.

Reign of fortunate attempt made by the British government to sub- an estimate of its produce. He was of opinion that the Reign of George III. jugate this island were immense.

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Parliament assembled on the 20th of November; and in the speech from the throne it was observed, that the success which had attended our arms during the course of the present year had been productive of the happiest consequences, and promoted the prosperity of the country; that our naval triumphs had received fresh splendour from the memorable action in which Lord Nelson had attacked a superior enemy, and turned an extravagant enterprise to the confusion of its authors; that the magnanimity of the emperor of Russia and the vigour of the Ottoman Porte had shown that these powers were impressed with a just sense of the present crisis; that their example would be an encouragement to other states to adopt that line of conduct which was alone consistent with security and honour; that our preparatious at home had deterred the enemy from attempting to invade our coasts; that in Ireland the rebellion had been suppressed; that under the pressure of protracted war, the produce of the public revenue had been fully adequate to the increase of our permanent expenditure; that the national credit had been improved, and commerce flourished in a degree formerly unknown. The debates which occurred in the House of Commons upon this occasion were not remarkably interesting, as the leading members of the old opposition by Mr Tierney, Sir Francis Burdett, Sir John Sinclair, and ley moved the usual address to the throne, which was seconded by Lord Craven.

As a prospect had now opened of reviving, upon a most extensive scale, the continental war against France, it became necessary to provide great pecuniary resources to subsidize the armies which were to be brought forward, especially by the Russians, the poverty of whose country could ill afford to sustain the expense of supporting armies in Italy or on the banks of the Rhine. The same difficulties, upon this subject, nobody regarded his neighbour as unor rather doubts, however, concerning the prudence of carrying to its utmost length the British practice of borrowing money to defray the extraordinary expense incurred during each year of the war, which had led to an augmentation of what are called the assessed taxes, still induced the minister to attempt to raise a proportion of the extraordinary or war expenditure within the year, not by a loan, but by taxes to the requisite amount. With this view he brought forward what was accounted a very bold measure, namely, a project for imposing a general tax upon the income of every individual throughout the nation. Mr Pitt stated in the House of Commons his plan to be, that no one whose income was less than sixty pounds per annum should be obliged to contribute more than the taxes he already paid; but that every one who had an income of or beyond that amount should be additionally burdened, some in the proportion of ten per cent. and others at a lower rate. All who had two hundred pounds a year would be required to sign a declaration of their willingness to pay a certain sum, not less than a tenth part of their income, without particularizing the modes in which it accrued; and a scale of easy computation would be adjusted for the rest. If doubts of the fairness of the statement should arise, the commissioners might summon an individual before them, and demand upon oath a minute specification of his income; and if, on a continuance of suspicion, full proof of accuracy should not be adduced, they might fix the amount of contribution. If they should require more than a tenth, no relief would be allowed unless the books of the tradesplan, Mr Pitt mentioned the data upon which he formed by the identity of the executive power; a very insufficient

annual rent of all the land in England and Wales amount-George III. ed to twenty-five millions of pounds sterling; a sum which, by the allowance of a fifth part for the exceptions under sixty pounds, and the modifications under two hundred pounds a-year, would be reduced to twenty millions. Six millions, he thought, might be assumed as the clear income of the land to tenants, the tithes might be valued at four millions, the produce of mines, canals, and the like, at three, the rents of houses at five, and the profits of the liberal professions at two; on all these heads it might be sufficient to allow an eighth part for Scotland, which would be five millions. Income drawn from possessions beyond seas might be stated at five millions; annuities from the public funds at twelve; and those of internal trade, mechanical skill, and industry, at twenty-eight millions. These calculations formed an aggregate of a hundred and two millions; and from this source about ten millions of supply were expected to arise. This measure was opposed, without success, by Mr Tierney, Sir John Sinclair, Mr Pulteney, and others. Its chief defects were its inequality in point of principle, and the falsehood it occasioned with a view to evade it when carried into practice. Its inequality in point of principle is extremely obvious; because, under the tax upon income, a man without capital who earned two hundred pounds per annum by his industry, paid the same were usually absent. Administration was chiefly opposed tax to government with a man living in idleness and enjoying a revenue of the same amount upon a land estate. Sir William Pulteney. In the House of Lords, Earl Darn- In its collection this tax presented to merchants, and all other persons whose income depends upon their own industry, a powerful temptation to represent the amount of

the latter as extremely low. It was expected, indeed, that the vanity of appearing wealthy and prosperous would counteract this tendency; but it was soon found that, in a com-

mercial community, the love of gain is not easily subdued

by any other passion; and as a general understanding soon

prevailed among men with regard to each other's feelings

prosperous, merely because he had reported his own income to government at a low rate.

The fear of a French invasion had in a former age induced the English nation so far to overcome their own prejudices as to consent to an incorporating union with Scotland. The rebellion in Ireland, together with the dread that by means of French aid Ireland might be dismembered from the British empire, as the American colonies had been, now produced a sense of the necessity of doing that which ought to have been done three centuries before this date; that is, of uniting Ireland to Britain, by incorporating into one the heretofore distinct legislatures of the two islands. The measure was at this period very practicable, because Ireland was in fact under the dominion of forty thousand troops, who had been collected to crush the rebellion, and protect the island against the French; and because the friends of government were too much intimidated by the confusion and the scenes of bloodshed which had recently occurred there, to venture to oppose vigorously a measure which promised for the future to preserve the tranquillity of the country inviolate. On the 31st of January Mr Pitt proposed the measure in the British House of Commons. He observed, that a permanent connection between Britain and Ireland was essential to the true interests of both countries; and that, unless the existing connection should be improved, there was great risk of a separation. The settlement of the year 1782 was so imperfect, that it substituted nothing for that system which it demolished; and it was not considermen, or the ordinary accounts kept by others, should be ed as final even by the ministers of the time. It left the submitted to inspection. Having stated the outlines of his two realms with independent legislatures, connected only

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nection; and if the two parliaments had differed on the subject of the war, the danger of a disjunction would have been seriously alarming. The entire dissociation of the kingdom was one of the greatest aims of our enemies; and as their eventual success in Ireland would expose Britain to extreme peril, the establishment of an incorporative union, by which their views might be effectually baffled, was a necessary act of policy. Among the advantages which would accrue to Ireland from an incorporation with Britain, he mentioned the protection which she would secure to herself in the hour of danger; the most effectual means of increasing her commerce and improving her agriculture; the command of English capital, and the infusion of English manners and English industry, necessarily tending to meliorate her condition; whilst she would see the avenue to honours, distinctions, and exalted situations in the general seat of empire, opened to all those whose abilities and talents enabled them to indulge an honourable and laudable ambition. The question was not what Ireland would gain, but what she would preserve; not merely how she might best improve her situation, but how she might avert a pressing and immediate danger. In this point of view her gain would be the preservation of all the blessings arising from the British constitution. As the supposed loss of national independence formed, in the minds of many, a strong objection to the scheme, he argued that this would be a real benefit; that the Irish would rather gain than lose in point of political freedom and civil happiness; and that though a nation possessing all the means of dignity and prosperity might justly object to an association with a more numerous people, Ireland, being deficient in the means of protection and civil welfare, could not be injured or degraded by such a union with a neighbouring and kindred state as would connect both realms by an equality of law and an identity of interest. Mr Sheridan opposed a union, as particularly unseasonable, amidst the irritation which at this period prevailed in Ireland; and he deprecated the accomplishment of the object by means of force or corruption. The measure, however, was approved of by a very large majority; and in the House of Lords the same subject was afterwards discussed with a similar result. But in the Irish parliament the proposal was resisted with such vehemence, that administration, finding themselves supported only by a small majority, thought fit to avoid pressing the matter further at this time.

During the present year the British power in India was greatly augmented, and its territory extended, by the fall of Tippoo Sultan, the son and successor of Hyder Ali. From the time when this prince had been compelled by Lord Cornwallis, in 1792, to surrender one half of his dominions, it was understood that sooner or later he would make an attempt to recover what he had lost. It would even seem that he had entertained hopes of aid from the French, and that with this view he had privately sent envoys to the Isle of France, to attempt to form a connection with the present French rulers. But when intelligence reached India of the expedition to Egypt, and the victory of the Nile, the British governor-general demanded from Tippoo Sultan an explanation of his views; and after some fruitless negociation, a British army under General Harris invaded the territory of Mysore, which they found in a bad state of preparation for war. After some slight encounters the British army encamped before Seringapatam on the 6th of April; but it was not till the 2d of May that the besieging batteries began to breach the wall. On the

Reign of tie, either in time of peace or of war, and inadequate to the 4th, during the heat of the day, the place was stormed, Reign of George III. consolidation of strength, or the mutual participation of po- and Tippoo himself perished fighting gallantly at one of George IIL litical and commercial benefits. The case of the regency the gates of the fortress. His dominions were seized by the exhibited a striking instance of the weakness of the con- British, who bestowed a portion of them upon the Mahrattas and the nizam their ally; whilst part was reserved under the direct sovereignty of the East India Company, and the remainder nominally bestowed upon a prince of the family which had lost its power by Hyder's usurpation. The substantial authority over this last-mentioned portion of Tippoo's dominions, however, was in truth retained by the British government; and as the nizam himself soon became entirely dependent upon the British power, the whole peninsula of Hindustan, with the exception of the Mahratta states, which evidently could not long remain unsubdued, might now be considered as under the dominion of Great Britain.

> In Europe the present campaign proved extremely event-The French directory had been more anxious to establish its own power at home, than careful to maintain the armies upon the frontiers and in the conquered countries in a proper state of force and efficiency. A French army under General Jourdan advanced into Suabia in the month of March, but was encountered and beaten at Stockach by the Archduke Charles. The importance of the possession of Switzerland instantly displayed itself. The vanquished French army immediately crossed the Rhine into Switzerland, and in that mountainous country contrived to make a stand during the greater part of the summer. The Austrians advanced as far as Zurich, of which they obtained possession; but before they could proceed further, the French armies, having been reinforced towards the end of the season, were enabled in their turn to assume the offensive.

> In Italy the French manœuvred unskilfully at the opening of the campaign. Instead of concentrating their forces, they attempted to retain possession of the whole of that country, and were thus beaten in various engagements at different points. The combined Austrian and Russian army was commanded by the Russian general Suwarof, who pressed upon the French with incredible activity and energy; carrying on a multiplicity of sieges, and bringing his troops together with wonderful celerity, whenever his enemy attempted to take advantage of the manner in which his forces were scattered. Macdonald, with the Neapolitan army, was defeated on the Trebbia; Moreau, who succeeded Joubert, killed at the commencement of the battle, was beaten at Novi; and in a number of combats of less magnitude the Austro-Russian army proved almost uniformly successful. The result of the whole was, that before the campaign terminated, Suwarof had driven the French out of Italy, with the exception of Savoy and the Genoese territory. But this was not accomplished without a great loss of men in sieges and battles, in which the hardy warriors of the north suffered very severely. Their leaders depended for success more upon the intrepidity of their troops, and the promptitude with which they rushed into action, than upon the skilful dispositions with which they arranged their force or harassed their enemy. Hence it happened that, amidst all Suwarof's victories, no instance occurred of any column of French troops being compelled to surrender without fighting, nor was any advantage gained but by the efforts of superior force exerted in open battle. Such a warfare, carried on against a single enemy by a combined army, could not long be successful. The Austrian officers complained loudly of their northern allies as men destitute of military skill, who wasted armies without a proportional return of conquest; whilst, on the other hand, the Russians censured their associates as destitute of proper spirit, and as protracting the war by an ill-timed caution.

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The advantage derived by the French from the posses-George III. sion of Switzerland having by this time begun to be understood, a resolution was in consequence formed to close the campaign, not by sending Suwarof from Italy into the south of France, but by directing him to turn his arms northward against the Alps. The Archduke Charles had spent the summer in pressing upon the French in that quarter, but had not been able to advance beyond Zurich; here, however, he left a considerable body of Austrians and Russians, and proceeded with a division of his army towards Manheim and Philipsburg. Suwarof advanced from Italy at the head of eighteen thousand men to take the command of these troops; but his views were anticipated by the French general Massena, who, finding the Archduke Charles and Suwarof at the distance of more than a day's march on his left and right, instantly attacked the troops stationed near Zurich. The Austrians perceiving the hazardous nature of their situation, retreated with only a moderate loss; but the Russians, from an ill-judged contempt of their enemy, total ignorance of the country, and want of skill in the art of conducting war in it, maintained their ground till they were hemmed in on all sides. They attempted to resist the French, as they had often resisted the Turks, by forming a hollow square of great strength; but neither this nor their own courage afforded any safety against the artillery of the enemy, in the face of which an iron front of bayonets was presented in vain. Their order was at last broken, and their retreat converted into an utter rout. Suwarof was at the same instant advancing rapidly to their relief; but the victorious enemy now turned quickly upon him, and attempted to encompass him on all sides. By incredible exertions, however, and following paths which were believed to be utterly impracticable, he effected his escape with about five thousand of his troops, in want of every thing, and retaining only the muskets in their hands.

> Thus terminated on the eastern side of France this active and brilliant campaign. The allies remained masters of Italy; but France was still enabled to menace that country, as well as Germany, by retaining possession of Switzerland. In the meanwhile the British attempted, with the aid of Russian auxiliaries, to drive the French out of Holland. On the 27th of August, a landing was effected under Sir Ralph Abercromby at the mouth of the Texel; and the Zuyder Zee was immediately entered by a British fleet under Admiral Mitchell. Upon this the Dutch admiral, Storey, surrendered the fleet under his command, alleging that his men refused to fight. The ships were twelve in number, and eight of them mounted from fifty-four to seventy-four guns. Here, however, the effectual success of the expedition terminated. The Duke of York afterwards assumed the command, and forces amounting to thirty-five thousand men were landed; but it was soon discovered that the invasion had been ill concerted and ill directed. To have afforded a prospect of success, the invading army should have been landed in the vicinity of Rotterdam, which was full of Scotsmen, and where the supporters of the stadtholder were numerous; and then advanced rapidly into the centre of the country, to encourage the numerous enemies of the French to come forward in favour of the invaders. Instead of this the army was disembarked at the extremity of a long and narrow neck of land, having the sea on both sides, where the French and Dutch were able to arrest their progress for a considerable time with a mere handful of troops. The unusual wetness of the season, which greatly injured the roads, also added to the diffi-British commander was at length under the necessity of withdrawing his troops to the point at which they had origi-

by which it was stipulated on the one hand that he should Reign of not injure the country, and that a number of French pri-George III. soners in England should be released; whilst, on the other hand, it was agreed that the Duke of York should be permitted to retire unmolested.

At the end of this campaign the French government underwent a new change. After the conquest of Egypt Bonaparte had invaded Syria, and subdued or conciliated most of the native tribes; but his career of victory was stopped at St Jean d'Acre by the Turkish governor of that town, assisted by the British under Sir Sidney Smith. He was forced to raise the siege of that place, after fifty-nine days of open trenches, and delivering five unsuccessful assaults; and having returned into Egypt, and destroyed a Turkish army at Aboukir, he ventured upon a step which is without example in the history of modern Europe. Having learned from an old newspaper the great reverses which the French armies had experienced in the early part of the campaign, and the general discontent produced by these misfortunes, he resolved to trust to fortune and return to France. With this view he secretly embarked, along with a select party of friends, on board a small vessel, leaving the command of his army, which was now completely insulated in the country, to General Kleber, an officer of high reputation for military genius and enterprise; and after escaping a thousand perils he landed safely at Frejus, in the south-east of France. The unexpected arrival of an officer who had never fought in Europe without success was welcomed by the public at large as a happy event; and in the first moment of joy little inquiry was made as to the manner in which he had abandoned his army, an act which in any other circumstances would have been regarded as one of the greatest of military crimes. Finding a party willing to second his views, Bonaparte now took advantage of the satisfaction occasioned by his arrival, together with the discontents arising from the corruption and mismanagement of the directorial administration, to usurp the government, cashier the directory, and to dissolve the representative legislature.

The British parliament was assembled as early as the 24th of September, in order to provide for an augmentation of force, which was thought necessary to give effect to the invasion of Holland, an enterprise of the success of which sanguine hopes were at that time entertained. The speech from the throne, after recommending the propriety of permitting to a considerable extent the voluntary service of the militia, in order to augment our forces abroad, stated that our prospects had been improved beyond the most sanguine expectation; that the deliverance of Italy might now be considered as secured; that the kingdom of Naples had been rescued from the French yoke, and restored to the dominion of its lawful sovereign; that the French expedition to Egypt had been productive of nothing but calamity and disgrace, whilst its ultimate views against our eastern possessions had been utterly confounded; that there was every reason to expect a successful result from our efforts for the deliverance of the United Provinces; and that to our ally the emperor of Russia we were in a great measure indebted for the favourable change in the general posture of affairs. It was further stated that, in pursuance of the recommendation of the British parliament, his majesty had communicated to both houses of parliament in Ireland their sentiments respecting a union with that kingdom.

In consequence of the recommendation from the throne, an act was passed, authorizing his majesty to receive into culties with which the invaders had to struggle; and the the army volunteers from the militia regiments, and some measures of finance were adopted; but government having received intelligence of the failure of the expedition nally disembarked. Here a convention was entered into, against Holland, parliament was suddenly adjourned. In

Reign of the meanwhile affairs on the Continent began to assume restoration of the princes of the house of Bourbon; that Reign of George III. a most unpropitious aspect. The emperor of Russia, such an event would at once remove all obstacles in the George III. being exasperated at the defeats sustained by his troops towards the close of the campaign, became dissatisfied irascible and unreasonable temper might lead him not merely to desert but to quarrel with them. In the meanwhile Bonaparte, under the title he had assumed of First Consul of the French Republic, resolved to signalize his acquisition of power by an attempt to procure peace. With this view he thought proper to address a letter, signed by himself, to the king of Great Britain. In this document, after announcing his own appointment to the office of first magistrate of the republic, he asked, "Is the war which for eight years has ravaged the four quarters of the world to be eternal? Are there no means of coming to an understanding? How can the most enlightened nations of Europe, powerful and strong beyond what their safety and independence require, sacrifice to ideas of vain grandeur, commerce, prosperity, and peace? How is it that they do not feel that peace is of the first importance, as well as the highest glory?" "France and England," he added, "by the abuse of their strength, may still for a long time, for the misfortune of all nations, retard the period of their being exhausted; but, I will venture to say it, the fate of all civilized nations is attached to the termination of a war which involves the whole world." letter was transmitted through the medium of an agent of the French government, who resided at London for the sake of managing the exchanges and other affairs relative to prisoners of war.

But Lord Grenville, as secretary of state for foreign affairs, informed the agent who had transmitted Bonaparte's letter, that his majesty could not depart from the usual forms of transacting business, and therefore, that the only answer to be returned would be an official note from himself. In this note his lerdship stated that the king wished for nothing more than to restore tranquillity to Europe; that he had only made war in defence of his people, against an unprovoked attack; and that it would be in vain to negociate while the same system continued to prevail in France which had ravaged Holland, Switzerland, Germany, and Italy. "While such a system therefore prevails, continued his lordship, "and while the blood and treasures of a powerful nation can be lavished in its support, experience has shown, that no defence but that of open and steady hostility can be availing. The most solemn treaties have only prepared the way to fresh aggression; and it is by determined resistance alone, that whatever remains in Europe of stability for property, for personal safety, for social order, or the exercise of religion, can be preserved. For the security, therefore, of these essential objects, his majesty cannot place reliance on the mere renewal of general professions of pacific dispositions. Such professions have been repeatedly held out by all who have successively directed the resources of France to the destruction of Europe, and whom the present rulers have declared all to have been incapable of maintaining the relations of amity. Greatly will his majesty rejoice whenever it shall appear, that the danger to which his own dominions and those of his allies have been so long exposed has really ceased; whenever he shall be satisfied that the necessity of resistance shall be at an end, and, after so many years of crimes and miseries, better principles have prevailed, and the gigantic projects of ambition, endangering the very existence of civil society, have at length been relinguished. But the conviction of such a change can result only from the evidence of facts." His lordship then went on to say, with insulting irony, that the best pledge of the reality and permanence of such a change would be the

way of negociation, confirm to France the unmolested enjoyment of its ancient territory, and give tranquillity to with his allies; and there was reason to dread that his other nations; that, however, his majesty did not limit the possibility of solid pacification to this mode, and made no claim to prescribe to France what should be the form of her government; that he only looked to the security of his own dominions, of his allies, and of Europe; that unhappily at present no such security existed, nor any sufficient evidence of the principles by which the new government would be directed, or even of its stability; and that in this situation, it remained for him to pursue, in conjunction with other powers, the exertions of a just and defensive war.

As one of the principal objects on account of which Bonaparte had commenced this negociation was probably to cast upon Great Britain the odium of continuing the war, he persevered in this purpose with uncommon dexterity. Appearing not to be disconcerted by the first rejection of his offers, he continued the correspondence through the medium of Talleyrand, his minister for foreign affairs, who, in a masterly note in answer to that of Lord Grenville, dissected the official communication of the British minister with consummate ability, and refuted the various statements and views which it embodied. He began with recriminating respecting the origin of the war, and presented a picture very differently sketched and coloured from that which Lord Grenville had portrayed in his letter. The charge of aggression brought against the French nation was haughtily repelled, and retorted on the coalesced powers, particularly on the British government. After expatiating on this subject, the French minister observed, that a sincere desire for peace ought to lead the parties to the discovery of the means of terminating the war, rather than to apologies or recriminations respecting its commencement; that no doubt could be entertained of the right of the French nation to choose its own government; that this was a point which could not be decently contested by the minister of a crown which was held on no other tenure; that at a time when the republic presented neither the solidity nor the force which it now possessed, negociations had been twice solicited by the British cabinet, and carried into effect; that the reasons for discontinuing the war were become if possible more urgent; that, on the contrary, the calamities into which the renewal of the war must infallibly plunge the whole of Europe, were motives which had induced the first consul to propose a suspension of arms which might likewise influence the other belligerent powers ;and he concluded with pressing this object so far as to propose the town of Dunkirk, or any other, for the meeting of plenipotentiaries, in order to accelerate the re-establishment of peace and amity between the French republic and Great Britain. In the answer of the British minister to this note, the recrimination of aggression was as contemptuously repelled as it had been haughtily urged. Referring to his former note, Lord Grenville observed, that the obstacles which had been presented rendered hopeless for the moment any advantages which might be expected from a negociation; that all the representations made with so much confidence by the French minister, the personal dispositions of those in power, the solidity and consistence of the new government, were points which could not be admitted as motives for opening a negociation, since these considerations remained yet to be proved; and that the only evidence must be that already explained by his majesty, namely, the result of experience and the evidence

On the 22d of January copies of this correspondence were presented to the British parliament, along with a message from his majesty, announcing that he relied on the

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Reign of support of his parliament, and the zeal and perseverance of keep an army of sixty thousand men to preserve tranquil- Reign of George III his subjects, in carrying into effect such measures as would lity in the interior of France: every acr of his government George III. best confirm the signal advantages obtained in the last campaign, and conduct the contest to an honourable conclusion. On the 28th of the same month the subject was discussed in the House of Lords upon a motion made by Lord Grenville for an address of thanks to his majesty in consequence of the message. Lord Grenville contended, that nothing in the state of Europe admitted a rational hope that there was any security but in war; and that peace with a nation at enmity with order, religion, and morality, would rather be an acquiescence in wrong than a suspension of arms in ordinary warfare. He entered into a comment upon the note of the French minister, and disputed all its positions, observing that the love of peace, on the part of France, had been displayed in a war of eight years with every nation in Europe excepting Sweden and Denmark; that her disinclination to conquest had been evinced by the invasion of the Netherlands, of Italy, of Switzerland, and even of Asia; that no honourable or permanent peace could be made with the present rulers of France; and that every power with which she had treated could furnish melancholy instances of the perfidy, injustice, and cruelty of the republic. He remarked, that General Bonaparte, in the third year of the republic, imposed upon the French, at the mouth of the cannon, that very constitution which he had now destroyed at the point of the bayonet. If a treaty was concluded and broken with Sardinia, it was concluded and broken by Bonaparte; if peace was established and violated with Tuscany, it was established and violated by Bonaparte; if armistices were ratified and annulled with Modena and the other petty states of Italy, they were ratified and annulled by Bonaparte; if that ancient republic Venice was first drawn into a war, and compelled afterwards to conclude a treaty, it was that Bonaparte might more easily overthrow her constitution, and annihilate the political system by which she had existed with glory and security for ages past; if the government of Rome was subverted, it was subverted by Bonaparte; if Genoa was reduced to the same humiliating situation, her wealth and independence were sacrificed to Bonaparte; if Switzerland, deluded by offers of peace, was induced to surrender her rights and liberties, she was deprived of them by Bonaparte. He had multiplied violations of all moral and religious ties; he had repeated acts of perfidy; his hypocrisies were innumerable; and in that country where he had affirmed that the French were true Moslemins, he had given us a correct idea of his sincerity and his principles. If the interest of Bonaparte were deeply concerned, he might be sincere, and there was no doubt but it was his interest to consolidate his power; but it ought not to be forgotten, that whenever any acts of atrocity were to be accomplished by the French, they had been usually effected by a suspension of arms. The proposed negociation would relieve her from the actual pressure of alarming difficulties, but could not relieve England from any. The ports of France, which were now blockaded by our fleet and cruisers, would be thrown open to introduce naval stores, and a variety of necessary artisent to bring back the troops which were now deprived of be employed in augmenting the numbers of the French armies. To us a suspension of arms could not be productive of any benefit whatever; our ports were not blocked up, our commerce was not interrupted; and it should also be considered that there would be no security for the maintenance of such a suspension. Was Bonaparte now prepared to sign a general peace? If he were not, he could

was supported by force; and if he even were sincere, it was hazarding too much to hazard all on his single life. What reliance could be placed on the unanimity of the French people? Men of the blackest characters had been appointed to situations of the greatest trust; men infamous for professed principles of anarchy had been raised to places of confidence and power; and those who were judges in the sanguinary tribunals of Robespierre were now exalted to a distinguished rank in the republic. His lordship concluded by disclaiming on the part of administration any wish to consider the restoration of the French monarchy as the object of the war.

The Duke of Bedford opposed the noble secretary's mo-

tion, and contended, that all the objections against negociation might have been urged against the negociations whic' the ministers themselves had formerly opened at Lisle. He considered the conduct of the British government on the present occasion as unwise, because provoking and unconciliatory. He thought that, in a correspondence with the present French government, all discussion about the original commencement of the war ought to have been avoided. Whether England or France was the first aggressor, was a question to be reserved to posterity. The wild scheme of restoring the French monarchy was the sine qua non, if not of peace, at least of negociation; for notwithstanding that the noble secretary had denied the charge, yet whilst he pointed out the impossibility of treating with the French government during all its stages to the present, and insisted upon vigorous hostilities being the only means of our security, no inference could be drawn, but that the war must be continued till monarchy was reestablished. If the restoration of monarchy was not the object, what was it? Were ministers contending that we ought to wait for a more favourable opportunity of entering into negociation? Was it to be obtained by railing at Bonaparte? There were no terms sufficiently strong to censure the littleness which attacked his character, in order to ruin him in the estimation of the French nation; as if by so doing, we could negociate with more effect, or gain a fairer prospect of peace. His grace contended that no confidence was to be reposed in our present continental allies; and as a severe scarcity at this period prevailed in the country, this circumstance was made use of as an additional argument against persevering in the war. The first consul, doubtless, sought to make a peace advantageous to himself and the nation over which he presided: like all other statesmen, his motives might not be influenced by humanity: it was to be supposed his aim would be to satisfy the French people, and consolidate his own power. As to the abuse which ministers threw upon his character, it was their constant habit to abuse every ruling power in France. But whenever they had been driven by the voice of the people to negociate, their former ill language had never been any impediment. The duke concluded with a motion for an address recommending a negociation for peace.

Lord Borington supported the views of ministers. But cles, of which the country was in want; and fleets would be Lord Holland reprobated their conduct throughout the contest. At one time they asserted that the ambition all intercourse with the republic, and which might then of France was so insatiable, that she would listen to no terms; they were now driven from that pretext, and urged that a peace would be insecure. As to the ambition of the enemy, it was a consideration of weight in the arrangement of terms, not a preliminary objection preclusive of treaty. What proof could be given of the abandonment of dangerous views, but a negociation in which moderation would be displayed. Was it reasonable to suppose that not be sincere in his offers. It was necessary for him to he would admit that the guilt of the aggression lay with

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Reign of France? This was a point which ought not to have been had been guilty of the original aggression in the war, and Reign of George III. discussed. The object was to treat upon actual circum-Bonaparte, desirous to attain peace by any means, should note allow him to do? He would find that the restoration of the hereditary line of kings was the only case in which a speedy peace would be admitted as possible; in fact, therefore, this restoration was the sine qua non in which immediate negociation was admissible with ministers. But surely if the ambition of the republic was so formidable, we could not forget this ground of apprehension when we talked of restoring the house of Bourbon. Had we forgotten their proverbial ambition, and was their restoration the remedy for evils arising from such a source? We had now taken up the principle, so much objected to Jacobins, of distinguishing between the people and their government. But what was the conduct of the French? Bonaparte distinctly renounced this principle in the letter to the king, and acknowledged the title and the character of his majesty's government. The note of our ministers was a manifesto to the royalists, and formed for that purpose alone. Lord Holland further stated, that the people at large disapproved of the abrupt rejection of Bonaparte's overtures; he therefore gave his most decided support to the amendment. The Earl of Carnarvon would not consider the answer of our ministers as a refusal to treat for peace, or a declaration of eternal war; it was a call upon the house and the country to pause before they rashly suffered themselves to enter into a negociation with an unsettled government. He did not expect any extraordinary faith to be manifested by Bonaparte, more than by any other chief or chiefs; but although he would be best pleased with the restoration of monarchy in France, in all times, in monarchies as well as republics, aristocracies, and every other species of government, good faith in treaties was preserved and exemplified only as long as it was the interest of the parties to maintain it. So little integrity had history left on record, that, at the very time they were signed, a secret intention was often indulged to violate them at a particular period. The address, as moved by Lord Grenville, was then carried by a great majority.

In the House of Commons Mr Dundas moved a similar address, which gave rise to a similar debate. Mr Dundas said, that the leading feature of the French revolution was a disregard of all treaties, and a contempt for the rights of other powers; and in proof of this assertion, he considered it as necessary merely to recite the names of Spain, Naples, Sardinia, Tuscany, Genoa, Geneva, Modena, Austria, Russia, England, and Egypt, with Denmark and Sweden, though at all times neutral states. Britain had not at this time any reasonable cause to suppose that a change of principles had taken place. The Jacobinical form of government was indeed at an end; but in substance and essence all the qualities of the revolutionary government were in as full force at this moment as they were in the days of Robespierre. Mr Whitbread asserted, that, had it not been for the interference and ambition of the other powers of Europe, the French revolution would have assumed a very different character from that which it now exhibited. He remarked, that other powers had treated neutral states no less unjustly than had been done by the French; Lord Harvey and Lord Hood had ordered the French ministers to be dismissed from Florence; and by threats we had compelled Genoa to dismiss her French inhabitants. He compared Bonaparte with Suwarof, and the invasion of Egypt by France with that of Poland by Austria, Russia, and Prussia, whose friendship we had frequently courted. Mr Thomas Erskine entered at great length into the question, whether France or Great Britain her of new-modelling her own government. In all this he

contended that the British government had engaged in it George III. stances and the real grounds of dispute. Suppose that unnecessarily, and persisted in it without necessity. Mr Pitt, on the other hand, affirmed that the French leaders sit down to consider how he could succeed; what does the had themselves begun the war, on the principle that it was necessary to consolidate the revolution. With regard to the proposal to negociate with their present leader, it was impossible to discuss fairly its propriety, without taking into consideration his personal character and conduct. Mr Pitt then expatiated on the conduct of Bonaparte at Campo Formio, in the Milanese, Genoa, Modena, Tuscany, Rome, Venice, Switzerland, and Egypt. His arts of perfidy, he said, were commensurate with the number of treaties; and if we traced the history of the men in this revolution whose conduct had been marked by the most atrocious cruelty, the name of Bonaparte would be found allied to more of them than that of any other within these ten eventful and disastrous years. From these facts the house might judge what reliance might reasonably be placed on this conqueror, and what degree of credit might be given to his professions. It had been observed, indeed, that whatever had been his character, he had now an interest in making and preserving peace. This was a doubtful proposition. That it was his interest to negociate, would be readily acknowledged, and to negociate with this country separately, in order to dissolve the whole system of the confederacy on the Continent; to paralyse at once the arms of Russia, of Austria, or of any other country which might look to us for support; and then either to break off his separate treaty, or, if he should have concluded it, to apply the lesson taught in his school of policy in Egypt, and to revive at his pleasure those claims of indemnification which may have been reserved to some happier period. Under all these circumstances of his personal character and his newly acquired power, what security had he for retaining that power but the sword? His hold upon France was the sword, and he had no other. But was the inference to be drawn from these considerations, that we ought in no case to treat with Bonaparte? No; but we ought to wait for the evidence of facts. At present there was nothing from which we could presage a favourable disposition in the French consuls. There was the greatest reason to rely on powerful co-operation from our allies; the strongest indication in the interior of France of a disposition to resist this new tyranny; and every ground to believe, that if we were disappointed of complete success, the continuance of the contest, instead of making our situation comparatively worse, would make it comparatively better. With regard to the negociation at Lisle in 1797, to which allusions had been made, the Jacobin system of prodigality and bloodshed, by which the efforts of France had been supported, had at that period driven us to exertions which had exhausted the ordinary means of defraying our immense expenditure, and led many who were convinced of the necessity of the war to doubt the possibility of persisting in it. Under this impression we negociated, not from the sanguine hope that its result would be permanent security, but from the persuasion that the danger arising from peace in these circumstances would be less than the continuance of war with inadequate means. Mr Fox was decidedly of opinion that France, at the commencement of the war, was the defending party. The aggressions of Austria and Prussia could not be denied by any impartial person: nothing could be more decidedly hostile than their proceedings; they scrupled not to declare to France that it was her internal concerns, not her outward actions, which provoked them to confederate against her; they did not pretend to fear her ambition, her conquests, her troubling her neighbours; but they accused

Reign of was not seeking to justify the French, either in their in- conclusion of a work so interesting to the security and Reign of George III. ternal or external policy. On the contrary, he thought prosperity of the British empire. In the House of Lords George III. their successive governments had been as execrable in various instances as any of the most despotic and unprincipled governments which the world had ever seen. Men bred in the school of the house of Bourbon, once engaged in foreign wars, would naturally endeavour to spread destruction, and form plans of aggrandisement, on every side; they could not have lived so long under their ancient masters without imbibing the insatiable ambition and restless spirit, the perfidy and the despotism, inherent in the race; they had imitated their great prototype, and through their whole career of crimes had done no more than trace the steps of their own Louis XIV. Are we for ever, continued Mr Fox, to deprive ourselves of the benefits of peace, because France has perpetrated acts of injustice? With the knowledge of these acts, we had treated with them twice, and ought not now to refuse to do so? Much had been said of the short-lived nature of military despotism; yet such was the government erected by Augustus Cæsar, which endured six hundred years. Indeed, it was too likely to be durable wherever it was established. Nor was it true that it depended on the life of the first usurper. Half of the Roman emperors were murdered, yet the tyranny continued; and this, it was to be feared, would be the case in France. On a division, however, the address was carried by a very large majority.

The great measure of a legislative union with Ireland was carried into effect during the present session of parliament. Administration had found it necessary to delay this matter in consequence of the opposition in the Irish parliament; but during the recess they had obtained a more ample majority; and as the British parliament had already, on Mr Pitt's motion, passed resolutions in favour of the union, the project was formally introduced to the Irish parliament on the 5th of February 1800, by a message from the lord-lieutenant, in which his excellency stated that he had it in command from his majesty to lay before the houses of legislature the resolutions of the British parliament, and to express his majesty's wish that they would take the same into their most serious consideration. After a long and spirited debate, the ministry prevailed by a majority of forty-three. The distinguished abilities of Mr Grattan were once more displayed on this interesting occasion. In the debate which took place on proposing the first article of the union, he opposed the measure with such vehemence, that the chancellor of the exchequer accused him of associating with traitors, and of disaffection to the government; but the reply of Mr Grattan was so pointed and severe, that the chancellor conceived himself under the necessity of resenting it by a challenge, and a meeting having taken place in consequence, he was wounded in the arm. The question, however, was carried by a considerable majority; and as the discussion proceeded, the numbers of opposition appeared to diminish. The last struggle, as it may be deemed, occurred on the 13th of March, when Sir John Parnell moved to petition his majesty to call a new parliament, in order that the sense of their constituents might be more fully ascertained; but this motion was also overruled. In the mean time the business proceeded with little opposition in the House of Lords, which, on the 24th of March, adopted the whole of the articles of union with few alterations; and soon afterwards both houses waited on his excellency with a joint address to this effect. No time was now lost in submitting the measure anew to the British parliament. On the 2d of

the measure was opposed by Lord Holland, on the ground 1800.

that a union at this time was not the spontaneous offer of the parliament of Ireland, uninfluenced by corruption or menace; but the articles were afterwards carried in a committee of the house, after some debates of no great importance. In the House of Commons Mr Pitt stated that the principal act of the treaty, that which fixed the share of representation Ireland was to have in the united parliament, was founded upon a comparative statement of the population of both kingdoms, as well as the revenue of both. The number of members fixed for the counties and two principal cities was sixty-eight; and that for the most considerable cities, towns, and boroughs, was thirtyone, who would be selected without partiality. He next adverted to the arrangements respecting the House of Peers, and the members to be returned; and observed, that as the members for the Commons of Ireland were in number nearly double those of Scotland, the same rules would be observed with the peerage, which therefore was to consist of thirty-two members. It was also understood, that such peers of Ireland as might not be among the twenty-eight temporal peers, should be allowed to sit in the united parliament until elected. The only article consisting of minute details related to the apportionment of the shares of the revenue of each country respectively. Mr Grey opposed the union on nearly the same grounds as Lord Holland had done in the Upper House. It had been asserted in a speech of the lord-lieutenant to the Irish parliament, that five sevenths of the country, and all the principal commercial towns, except Dublin, had petitioned in favour of the union. But this only meant that nineteen counties had presented petitions, and that these counties constitute five sevenths of the surface of Ireland. He admitted the petitions in favour of the union; but by what means were they obtained? The lord-lieutenant, who, besides being the chief civil magistrate, is commander of a disciplined army of a hundred and seventy thousand men, and able to proclaim martial law when he pleases, procured these petitions, which were signed by few names, and those by no means the most respectable. But fortunately there were many petitions on the other side, not obtained by solicitation and at illegal meetings, but at public assemblies, of which legal notice had been given. Twenty-seven counties had petitioned against the measure; the petition from the county of Down was signed by seventeen thousand respectable, independent men; and all others were in a similar proportion. Mr Grey then adverted to some of the principal arguments of the unionists; and concluded by moving an address to his majesty for a suspension of all proceedings relative to the union, till the sentiments of the people of Ireland could be ascertained. Mr Sheridan represented the measure as an act of tyranny towards the people of Ireland, which must become the fatal source of new discontents and future rebellions. Mr Grey's motion was, however, rejected by an overwhelming majority.

Early in the session mention had been made by opposition of the unfortunate invasion of Holland by the British forces; but ministers declined entering upon the subject, as the expedition had been carried on under the superintendence of Mr Secretary Dundas, and that gentleman, soon after the meeting of parliament, had gone down to Scotland in the depth of winter, without any ostensible business; a circumstance which gave rise to suspicions April, a message from his majesty was presented to both that some dissatisfaction existed at court on account of the houses of parliament, communicating the resolutions of result of the Dutch invasion, or the manner in which the the Irish parliament in favour of an incorporating union Duke of York had been supported in it by the adminisbetween the two kingdoms, and recommending the speedy tration at home. On the 10th of February, however, the

Reign of subject was introduced in the House of Commons by Mr they had no waggons at all, and could not possibly have Reign of George III. Sheridan, who moved for an inquiry into the causes of its failure. He treated the capture of the Dutch navy as of little value, or rather as pernicious, on account of the example of mutiny which it exhibited on the part of the seamen whom we had received into our service; he admitted that the restoration of the stadtholder was a justifiable motive for our interference, but contended that Britain had treated the people of Holland ill, by obliging them to enter into the present war, and avoiding to promise a restoration of their colonies in case of a successful invasion; he asserted that the expedition itself was ill arranged, as the army after its landing had no means of moving forward on account of the want of necessaries, and, instead of delivering the Dutch, was under the necessity of entering into a capitulation for its escape, and of holding out, as an inducement to enter into this capitulation, a threat of destroying for ever the commerce of that very people whom we had embarked to save; and he contended, that to vindicate the honour of the British army, it was necessary to inquire into the cause of its misfortunes upon this occasion. Mr Dundas defended the expedition against Holland with his usual dexterity. He stated its object to be threefold: first, to rescue the United Provinces from the tyranny of the French; secondly, to add to the efficient force of this country, and diminish that of the enemy, by gaining possession of the Dutch fleet; and, lastly, by hostile operations in Holland, to oblige the French to weaken their armies in various other quarters. Mr Dundas contended, that at the commencement of the expedition a great probability existed of the success of all these objects; two of them did actually succeed, and only one failed. With regard to the capture of the fleet, he declared himself astonished that a doubt should exist about the value of such an acquisition. That fleet had been absolutely destined for the invasion of our dominions; along with it we took nearly seven thousand seamen, all of whom were liable to be employed in the French fleet, and forty thousand tons of shipping, which might have annoyed our commerce. By the invasion of Holland, also, the French had been compelled to weaken their other armies, which gave success to Suwarof in driving them from Italy, and to the archduke on the Upper Rhine and in Switzerland. They had indeed succeeded in defending Holland; but, as the price of this success, they had been severely pressed in every other quarter. At the moment our enterprise was undertaken, it was doubtful whether they would send their reinforcements thither, or to other parts of the Continent. They had poured prodigious reinforcements into Holland, by which means we were unable to rescue it from their yoke; but the result was, that they had lost every other point which they had contested during the whole campaign. With respect to the conduct of the enterprise, never was a commencement more prosperous than that of the late expedition. Sir Ralph Abercromby had sailed for the Helder on the 13th of August, and every thing promised the most rapid success. On the 14th came on the most extraordinary hurricane that ever blew from the heavens; it was found impossible to land a single soldier on any part of the coast of Holland; and this continued till the 27th. The consequence was, that the enemy knew where our army must land, and their troops came in shoals to oppose us; seven thousand men were collected; and as they were superior in number, Sir Ralph could not land his men to advantage. The ardour of the soldiers and the gallantry of the commander were never excelled on any occasion. Without any thing but their muskets and bayonets, against cavalry and artillery, they made good their landing, and by it they secured the Dutch fleet. It was alleged that

landed them had they been there. Instantly on their land- George III. ing they could not want them; for all they had then to do was to secure a landing place and a post of communication. Sir Ralph had to consider what position he should take till the 1st of September, when reinforcements would arrive. The same tempest prevented the Russian troops from arriving to reinforce the army; they did not come till the 18th. The Duke of York offered to the Russian general, D'Hermann, to delay the attack, if he thought his men were not sufficiently recovered from the fatigues of the voyage; but the general requested that the attack should be made, with a promptitude and alacrity which reflected the highest honour upon him; and this ardour led him into the field two hours sooner than the time appointed. The army, however, was gloriously successful until a late hour in the day. General d'Hermann and his troops were in possession of the village of Berghen, and crowned with victory, till his zeal led him beyond a given point, and turned the fate of the day. When the attack was made the French amounted to seven thousand, and the Dutch to twelve thousand men; yet, notwithstanding this superiority of force, our troops fought and conquered; but the French continually pouring in reinforcements, the duke was advised to accede to the terms of an armistice, which was by that time mutually wished for. The duke yielded to this advice; and, by so doing, consulted the dictates of reason and humanity. Mr Dundas contended that our army returned with as much honour as they entered Holland. The Duke of York, indeed, agreed to give up eight thousand French prisoners on condition that his retreat should be unmolested; but he could not be wrong in doing so, because our prisons were overloaded with them; and he did not recede from any one article in which national dignity was concerned.

Mr Tierney supported the proposal for an inquiry. He disputed the advantages said to result from the expedition, and contended, that to a secret committee, or in some other form, ministers ought to account for their conduct, and exonerate themselves from suspicions too strong to be removed without proof. It was unconstitutional, and an insult on the house, to say this could not be done consistently with the preservation of secrecy. General Abercromby landed on the 22d of August with ten thousand men; he got possession of the Helder; he was reinforced by General Don on the 27th. Was it not strange that fifteen thousand men, headed by an able general, and going by invitation, should think it imprudent to advance? Had the Dutch been well affected, why did they not declare themselves? No French troops were then in Holland to keep them in awe. Why did not the Duke of York sail at the same time with General Don? Why were all our forces sent to one place, and forty-three thousand men cooped up in a narrow peninsula where but few could act at a time? It was strange that ministers, who were so fond of making diversions, did not think of making a diversion in some other quarter. This was a point which only military men could determine; and the house was bound to examine officers, that the truth might be known. The capitulation, he said, had fixed an indelible blot on the national character. A king's son, commanding forty thousand men, had capitulated to a French general who had only thirtyfive thousand. Mr Addington observed, that having maturely and dispassionately considered the nature of the proposed inquiry, it appeared to him to rest upon two grounds: first, the propriety of judging any measure by its event; and, secondly, that in consequence of a failure, there was a necessity for investigation. It ought to be recollected, that the worst concerted plans had often prothe troops had no means of drawing their waggons; but duced the most brilliant success, and the best terminated

Reign of in disaster. No human being could command success, and French troops continued to hold possession. Bonaparte Reign of George III no existing government control the elements. The pro-

majority.

During the present year the war proved extremely eventful. The army which Bonaparte had left in Egypt under General Kleber being disgusted by the desertion of their leader, a negociation was entered into by Kleber with the Turkish grand vizier and Sir Sidney Smith; the result of which was, that the French agreed to abandon the whole of Egypt, on condition of being permitted to return unmolested to France. The convention was concluded at El Arish on the 24th of January; and the immediate return of this discontented army to France might have proved dangerous, if not fatal, to the newly-established power of the first consul. But here the usual for-tune of Bonaparte prevailed. The British government, suspecting that some proposal of this kind might be made, sent secret orders to Vice-admiral Lord Keith not to consent to any arrangement which might leave so large an army at liberty to act in Europe, or which should not include the surrender of all the ships in the port of Alexandria. The consequence was, that Lord Keith refused to ratify the treaty of El Arish which Sir Sidney Smith and the Turkish grand vizier had concluded, and detained as prisoners General Dessaix and a number of troops which had been sent from Egypt. The French general Kleber immediately intimated to the Turks a determination to resume hostilities. He attacked and totally routed their army, consisting of forty thousand men, in the neighbourhood of Grand Cairo; and multitudes perished by slaughter and in the desert, while the French remained complete masters of the country. When it was too late, an order arrived from Britain to permit General Dessaix and the troops along with him to land in France, and to fulfil every part of Sir Sidney Smith's treaty; but the state of affairs had changed; Kleber had been assassinated by a fanatical Arab, and his successor, Menou, refused to evacuate Egypt; so that it became necessary, at a future period, to send an army from Britain to drive the French out of the country which they had proposed to evacuate without firing a shot or shedding a drop of blood.

The Austrian armies in Germany and in Italy were respectively commanded by General Kray and by General Melas. The campaign was conducted on the part of the French government with great ability and decision. It had been publicly announced in all the French newspapers that the armies were to be reinforced as powerfully as possible; and that an army of reserve was to be formed in a central position between Germany and Italy, from which the armies might be supplied with fresh troops according to the events of the war. Dijon was mentioned as the head-quarters of this army of reserve, and it already amounted to upwards of forty thousand men. Nobody suspected that any important plan of operations or military stratagem was concealed under the affected notoriety of this arrangement. Accordingly the Austrians commenced the campaign by an attack upon Massena in the Genoese territory; and after a succession of obstinate conflicts the French were driven into Genoa, where they sustained a siege, till compelled to surrender from want of provisions. Whilst Melas besieged Genoa, and even pushed forward his parties through Nice into the ancient French territory, Bonaparte in person suddenly repaired to Dijon and joined the army, to the assembling of which Europe had paid little attention, on account of the appellation which it had received of an army of reserve; and immediately advancing, he crossed the Alps by the Great St Bernard, and descended into the Milanese with little opposition. At the same time powerful reinforcements joined him from Switzerland, of which the

thus placed himself in the rear of the Austrian general, and George III. posed inquiry was accordingly negatived by a very large hazarded every thing upon the fortune of a single battle. He was accordingly attacked on the plain of Marengo, near Alessandria; and, as the Austrians were greatly superior in cavalry and artillery, they proved victorious during the greater part of the day. The French wings were turned, the centre division was broken, and scarcely six thousand men stood firm at any one point, when General Dessaix, late in the action, arrived with a reinforcement of six thousand troops, though fatigued by a rapid countermarch of several leagues. At this moment the battle seemed to be irretrievably lost. The French had been thrown back in the utmost disorder upon Montebello, where Lannes was still maintaining a furious though desperate resistance; the whole field of battle was in possession of the Austrians; the French troops were crowded together in a disorganized mass, in which the enemy's artillery were committing the most frightful havoc; and only one effort more seemed necessary on the part of the Austrians, with their fine cavalry, in which arm they were greatly superior, to complete the destruction of the French army. Matters were in this state when Dessaix arrived, who, perceiving the desperate situation of affairs, instantly hurried his division into action. Surprised at, but not unprepared for this renewed attack, the Austrians developed a powerful force to oppose it; Dessaix fell mortally wounded; and his division were on the point of being overwhelmed, when an event almost unexampled in war not only saved the French army from destruction, but totally changed the fortune of the day, and converted a disastrous defeat into a complete victory. While a body of Austrian grenadiers, six thousand strong, were advancing to the charge along a broad causeway, and carrying all before them, they were suddenly and furiously attacked in flank by General Kellerman, at the head of six hundred horse, which he had managed to conceal among some mulberry trees. A panic immediately seized them, and believing themselves assailed by the mass of the French cavalry, they threw down their arms. The whole affair passed in an instant, and even the victors themselves were astounded at their own success. Bonaparte, however, lost not a moment in profiting by this extraordinary turn of fortune. The French rallied with their usual promptitude on Dessaix's division, which still preserved some degree of order; resumed their former positions; recommenced the battle, which they had a few minutes before given up for lost; and, animated with the enthusiasm inspired by Kellerman's extraordinary success, drove the Austrians from the field. In the French official account of this memorable conflict, which decided the fate of all Italy, no mention whatever is made of Kellerman's gallant and decisive attack; and it reflects little credit on the memory of Bonaparte, that, though he afterwards heaped wealth and titles in boundless profusion on the man who had not only saved him and his army from destruction, but converted a disastrous defeat into a splendid triumph, he should never have made any public admission of the unparalleled achievement which changed the fortune of the day. The service was probably considered as too great to be acknowledged, because it could never be sufficiently rewarded; and it ill comported with the character of Bonaparte to admit that, in genius, promptitude, and energy, he could ever be surpassed by any of his lieutenants. On the following day Melas entered into negociation, and, as the price of an unmolested passage to the Austrian states, he agreed to abandon all Piedmont, and

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est fortresses in Europe. On the side of Germany the French under General Moreau were scarcely less successful. They passed the Rhine

the basin of the Po, and to surrender twelve of the strong-

Reign of in the neighbourhood of Strasburg, where they were op- prohibition of exportation of provisions was unnecessary, Reign of George III posed by the Austrians. But this was only a feigned attack. Speedily retreating, the main body of their army descended from the mountains of Switzerland, and crossed the Rhine in the rear of the Austrian army near Schauffhausen. After a desperate engagement, the Austrians four thousand were taken prisoners. As the mode of attack had been unforeseen, and was consequently unprovided for, the loss of magazines and baggage was immense. In another and harder fought battle, at Moskirch, the Austrians lost upwards of eight thousand men. At Biberach, Augsburg, and Hochstet, the French were equally successful; and the result was, that the Austrians were under the necessity of crossing the Danube, leaving the French masters of the electorate of Bavaria, and in a condition to invest Ulm. A general suspension of hostilities was now agreed to, by which both parties retained possession of their actual positions; and a negociation for peace was entered into between the French and Austrians, which produced an attempt to negociate on the part of Great Britain; but as the French also demanded a naval armistice, the negociation was dropped; and after a considerable delay, during which the Austrian minister at Paris concluded a treaty which his court afterwards disowned, preparations were made for re-opening the campaign. But the French ultimately consented to renew the armistice with the Austrians, on condition of obtaining possession of the important fortresses of Ulm, Ingoldstadt, and Philipsburg. These armistices and negociations proved of great service to the French. The consent to a truce in the midst of an unexampled career of victory gave an appearance of moderation to the new consular government; whilst the conclusion of a treaty at Paris, to which the Austrian government afterwards refused to adhere, induced neutral nations to consider Bonaparte as anxious for the attainment of peace. Hence the wonderful success which attended his arms, during the early part of the campaign, was far from rousing the jealousy of the other states of Europe. The northern nations eagerly courted his alliance; and the emperor Paul of Russia, actuated by the natural instability of his temper, and an admiration of military success, not only entered into a close alliance with Bonaparte, but seized the British vessels in his ports; whilst the Danes, Swedes, and Prussians, formed a confederacy for evading the right claimed in war by maritime states, of preventing their enemies from being supplied with naval stores by means of neutral vessels.

In the meanwhile Great Britain was greatly distressed by a scarcity of provisions, and riots broke out in London and some provincial towns. On this account parliament assembled on the 11th of November, and the principal discussion which occurred in it related to the scarcity which prevailed throughout the country, and involved in great difficulties both the middle and lower classes The members of opposition asserted that of society. the war and the scarcity were closely connected; whilst Mr Pitt and his colleagues contended that a more obvious cause might be found in the deficiency of the two preceding crops, owing to cold and rainy seasons. A royal proclamation was issued in the beginning of December, exhorting all heads of families to reduce the consumption of bread by at least one third, to abstain from the use of flour in pastry, and to restrict the consumption of oats and other grain by horses; and acts of parliament were at the same time passed prohibiting the exportation, and offering bounties upon the importation, of grain. These measures, however, were of a very doubtful character. By increasing the alarm of scarcity they induced wealthy persons to buy up grain, and to withhold it from the markets; the

when a better price could be obtained in Britain than else-George IIIwhere; and the same high prices afforded a sufficient bounty for importation.

1801

At the commencement of the following year government laid an embargo on all Russian, Danish, and Swedish ships were defeated with the loss of ten thousand men, of whom in British ports; so that Great Britain was now at war with nearly all Europe. Austria, indeed, ventured to renew hostilities; but the French general Moreau, having defeated the Archduke John with tremendous loss, at Hohenlinden, drove back the Austrian army upon their capital, advancing within seventeen leagues of Vienna; whilst at the same time signal defeats were sustained by them both in Italy and in Franconia. From the necessity of their affairs, therefore, the Austrians were compelled to sue for peace, which was accordingly concluded at Luneville. The Netherlands and the Milanese were resigned; France extended her boundary to the Rhine; and Tuscany was relinquished by the grand duke, who was to receive an indemnification in Germany; whilst, on the other hand, the city of Venice and a portion of its ancient territory were given up to Austria. The German princes who suffered by the treaty were to receive an indemnification out of the ecclesiastical states of the empire; thereby weakening still further the influence of the house of Austria. By this treaty the French became masters of Europe to the southward of the Rhine and of the Adige.

The commencement of the year 1801 was marked in Great Britain by the termination of Mr Pitt's administration. When this event was announced to the public, it created no small degree of astonishment. Since Mr Pitt had come into office a new generation had sprung up; and a succession of the most extraordinary public transactions had occurred, amidst all of which that minister, with his kinsman Lord Grenville, and his friend Mr Dundas, had remained firmly established in power. The authority and influence of these men had in some measure interwoven itself in the opinions of the people, and they were surrounded by a train of powerful adherents, dependent on their patronage; whilst, at the same time, Mr Pitt himself retained such a degree of popularity as caused his dismission or resignation to appear a very bold measure in the present state of affairs. The ostensible cause assigned for Mr Pitt's dismission obtained little credit with any one. He was represented as having promised to the Irish Catholics an equalization of privileges with their fellowsubjects, on condition of their acquiescing in the treaty of union; but it was pretended that, since his majesty had been persuaded to oppose the measure, as contrary to his coronation oath, the ministry, in such a state of matters, could no longer honourably remain in office. Of the true cause of this change little is publicly known. It does not seem necessary, however, to search into secret history for an explanation of a transaction which may be sufficiently accounted for on principles which must be obvious to all. The influence acquired by Lord North, arising from the patronage he enjoyed during the American war, enabled him, by combining with others, to establish a formidable interest in the legislature. But the power possessed by him was trifling when compared with that which Mr Pitt and his friends possessed. The war which Mr Pitt had conducted had been expensive in a degree altogether unexampled in preceding times; whilst the circumstances under which it commenced had united, as a party under him, almost all the persons of property in the kingdom. During his long administration, too, the crown possessed, in a more direct manner than formerly, the increasing patronage of India; and hence the leading members of this administration might be regarded as having attained a degree of power and influence which could not easily be shaken;

George III by any combination of subjects in a free country. In such circumstances, it was natural for an experienced prince to wish for a change. Mr Pitt had been originally taken into office as the agent of the crown in the House of Commons, to support the royal prerogative there, against a combination of powerful and accomplished men; he had enjoyed great popularity, and had been considered as the man best qualified to conduct the war of the French revolution; and as he knew the high rank which he held in public estimation, and treated the House of Commons with but little deference, it is not improbable that in the cabinet he may have presumed upon the indispensable importance of his own services, and, accounting himself necessary to the administration of the empire, arrogated a degree of independence not at all graceful nor becoming in a mere instrument of the crown. Some, however, have thought that his retirement on this occasion is to be ascribed to a totally different cause; that as he had been mainly instrumental in plunging the country into the war with France, and as all his schemes for humbling that nation had proved abortive, he could neither admit his error, nor adopt the only means which now remained, in some degree to atone for it; and that he desired to escape the mortification of negociating a peace with a power which he had so often denounced, and which he wished to exclude from the pale of political and social relations in Europe. And, in support of this view, it may be mentioned that, on the dismissal of this administration, a resolution appears to have been at the same time adopted by the British court, seriously and earnestly to endeavour to obtain peace upon any tolerable terms.

With regard to the general merits of Mr Pitt's administration, we are still probably too much involved in the passions and prejudices which it excited to be able to appreciate them with sufficient candour and intelligence. He derived great advantage from the copious and stately eloquence which he at all times displayed in the House of Commons; and certainly no man ever possessed so completely the art of managing the people of England, and retaining their attachment, at the same time that he continued to possess the confidence of his sovereign. Although he obtained the government of the British empire at a very youthful age, the prudence of his conduct and the magnitude of some of his designs entitle him to a very high rank as a statesman. His sinking fund, though not contrived by himself, and though based on erroneous principles, was a great and important measure, as it contributed to sustain the national credit at a period of unexampled difficulty and embarrassment, and enabled the country to weather a contest which might otherwise have proved fatal to its independence. His commercial treaty with France was also, whatever the political economists may say to the contrary, a measure recommended by the soundest wisdom. The most ambiguous circumstances in Mr Pitt's public conduct were those which related to parliamentary reform, to the trial of Mr Hastings, and to the slave-trade, in which he adopted the popular side in the debate, although the court was known to be hostile to his avowed sentiments, which accordingly were never successful. The most difficult question relates undoubtedly to the war with France. Though by the forms of the British constitution Mr Pitt was responsible for engaging in this war, and for continuing in it, yet as he was not actually the head of the state, it is possible that the interference of Britain might not originate with him, and that he consequences, the enormous aggrandisement of France, as nothing more than a nominal minister, holding a tem-

Reign of and which might prove extremely inconvenient, when held the subjugation of the weaker states, and the accumulation Reign of of that intolerable load of debt which hangs like a mill-George III. stone round the neck of this country, and encumbers every effort it can make to develope its natural resources. Had Britain originally remained neutral, or rather, had she negociated in favour of the independence of France, brought into hazard as it was by the combination of the great military powers, that country would have been confined within her ancient boundary; Italy, Switzerland, and Holland would have retained their independence; and the strength of Austria would have remained unbroken; or, if Britain had withdrawn early from the contest, and avoided urging and subsidizing the continental powers, until they were successively vanquished, the same result might have ensued. On the other hand, if the war is to be considered as undertaken to overturn the principles of the French, it was undoubtedly successful to a certain extent, as it compelled them to abandon these principles, and to have recourse to a military usurpation; but it ought to be remembered, that to Britain as a nation the political principles of the French were of no importance whatsoever, whilst their permanent aggrandisement was calculated to bring into hazard our very existence as an independent nation. Mr Pitt and his friends called forth the resources of the country for the support of the war to an astonishing extent. Immense treasures were lavished in supporting our allies in fruitless or absurd expeditions, and in schemes which served only to augment the public burdens, and to increase the influence of the crown by the extension of its patronage. The acquiescence of the public in the war was preserved by keeping the minds of men in a state of constant alarm, from the fear of danger to the constitution, in consequence of the alleged disaffection of a body of the people; and in this manner a constant spirit of persecution was maintained throughout the country, which thus seemed to be ruled rather by a jealous faction than by a legitimate government. The concluding measure of Mr Pitt's administration, the union with Ireland, is entitled to much praise. It was suggested by the course of events, and tended to remedy a great defect in the constitution of the British empire, the want of consolidation into one united political body.

Of the associates of Mr Pitt, Lord Grenville, who acted as minister in the House of Lords, was the principal in England, and Mr Dundas in Scotland, and perhaps also in the rest of the empire. This last gentleman possessed the greatest share of power ever intrusted to any Scotsman since the union, excepting for a short time to Lord Bute. During a considerable length of time he appears to have conducted almost the whole public business of that vast assemblage of nations, in all the climates of the globe, which constitutes the British empire; and under his patronage, and that of his friend Mr Pitt, a numerous body of dependents rose to the possession of boundless opulence; whilst they themselves, engrossed by the pursuits of ambition, were understood to have been somewhat careless of their private concerns.

At the time when the change of ministry took place the king became affected with a severe illness, supposed to be the result of anxiety and agitation of mind. In making choice of a new prime minister, however, he avoided admitting into power the party which had opposed the war; and selected Mr Addington, who, as we have already mentioned, was originally patronized by Mr Pitt, and who, as speaker of the House of Commons, had gained approbation by his good temper, prudence, industry, and conciliating manhad only the alternative of engaging in the war or of re- ners. This gentleman appears to have obtained from his linquishing his power. If the war is to be considered as predecessors in office a promise of support in parliament; advised and conducted by him, he is responsible for all its and he was therefore represented throughout the country

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Regn of porary situation, which, on the first opportunity, he was to from protecting the commerce of France on the seas or in Reign of retained in the nomination to all inferior offices. Mr Addington's appointment as first lord of the treasury and chancellor of the exchequer was followed by the nomina-Lord Hawkesbury as secretary of state for the foreign department, of Lord Pelham for the home department, and of Colonel Yorke as secretary at war. Lord Eldon was succeeded by Sir Michael Pepper Arden, then created Lord Alvanley, as chief justice of the common pleas; and Mr Addington by Sir John Mitford, afterwards Lord Redesdale, as speaker of the House of Commons. Sir William Grant was made master of the rolls, and Mr Law and Mr Percival attorney and solicitor generals.

On the 2d of February the parliament of Great Britain and Ireland was opened; but as the king's illness immediately succeeded that event, the new administration did not obtain formal possession of office until the month of March, and during the interval the old ministers continuthe throne expressed great satisfaction that the crown would now be able to avail itself of the advice of the united parliament of Great Britain and Ireland; hoped that this memorable era, distinguished by a measure calculated to consolidate the strength of the empire, would be equally marked by the energy and firmness which the present situation of the country so peculiarly required; and stated that the court of Petersburg had treated our representations of the outrages committed against our ships and property, and against Englishmen, with the utmost disrespect, and that acts of injustice and violence had aggravated the first aggressions. It mentioned that a convention had been concluded between Petersburg, Copenhagen, and Stockholm, the avowed object of which was to establish a new code of maritime law, inconsistent with the rights and hostile to the interests of this country; and that the earliest measures had been taken to repel this confederacy, and to support those principles essential to the maintenance of our naval strength. It recommended an inquiry into the high price of provisions, and promised a termination of the present contest whenever it could be done consistently with security and honour.

When the usual address was moved, some discussion occurred in both houses regarding the actual state of affairs, more particularly as connected with the combination of the northern powers against Britain. In the House of Commons Mr Grey deplored the prospect of a war with all Europe. Russia had evidently been guilty of the grossest violence and injustice towards this country, in the confiscation of the property of our merchants, and in the treatment of our sailors; but the emperor accused the British government of violating a convention by which he was to receive the island of Malta as the reward of his co-operation against France; and the truth of this assertion ought to be investigated. Concerning the northern confederacy, Mr Grey remarked, that the principles on which it was founded were of no recent origin, as indeed was very generally known. Mr Pitt, who still acted as chancellor of the exchequer, declared, that with every one of the three northern powers, independently of the law of nations, we had on our side the strict letter of engagements by which they were bound to us. In the convention signed between Great Britain and Russia, the latter hound herself to use her efforts to prevent neutral powers

George III. relinquish in favour of Mr Pitt and his friends. And this the ports of France; and Denmark and Sweden had ex-George III. account of the state of affairs derives plausibility from the pressed their readiness to agree on that very point which actual support which the new minister received from these they were now disposed to contend. We did not indeed gentlemen, and from the influence which they evidently know the precise terms of their new convention; but as its existence and general object were acknowledged, we must necessarily act upon the supposition of their hostility.

In March Mr Grey moved for an inquiry into the state tion of Lord Eldon to the office of lord high chancellor, of of the nation. We were now, he said, in the ninth year of Lord St Vincent to that of first lord of the admiralty, of a war with France, and threatened with a war by all the maritime states of Europe, if not actually involved in it; we had added L.270,000,000 to the capital of our national debt, and above L.17,000,000 to our annual taxes; we found ourselves opposed to France, which was now extended in territory, increased in population, and supported by all the states of the north. We were opposed to her with diminished means, exhausted strength, and stripped of every ally. It was, therefore, incumbent on the representatives of the people to enter into a serious inquiry into the means most likely to restore to us security and happiness. The conquests we had made during the war had not compensated our disasters or the acquisitions made by France. Her frontier now extended to the Rhine, to the Alps, and to the ocean; yet all these possessions ed to hold their former situations. At the opening of the we had consented to abandon as the price of peace which imperial parliament, as it was now called, the speech from ministers might have made with France confined within her ancient limits, while our own country was prosperous and happy. Our losses were thus irretrievable, and our triumphs empty. There was almost no shore from the Texel to the Adriatic which had not witnessed the defeat of our forces and the disgrace of our arms. The unfortunate attempt upon Dunkirk, the shameful retreat through Holland, the evacuation of Toulon, the abandonment of Corsica, and the expedition to Quiberon, were all fatal proofs of ill-concerted schemes; but the late expedition against Holland was more disgraceful than the rest, because it terminated in a capitulation to an inferior force. Administration had acted with such imprudence that even our very allies were now converted into enemies. The Swedes and other neutral nations had complained that their trade was molested, their ships detained, and justice refused them in our courts, or so long delayed that it was useless. These were points which undoubtedly deserved investigation. Nor did the internal condition of the country less require consideration. The sum of L.270,000,000, as already mentioned, had been added to the national debt, exclusive of imperial and other loans, and the reduction by the sinking fund; and yet the ex-ministers alleged that they left the country in a flourishing condition. Yet every Englishman, from diminished comfort, or from positive distress, felt this declaration to be an insult. The situation of the sister kingdom was also alarming in the extreme. Since the recal of Earl Fitzwilliam, Ireland had been the scene of transactions shocking to humanity. Was it now tranquil? Though rebellion had been crushed in the field, it lurked in secrecy; the mass of the population was disaffected; and nothing prevented the separation of Ireland from Britain but the inability of France to send a force to assist the rebels. Upon these grounds he called for an inquiry into the actual state of affairs, and demanded the support of the new administration, as a testimony of their disapprobation of the measures of their predecessors.

Mr Dundas defended, with plausible statements and arguments, the conduct of the war. The principle which he laid down was, that war ought to be directed to the destruction of the commerce and colonial possessions of the enemy, including their maritime power, which must depend upon their commerce. It was hardly possible for England to be long at war with France without being in-

Reign of volved in disputes on the Continent, which might deprive George III us of many of the markets which we had for our goods; and therefore it was peculiarly our interest to gain these colonies, that they might remain open for our commodities. In order then to judge how far the war, conducted on this principle, had been disastrous and disgraceful, he would state its progress and success. Hostilities commenced against France in February 1793; and in that year Tobago, St Pierre, Miquelon, Pondicherry, part of St Domingo, and the fleet at Toulon, were taken, besides the possessions of the Newfoundland fishery. In the year 1794 we captured Martinique, Guadaloupe, St Lucie, the Saints, Corsica, and Mariagalante; in 1795, Trincomalee and the Cape of Good Hope; in 1796, Amboyna, Berbice, and Demerara; in 1797, Trinidad, with four ships of the line either taken or destroyed; in 1798, Minorca; in 1799, Surinam; in 1800, Goree, Malta, and Curaçoa. These had been our successes. With regard to the expedition against Holland, he defended it on the same principles as formerly. As to the navy, he stated, that since the commencement of the present war we had taken or destroyed eighty sail of the line belonging to the enemy, a hundred and eighty-one frigates, two hundred and twenty-four smaller ships of war, seven hundred and forty-three French privateers, fifteen Dutch and seventy-six Spanish ships. The losses we had sustained were three sail of the line, one of which we had retaken; one fifty gun ship, which we also retook; and of the frigates captured by the enemy, the Ambuscade alone remained in their possession. One of the great advantages to be derived from the colonial possessions of the enemy was the markets they furnished for our manufactures. In the year 1793 the manufactures sent from this country to the West Indies amounted to above L.1,800,000 sterling. Before the war our exports to the East Indies did not exceed one million, but in the preceding year they exceeded L.1,600,000, a proof that we had not lost the markets of Europe. The failure of an expedition was now considered as a decisive proof of misconduct in ministers; but in the glorious Seven Years' War, which was in every body's recollection, there were expeditions attempted which completely failed, though the failure was not considered as a proof of incapacity or neglect in Lord Chatham. The conquests which we then made were Senegal, Louisburg, St Lucie, Duquesne, Guadaloupe, Martinique, the Havannah, Montreal, Pondicherry, Grenada, Belleisle, besides destroying the fortifications of Cherbourg; and we took or destroyed thirty-two sail of the line and fifty-eight frigates, besides a proportionable number of smaller vessels. We were now in possession of every place taken in that war, excepting Guadaloupe, the Havannah, and Belleisle; but, on the other hand, we had gained the Cape of Good Hope, Ceylon, Demerara, Berbice, and all the Dutch possessions in the East and West Indies, added to Minorca and Malta. We had also destroyed the confederacy formed against us in the East Indies, and acquired a great increase of power and territory in that quarter of the world.

Mr Pitt, after expressing his respect for the new administration, observed that no point had been more disputed than that of confidence in ministers. By some people it given proofs of having merited it. But this never could be carried in substance to the letter; for whoever entered into any employment, must at first be new to it: there could be no experience without trial; but when persons had been tried in one situation, and had acquitted themselves well in it, it was a rule to give them credit when they entered into another, until proof of their incapacity or misconduct appeared. He then lavished encomiums on Mr Addington, on Lord Hawkesbury, and on Earl St Vin-

cent, and asked the gentlemen of the opposition if they Reign of knew any one among themselves superior to Lord Hawkes- George IIL bury, excepting one, Mr Fox, whose transcendent talents made him an exception to almost any rule. Of the other individuals composing the new administration, much might be said; but he would only add, that it showed little reflection or consideration to affirm that the present ministers were unentitled to a constitutional confidence; and the house was bound by the best principles of policy to wait to see the conduct of the servants of the crown before they withheld it. Upon the subject of the retirement or dismissal of the late administration, he contended that his majesty had a right to part with his servants, and his servants to retire, without any explanation being given to the public. Concerning the affairs of the Irish Catholics, and their connection with the dismissal of administration, he stated, that a memorandum had been sent, in the name of a noble lord at the head of the executive government of Ireland, who thought it essential to communicate the grounds of the change of administration to persons more immediately connected with the Catholics; and it had been at his express desire that this communication had been made, and the motives explained to them which led to the change, in order to prevent any misrepresentation. Emancipation of the Catholics was a term he disclaimed. He never understood the situation of the Catholics was such as to need what deserved to be called emancipation; but he thought the few benefits which they had not yet anticipated might easily have been added to those so bountifully conferred on them in the present reign, not as a matter of right, but of liberality and political expediency. Had such a measure preceded the union, indeed, it would have been rash and destructive; and even now, if any attempt was made to push it so as to endanger the public tranquillity, or to pervert the affections of any of his majesty's subjects, the ex-ministers would be forward and firm in resisting it. But he hoped the day would come when such a measure might be revived, and carried in the only way in which he wished to see it carried, conformably to the general tranquillity of the empire. To him it had appeared of such importance, that, being unable to bring it forward as a measure of government, he did not conceive it possible for him, with honour, to remain in the same situation; and he wished it to be understood, that whenever the same obstacles did not exist, he would do every thing in his power to promote its success. He denied, however, that any of those who had retired from office had so pledged themselves to the Catholics as to be under the necessity of resigning their offices because they could not perform their promise and he also denied that ever the Catholics supposed they had received such a pledge. An expostulation was natural, but a pledge had never been given. He concluded that the British government had justice on its side, or rather was supported by the law of nations, in the claims which it now maintained to search neutral vessels for military stores on their way to the enemy, and to declare particular French or other ports under blockade, to the effect

tempting to enter them. Mr Fox observed, that it was undoubtedly a doctrine was held that no person was entitled to it, till he had recognised by the law of nations, that free bottoms did not make free goods; but he doubted much the propriety of discussing it at this critical juncture. He thought our claims upon this subject were extended too far when they were made to reach to naval stores, as these had not been at former periods considered as contraband. He then adverted to the successes of the war, which had been enumerated by Mr Dundas. On the navy he bestowed merited praise, and also on the late first lord of the admiralty, assigning his merit as the reason for the constant

of thereafter having a right to arrest neutral vessels at-

1801.

Reign of and brilliant triumphs of the navy; whilst our military was now stated as only amounting to about L.6,000,000. Reign of George III. expeditions, though our troops were as brave as our sea- As some deficiencies of former estimates required to be George III. France; and how had we succeeded? Which of the two nations had been most aggrandised in the course of it? A country paying double its land-rent was in a state demanding inquiry. The war secretary had talked much about the diversion of war, and shown us its nature on his principles. He had sent the Duke of York and an army of thirty thousand men to the only neck of land perhaps in the world where a fifth part of their own numbers was equal to cope with them. Of the armistice of Hohenlinden, and the negociation which followed it, Mr Fox spoke with indignation, reprobating the conduct of the minister, which had so fatally proved that eloquence was distinct from wisdom. Time had now evinced that all the great objects of the war were defeated, and that our allies had deserted us; and when no prospect of success remained, we might resort to negociation. The same men who had rejected the proposals of Bonaparte with insolence, must approach with respect, suing for favour, to avoid participating in the disgrace. With regard to the Irish Catholics, no man ought to be deprived of his rights because he worshipped God according to the dictates of his own conscience; and it was a reflection upon parliament to say, as Mr Pitt had said, that he could not there propose a measure which he approved. He declared his belief that no such difficulty existed, but that the late minister might wish to retire for a season, till overtures of peace were made, which he could not make, without mortification, to the man whom he had insulted. He spoke of the change of administration as a fortunate occurrence. Some indeed might suspect, from the panegyric of Mr Pitt, that the new ministers were the less gaudy puppets, directed by those who had quitted their stations; and if they adopted the system of their predecessors, with the additional blame of being hostile to the Catholic claims, acting in this point from their own motives, they would be unworthy of con-

The new chancellor of the exchequer, Mr Addington, observed, that the degree of confidence which the House of Commons ought to extend to the present ministers, it persons duly appointed by his majesty, unless it was precluded by antecedent character and conduct. He then commented on all the leading points in dispute with the northern powers; and after stating the grounds of the principle asserted by this country, and referring to the exception made by existing treaties, gave it as his opinion that the right for which we contended was vital and fundamental, and could neither be abandoned nor compromised. Lastly, he felt it incumbent on him to declare that it was the determination of his majesty's servants to take such steps as appeared to them best calculated for the restoration of peace; that no form of government in France would obstruct negociation; and that if there was a corresponding disposition on the part of the enemy, the grand object would be accomplished. The motion for inquiry was then rejected by a majority of more than two to one.

Notwithstanding the change of ministry, Mr Pitt brought forward the business of the supplies in the House of Commons. Their amount was L.35,587,462; of which sum L.15,800,000 was for the navy, L.15,902,000 for the army, and L.1,938,000 for the ordnance. The income tax 30th March, and with a fine breeze at north-north-west

men, had generally failed. In naval tactics almost every provided for, Mr Pitt stated, that the whole charge of thing depended on the talents of the officers; whereas, in the two countries, for the service of the year, would military movements, much depended on the original de- amount to L.42,197,000, which would be divided between sign. The boasted capture of islands was not the object the two countries thus: Great Britain for its fifteen sevenof the war: our object had been to protect Europe against teenths of the joint expense, and those charges which belonged separately to her, would have to defray, in round numbers, L.37,870,000; and the charges falling upon Ireland would be L.4,324,000. The sum of L.25,000,000 was raised by way of loan, and new taxes were imposed upon paper, tea, houses, lead, the post-office, and various other articles. The income tax was also further mortgaged, so that the debt for which it was pledged amounted to L.76,000,000.

In the meanwhile, to prevent the active co-operation of Denmark with Russia, and if possible to break up the northern confederacy, an armament was fitted out in the British ports, consisting of eighteen sail of the line, and as many frigates, sloops, bombs, fire-ships, and smaller vessels, as made the whole amount to about fifty-three sail. This fleet, under the command of Admiral Sir Hyde Parker, with Vice-admiral Lord Nelson as his second, sailed from Yarmouth on the 12th of March 1801, and soon afterwards reached its first rendezvous at the entrance of the Cattegat. The Danish navy at this time consisted of twentythree ships of the line, with about thirty-one frigates and smaller vessels, exclusive of guard ships. The Swedes had eighteen ships of the line, fourteen frigates and sloops, seventy-four galleys and smaller vessels, besides gun-boats, all in a state of respectable equipment. The Russians had eighty-two sail of the line and forty frigates, and of these thirty-one sail of the line and a proportional number of frigates were in commission in the Baltic, being divided between Petersburg, Archangel, Cronstadt, and Revel; but their fleet was ill built, ill manned, ill officered, and ill-equipped; and, of the number in commission in the Baltic, probably not more than twenty sail of the line could have been put into a condition to act against an enemy. At this time the Swedes had eleven sail of the line at Carlscrona, ready for sea, and in tolerable fighting trim; the Danish fleet at Copenhagen consisted of ten sail of the line ready for sea, exclusive of about an equal number in an unserviceable state; and, assuming the available Russian force as above stated at twenty sail of the line, it thus appears that the entire effective strength of the was not for him to conjecture; they only asked for that fleets of the northern confederates amounted to forty-one portion of it which should be constitutionally reposed in sail of the line, besides frigates and smaller vessels. But as not more than twenty-five or twenty-six of these could by any means have been assembled at a given point, and as even the best of them were decidedly inferior to our ships in condition, equipment, discipline, and skill, eighteen, or even fifteen British sail of the line were more than a match for them. This explanation is necessary to show that the British government were not guilty of any rashness in sending to the Baltic a force apparently so small in comparison of that to which it was opposed; though they certainly deserve the strongest reprobation for allowing any petty consideration to prevent them from appointing Nelson to the command.

It was at first hoped that Denmark, notwithstanding her hostile demonstrations, would prefer negociation to war; but this expectation having been disappointed, and the Danish government, instead of conciliation, having assumed a tone of open defiance, preparations were made for forcing the passage of the Sound, though in these much valuable time was lost through the irresolution of the admiral, Sir Hyde Parker. At length, however, the British fleet weighed anchor at six o'clock in the morning of the

Reign of entered the Sound in a line a-head, the van division com-George III. manded by Lord Nelson in the Elephant, the centre division by the commander-in-chief, and the rear division by Rear-admiral Graves. At seven the batteries at Elsineur, which had been represented as tremendous, commenced firing at the Monarch, which was the leading ship, and the other ships as they passed in succession; but the distance was so great that not a shot took effect, nor did any of the British ships fire in return except the van division, which only discharged a few broadsides. As the strait at Elsineur, however, is less than three miles across, a mid-channel passage would undoubtedly have exposed the ships to a fire from Cronenburg Castle, adjoining Elsineur, on the one side, and from the Swedish town of Helsinburg on the other; but the British having observed that the batteries of the latter mounted only eight guns of a small calibre, inclined to the Swedish shore, where not even a show of opposition was made, and passing within less than a mile of it, avoided a fire which, as proceeding from nearly a hundred pieces of cannon, could scarcely have failed to do much injury to the ships. About noon the fleet anchored at some distance above the island of Huen, which is about fifteen miles from Copenhagen; and the commander-in-chief, Vice-admiral Lord Nelson, and Rear-admiral Graves, accompanied by Captain Domett and the commanding officers of the artillery and troops (namely, the forty-ninth regiment, two companies of the rifle corps, and a detachment of artillery which had been embarked on board a division of the fleet in the Downs), proceeded in a lugger to reconnoitre the enemy's defences. These were soon ascertained to be of the most formidable description. It was apparent that the Danes could not be attacked without great difficulty and risk; and when a council of war was called in the afternoon, much as usual was urged to show the propriety of foregoing, or at least delaying, the attack. Councils of war never fight. But happily the opinion of Nelson prevailed, and he offered his services for the attack, requiring ten sail of the line and all the small craft. Sir Hyde Parker willingly accepted the tender, gave him two more line-of-battle ships than he asked, and wisely left every thing to his own judgment.

The force at Copenhagen was not the only obstacle to be contended with. The approach to it was by a channel extremely intricate and little known; and, to increase the difficulty of navigating it, the Danes had removed or misplaced the buoys. But Nelson himself saw the soundings made, and buoys laid in the outer channel, between the island of Saltholm and the Middle Ground, boating it upon this exhausting service until it was completed. An attack from the eastward was first meditated; but a second examination of the Danish position, on the 31st, and a favourable change of the wind, determined the vice-admiral to attack from the south. Accordingly, on the morning of the first of April, the British fleet removed to an anchorage within two leagues of the town, off the northwestern extremity of the Middle Ground; a shoal extending along the whole sea front of the city of Copenhagen, and leaving an intervening channel of deep water called Konigstiefe, or King's Channel, about three quarters of a mile wide. In the course of the forenoon Nelson, accompanied by Captain Riou of the Amazon, reconnoitred for the last time the position which he was about to attack; and soon after his return at one o'clock the signal to weigh appeared at the Elephant's mast-head. It was received with a shout throughout the whole squadron, and promptly obeyed. They weighed with a light and favourable wind; the small craft pointed out the course distinctly; Riou led the way in the Amazon; and coasting along the edge of the right hand shoal or Middle Ground until they reached and partly rounded its southern extremity, the

squadron anchored off Draco Point just as the darkness Reign of closed, the headmost of the enemy's line not being more George IIL than two miles distant. Captain Hardy now proceeded in a small boat, under cover of the night, to examine the channel between the anchorage and the Danish line, and actually approached near enough to sound round the first ship of the latter, using a pole lest the noise of throwing the lead should occasion a discovery. Having completed his task, he returned about eleven o'clock, and reported to the admiral the depth of the water, and the practicability of the channel up to the Danish line. This was gratifying news to Nelson, though it added to his impatience, and prevented him from sleeping during the remainder of the night, the whole of which was spent in preparing instruc-

tions and receiving reports.

The force now about to be attacked was of the most formidable description. It consisted of eighteen vessels, all two-decked ships, but some of themold and dismantled, with frigates, praams, and radeaux, mounting altogether about six hundred and fifty guns, and moored in a line of about a mile in extent, flanked at the north end, or that nearest the town, by two artificial islands called the Trekröner or Crown Batteries, one of thirty twenty-four pounders, and the other of thirty-eight thirty-six pounders, with furnaces for heating shot, and commanded by two-decked blockships. The entrance into the harbour and docks, which are situated in the heart of the city, was protected by a chain drawn across it, and also by some batteries on the northern shore, particularly the Trekröner already described; and, in addition to this, two seventy-four gun ships, Dannemarck and Trekröner, a forty-gun frigate, two eighteen gun brigs, and several armed zebecs, provided with furnaces for heating shot, were moored in advantageous positions off the mouth of the harbour. Along the shore of Amak island, a little to the southward of the floating line of defence, were gun and mortar batteries; and as the Danes were animated by an enthusiastic spirit of patriotism, and eager by every possible means to repel the assailants, there was no want of men, skilful and brave, to work the guns, either afloat or on shore.

The day of the second of April broke, as Nelson had hoped it would, with a favourable, south-easterly wind; and the signal for all the captains to come on board the flag-ship was hoisted as soon as it could be seen. As circumstances prevented the admiral's plan of attack being strictly followed, it may suffice to state that all the lineof-battle ships were to anchor by the stern abreast of the different vessels composing the enemy's line, an operation for which they were already prepared by having cables out of their stern-ports. The Amazon, Blanche, Alcmène, Arrow, and Dart, with two fire-ships, all under the direction of Captain Riou, were to co-operate in the attack on the ships stationed at the mouth of the harbour, and to act otherwise as circumstances might require. The bombvessels were to station themselves outside the British line, and to throw their shells over it; while the Jamaica, with the brigs and gun-vessels, was to take a position for raking the southern extremity of the Danish line; and a similar station was assigned to the Desirée. It was also intended that the forty-ninth regiment, under Colonel Stewart, and five hundred seamen under Captain Freemantle of the Ganges, should storm the principal of the Trekröner batteries, the instant that its fire should be silenced by the cannonade from the ships. Between eight. and nine o'clock the pilots, most of whom had been mates in Baltic traders, were ordered on board the Elephant. But as they hesitated about the bearing of the east and of the shoal, and the exact line of deep water, it became evident that their knowledge was not to be trusted. Nelson was extremely perplexed. The signal for action had been

Reign of made; the wind was fair; not a moment was to be lost. know the unfavourable accidents which had deprived Nel- Reign of cide; but they wanted the only ground for steadiness and resolution in such a case; and Nelson had now reason to regret that he had not trusted to Captain Hardy's single report. At length Mr Alexander Briarly, the master of the Bellona, undertook to lead the fleet; and his proposal being acceded to, the captains returned to their ships, and at halfpast nine the signal was made for the ships to weigh in succession, and advance to the attack.

next in order, having anchored rather outside than off the great shoal, could not weather it, and was obliged to bring up again in six fathoms water, where the current was so strong that, although she afterwards re-weighed, and continued for a long time to warp with the stream and kedge anchors, she was compelled again to bring up nearly in the spot from which she had last weighed. When the misfortune of the Agamemnon was discovered, the admiral and the Isis steered after the Polyphemus. The Bellona, notwithstanding a fair wind and ample room, kept too close on the starboard shoal, and grounded abreast of the outer ship of the enemy. The Russell following the Bellona, also grounded; and although both were within range of shot, their absence from their intended stations was severely felt. Three ships of the squadron were now aground and comparatively useless; so that Nelson was compelled to begin the attack with one ship of the line less than he had calculated upon as absolutely necessary. In compliance with the wish of the pilots, each ship had been ordered to pass her leader on the starboard side, from a supposition that the water shoaled on the larboard; but, as Captain Hardy had proved, the water deepened all the way to the enemy's line. The Elephant, flag-ship, came next; but Lord Nelson, as soon as he perceived the state of the Bellona and Russell, ordered his helm to be put a starboard, and passed within those ships; and all the ships astern followed his example. By this act of promptitude on the part of the admiral, the greater part of the fleet were saved from going on shore. At the moment when Lord Nelson's squadron weighed, Admiral Parker's eight ships did the same, and took up a position somewhat nearer the mouth of the harbour, so as to menace the northern wing of the defence; but a nearer approach was impracticable in time to render any active service in the engagement.

The cannonade commenced at five minutes after ten, and for nearly an hour the principal ships engaged were the Polyphemus, Isis, Edgar, Ardent, and Monarch. By half-past eleven, however, the Glatton, Elephant, Ganges, and Defiance, got to their respective stations, as did also several frigates and smaller vessels, and the action now became general. The Desirée proved of great service in raking the Provesteen, and drawing part of her fire from the Polyphemus and Isis; but owing to the strength of the current, the Jamaica, with the gun-vessels, could not get near enough to be of any service in the action; and the bomb-vessels were not able to execute much. The absence of the Agamemnon, Bellona, and Russell, disconcerted the plan of the attack, and caused several of the British ships to sustain a heavier share of the enemy's fire than had been allotted to them, or they were well able to bear; and among the sufferers on this account was the Amazon frigate, which, along with four others under Captain Riou, had boldly taken a position right against the Trekröner batteries. The cannonade had continued three hours, and few if any of the Danish block-ships, praams, or radeaux, had ceased firing, nor had the contest as yet taken a decisive turn to either side. Meanwhile the commander-in-chief, near enough to the scene of conflict to

George III They were urged to be steady, to be resolute, and to de- son of one fourth of his force, and yet too distant to know George III. the real state of the contending parties, suffered the most

dreadful anxiety: and from the reports made to him that signals of distress were flying at the mast-heads of two British line-of-battle ships, and the signal of inability on board a third; from observing the zig-zag course and slow progress of the Defence, Ramillies, and Veteran, which he had dispatched as a reinforcement; and from the distance of the London, which bore his flag, preventing his judging The Edgar led the way; but the Agamemnon, which was of the relative condition of the contending parties; Sir Hyde Parker was induced to throw out the signal for discontinuing the action. When this was reported to Nelson, he continued to walk the deck without appearing to take any notice of it. At the next turn the signal lieutenant met him, and having stated that the commanderin-chief had thrown out number thirty-nine, asked if he should repeat it. "No," replied Nelson, "acknowledge it;" and presently he called after the officer to know if the made signal for the Polyphemus, which followed the Edgar; signal for close action was still flying. Being answered in the affirmative, he said, "Mind you keep it so;" and, after pacing the deck for some time, moving the stump of his lost arm in a manner which always indicated great emotion, he accosted one of the officers thus: "Do you know," said he, "what is shown on board the commander-in-chief? Number thirty-nine." The officer asked what that meant. "Why, to leave off action." Then, shrugging up his shoulders, he exclaimed, "Leave off action! No, damn me if I do. You know, Foley," turning to the captain, "I have but one eye; I have a right to be blind sometimes:" and then putting the glass to his blind eye, in sportive bitterness, he exclaimed, " I really do not see the signal;" adding, after a momentary pause, "Damn the signal! Keep mine for closer battle flying. That's the way I answer such signals. Nail mine to the mast!" The three frigates and two sloops nearest to the London, however, obeyed the signal, and hauled off from the Trekröner batteries; when " the gallant, good Riou" was killed by a raking shot, which cut him in two, just as the Amazon presented her stern to one of the latter.

About half past one the fire of the Danes began to slacken, and at a little before two it had ceased along nearly the whole of their line. Some of the praams and light vessels had also gone adrift; but few if any of the vessels whose flags had been struck would suffer themselves to be taken possession of, and fired on the boats as they approached; whilst the batteries on the isle of Amak aided them in this irregular warfare. Nelson was justly irritated at this conduct on the part of the Danes; and at one time had thoughts of sending in the fire-ships to burn the vessels which had surrendered. But, as a preliminary measure, he retired into the stern gallery, and wrote to the crown prince of Denmark that celebrated letter, which will ever be memorable in the history of England: "Vice-admiral Lord Nelson is commanded to spare Denmark when she no longer resists. The line of defence which covered her shores has struck to the British flag; but if the firing is continued on the part of Denmark, he must set on fire all the prizes that he has taken, without having the power of saving the men who have so nobly defended them. The brave Danes are the brothers, and should never be the enemies, of the English." This letter was carried on shore with a flag of truce by Sir Frederick Thesiger, who found the crown prince at a sally-port. Meanwhile a destructive cannonade was still kept up by the Defiance, Monarch, and Ganges, while the near approach of the Defence and Ramillies silenced the fire of the Indosforethen, Holstein, and the ships next to them in the Danish line. But the great Trekröner still continued its fire. This formidable work, having had nothing but frigates and sloops

George III. uninjured; and as it had just been manned with nearly fifteen hundred men, it was considered as too strong to be successfully stormed. It was now judged advisable to withdraw the fleet out of the intricate channel while the islands of Amak and Saltholm, and steered for the northwind was fair; and preparations were making for this purpose, when the Danish adjutant-general Lindholm came, bearing a flag of truce; upon which the Trekröner discontinued its fire, and the action, after having lasted five hours, during four of which it had been hotly contested, was brought to a close.

purport of Lord Nelson's note, the latter replied in writing, that humanity was the object; that he consented to stay hostilities in order that the wounded Danes might be have been for one moment intrusted to another. On the taken on shore; that he would take his prisoners out of the vessels, and burn or carry off his prizes, as he should think fit; and that he would consider this as the greatest victory he had ever gained, if it should lead to a reconciliation between the two countries. Sir Frederick Thesiger was dispatched a second time with the reply; and the Danish adjutant-general was referred to the commander-in-chief for a final adjustment of terms. Lindholm, accordingly, proceeded to the London, about four mark and Sweden had quailed; but events had already miles off; and Nelson, availing himself of the opportunity thus afforded, made signal to the leading British ships, all of which were much crippled in their rigging and sails, to weigh in succession. The Monarch led the way, and touchships, drove her clear. The Glatton, drawing less water, passed free; but the Defiance and Elephant grounded ed for many hours, in spite of the exertions of their crews. At the opposite end of the line, also, the Desirée, having gone to assist the Bellona, became fast on the same shoal. Soon after the Elephant grounded, Lord Nelson quitted her and followed Lindholm to the London. The boats of treaty of armed neutrality which she had entered into with Sweden and Russia.

This was a murderous action. Our loss in killed and wounded fell little short of twelve hundred; whilst that of the Danes, including prisoners, amounted to about six thousand. Many of the British ships had suffered severely, from the steady hull-firing of the enemy; whilst, as the heavy carronades of the Glatton and Ardent would have produced their full effect, the destruction would have

Reign of opposed to it, and that only for a time, was comparatively themselves, and important to the maritime interests of Reign of England. George II 1801.

On the 12th the British fleet sailed from Copenhagen roads by the difficult channel of the Grounds, between the ern extremity of the island of Bornholm, in order to intercept a Swedish squadron, reported at nine sail of the line. The Swedish admiral, however, whose force consisted of only six sail of the line, sought refuge behind the forts of Carlscrona; and here a negociation was opened, which, on the 22d, ended in an agreement by his Swedish majesty The message from the crown prince being to inquire the to treat for the accommodation of all existing differences. On the 5th of May Sir Hyde Parker was recalled, and Nelson invested with the command, which ought never to 8th he informed the Swedish admiral, by a flag of truce, that although Sir Hyde Parker had consented not to interrupt Swedish navigation, he, Lord Nelson, would act against the Swedish fleet if he found it at sea; and he left Captain Murray with six sail of the line, the Glatton, and a frigate, to cruise off Carlscrona. On the 14th his lordship anchored off Revel roads, prepared, if necessary, to let Russia feel " the Nelson touch," under which Denoccurred in that country which changed the aspect of affairs, and brought on an accommodation without any further hostilities.

On the 23d of March the emperor Paul, who had pered the edge of the shoal; but the Ganges taking her amid- formed so versatile and extraordinary a part on the political stage, from the period when he ascended the Russian throne, expired suddenly. His capricious tyranny, which was at about a mile from the Trekröner, and there remained fix- last about to be directed against the members of his own family, proved fatal to him, and he fell the victim of one of those conspiracies to which despots are peculiarly exposed. His son and successor, Alexander, immediately disclaimed all hostility against Great Britain, and made reparation for the damage which our merchants had suffer-Sir Hyde Parker's division were actively employed during ed from the embargo laid upon their ships. A convention the whole night of the 2d in bringing out the prizes, and was adjusted with Russia in the month of June, which put in getting affoat the ships which were aground; and, by an end to the dispute with the northern states, as Sweden the morning of the 3d, the latter, except the Desirée, were and Denmark could not of themselves hope to resist the got off. The negociations continued during the five fol-lowing days; and, in the interval, all the prizes, except the agreement it was stipulated, that effects embarked in neu-Holstein, a sixty gun ship, which was sent home, were set tral vessels should be free, with the exception of contrafire to and destroyed. Six line-of-battle ships and eight band stores of war, and the property of an enemy; that praams had been taken. Of the former, the Zealand, a the latter designation should not include merchandise of much finer ship than the Holstein, was included amongst the produce, growth, or manufacture of the countries at those consigned to the flames, for what reason we have not war, acquired by the subjects of the neutral state, and been able to ascertain. On the 9th an armistice for four- transported on their account; that the commodities proteen weeks was, after much discussion, agreed to; and hibited should be such only as were declared contraband Denmark engaged to suspend all proceedings under the by the treaty of commerce concluded between Great Britain and Russia in 1797; that a port should be considered as under blockade when the ships of a belligerent power should be so stationed as to render it evidently dangerous to enter; that neutral vessels should not be stopped, except upon strong grounds; that the proceeding should be uniform, prompt, and legal; and that the right of searching mercantile ships sailing under convoy of a ship to the Danish ships or floating hulks, the greater part of of war should only be exercised by the ships of the gothem were literally knocked to pieces; and had the pilots vernment, not by those of private adventurers. By this permitted the British ships to take a closer position, where arrangement the chief points in dispute were settled in favour of this country.

The war between France and Great Britain was now been still more complete, and certainly more rapid. For reduced to merely maritime operations, and these were of the battle of Copenhagen Nelson received the title of Vis- no great magnitude. One of the most important occurred count; a paltry reward for services equally splendid in upon the coast of Spain, between Sir James Saumarez

I James's Naval History of Great Britain, vol. ii. p. 518, et seqq. London, 1822; Southey's Life of Nelson, vol. ii. p. 100, et seqq. London, 1813.

vantage of a leading wind, he conceived that he had every prospect of success. He had previously directed Captain Hood in the Venerable to lead the squadron; but the wind failing, this officer found it impossible to occupy the station assigned to him. Captain Stirling in the Pompée, however, having anchored opposite the inner ships of the enemy, commenced the action; while, in the ardour to engage, the Hannibal unfortunately ran aground. Every effort was now made by the admiral to cover this ship from from one of the batteries on shore, he was obliged to retire, and to leave her in their hands. The loss on board the English squadron was considerable. The admiral had scarcely reached harbour when he was apprised that the French line-of-battle ships, disabled in the action of the Spanish ships of the line under the command of Don Juan de Mozen, and a French ship of seventy-four guns; and that they were all under sail on the morning of the 12th of July, together with their prize the Hannibal. He had almost despaired of having a sufficient force in readiness to oppose such numbers; but by great exertion he was able to warp out of the Mole with all the ships under his command, the Pompée excepted, which had not time to get in her masts. The object of the British admiral being to intercept this powerful force on its way to Cadiz, he observed, late in the evening, that the enemy's ships had cleared Cabrita Point, and at eight he bore up after them. About eleven the Superb came up with the hostile squadron, and opened her fire at not more than three cables' length. At this critical period a mistake of the enemy decided the fate of the action. In the darkness and confusion, the Spanish ships fired upon each other; the Real Carlos took fire and blew up; whilst the Hermenegildo, mistaking her for an enemy, ran on board of her, and shared her melancholy fate; and the San Antonio, of seventy-four guns and seven hundred and thirty men, being thus left unsupported, struck to the Superb. The remaining ships of the enemy now crowded all sail and stood out of the straits; and at daybreak there appeared in sight only one French ship, which was standing towards the shoals of Cavil. But at this juncture the wind failing her, the Venerable was able to bring her to action, and had nearly silenced her when the loss of the mainmast obliged the captain of the Venerable to desist; and this ship, which was one of eighty-four guns, escaped along with

As the French had now resumed their usual menacing project of invasion, and appeared to be collecting a force in the harbour of Boulogne, an attempt was made by Lord Nelson to obstruct their preparations; and he succeeded in doing some damage, which appears to have encouraged him to make a more serious effort. Boats intended for boarding the French vessels were sent off in the night in four divisions, under the conduct of the Captains Somerville, Parker, Cotgrave, and Jones; and launches furnished with howitzers were detached under Captain Conn to join in the enterprise. Parker's division first approached the enemy, and commenced a furious attack, making strenuous efforts, with the most undaunted courage, and sanguine hopes of success. But an unforeseen obstacle baffled all their exertions. This was a very strong netting traced up to the lower yards of the French vessels, which were also

Reign of and a squadron of French and Spanish ships of war. On fastened by chains to the ground and to each other; and Reign of George III. the morning of the 6th of July, the British admiral stood so effectual was the resistance of the enemy thus protected, George III. through the Straits of Gibraltar, with the intention of at- that the crew of Captain Parker's boat were repulsed in tacking three French line-of-battle ships and a frigate, their attempts to board a large brig, by a furious discharge which were lying at anchor off Algesiras. On opening Ca- of cannon and musketry, which killed a number of the asbrita Point he found that the ships lay at a considerable sailants, while many more were wounded and maimed. The distance from the batteries on shore, and having the ad- captain received a shot which carried off his leg and part of his thigh, and his boat would have been seized by the enemy, had not a cutter seasonably towed her off. In the mean time Somerville silenced the fire of a brig near the pier head; but so far from being able to bring her off, he found difficulty in securing the retreat of his own boats. Cotgrave, after a spirited attack, was deprived of the services of many of his men by a fire from the flotilla and the shore. And Jones felt so strongly the obstruction of the tide, that not being able to approach before the break the enemy's fire; but as she was only three cables length of day, when the other captains were returning, he retired without making any hostile attempt. Captain Parker died of his wounds after the return of the fleet to the Downs. The number of British seamen killed and wounded on this occasion amounted to nearly two hundred.

Owing to the refusal of the former administration to ra-6th, were on the 8th reinforced by a squadron of five tify the capitulation of El Arish, negociated between General Kleber and Sir Sidney Smith, the French still retained possession of Egypt. To remedy this unpardonable blunder a considerable force had been dispatched from Great Britain, under the conduct of an experienced and gallant officer, Sir Ralph Abercromby. The British forces under Lord Keith and General Abercromby, after unexpected delays on the coast of Asia Minor, arrived off Alexandria on the 1st of March; and the following day the fleet made sail for the bay of Aboukir, where it anchored. The sea continued to run high until the 8th, and no disembarkation could be effected; but on that day the first division made good their landing at ten o'clock in the morning, in the face of a body of French, who, evidently aware of their intention, were posted in force, with considerable advantage, on some sand hills opposite the landing place. The front of the disembarkation was narrow, and a hill which commanded the whole appeared almost inaccessible; yet the British troops ascended it under a fire of grape and musketry with the utmost intrepidity, and forced the French to retire, leaving behind them seven pieces of artillery, and a number of horses. The disembarkation was continued during that and the following day; while the troops which landed on the 8th advanced three miles the same day. On the 12th the whole army moved forward, and came in sight of the French, who were formed advantageously on a ridge, with their left resting on the canal of Alexandria and their right towards the sea. As it was determined to commence the attack on the 13th, the British force marched in two lines by the left, with an intention of turning the right flank of the enemy. But the attack was in some measure anticipated by the French, who descended from the heights on which they were formed, and assailed the leading brigades of both lines. The British troops were therefore compelled to change their front, which, though one of the most difficult operations in war, was executed with the greatest precision; and the rest of the army immediately followed their example. After a severe conflict, victory declared in favour of the English, though not without considerable loss.

The French commander-in-chief, Abdallah Menou, appears to have acted upon this occasion with but little judgment. Instead of bringing down nearly his whole force to the coast, which would have enabled him greatly to outnumber, and consequently, in all probability, to defeat the invaders, who were less acquainted with the country than his own officers, he thought fit to hazard an engagement on the 21st of March with only half his force. The battle commenced before day light in the morning, by

the right of the English army, which they endeavoured by every possible means to turn. The attack on this point was begun with great impetuosity by the French infantry, sustained by a strong body of cavalry, who charged French were twice repulsed, and their cavalry were reinfantry, who were also repulsed and obliged to retreat. A corps of light troops, however, advanced, supported by infantry and cavalry, to keep in check the left of the English, which was the weakest of the line; but all their efforts were fruitless, and the British remained masters of the field. The loss on our side was great, amounting in killed, wounded, and missing, to upwards of fifteen hungenerals, Roiz, was killed, and Generals Lanusse and Bodet died of their wounds. A French regiment which had been styled Invincible was destroyed in this battle, and its colours fell into the hands of a serjeant of the 42d regiment, called Sinclair, having, it is said, been picked up on the field by a Maltese, named Anthony Lutz. The victory of the 21st decided the fate of Egypt. In this battle, however, the British army suffered a great calamity in the loss of its general. This officer was at once beloved and esteemed by the soldiers whom he commanded; he preserved the strictest military discipline, while at the same time he secured the attachment of his troops by his obvious anxiety for their welfare. Early in the revolutionary war he had been employed on the Continent. He commanded the advanced guard in the action on the heights of Cateau, and he conducted the march of the guards from in 1794. In the following years, till 1797, he command-British in the West Indies; and on his return to Europe he was invested with the rank of lieutenant-general, and appointed to the command of the forces in Ireland. In this station he made great efforts at once to protect the people and restore discipline to the army, both of which the violence of faction had induced the rumanners, yet he possessed great independence of character, and did not hesitate to express, in public orders, the indignation which he felt on observing the disorder and consequent misery which had been introduced into Ireland, by encouraging the licentious insolence of the troops towards persons accounted disaffected to the government: freely informing the army in that country that they were become formidable to every one but the enemy. In the expedition to Holland he displayed military talents which excited the admiration not only of his own army, but of the generals who were opposed to him.

After the death of Sir Ralph Abercromby, the command devolved upon General Hutchinson, who lost no time in proceeding towards Alexandria, where the principal force of the enemy was now concentered. In the mean time the town and castle of Rosetta were taken by a division of the British army under Colonel Spencer, aided by a body of Turks. The French garrison, amounting to eight hundred men, made but a feeble resistance, and retired to the right bank of the Nile, leaving a few men killed and prisoners. While such was the state of affairs in the neighbourhood of Alexandria, Admiral Blan-

Reign of false attack on the left of the English under Major-gene- fected a landing at Suez. The admiral had been sepa- Reign of George III. ral Craddock, in which the French were repulsed. But the rated from the rest of his squadron in the dangerous and George III. most vigorous efforts of the enemy were directed against difficult passage of the Red Sea; but before the end of April he was joined by a large reinforcement under the command of General Baird, who had with him Colonels Wellesley and Murray, and other officers of distinction.

As the capture of Grand Cairo, next to that of Alexin column. The contest was unusually obstinate. The andria, was a great object with the allies, a force was detached early in May for its reduction. On the 9th Genepeatedly intermixed with the English infantry. While ral Hutchinson, with four thousand British and an equal this was passing on the right, the French attempted to number of Turks, attacked the French near Rhamanieli; and penetrate the centre of the British army with a column of the latter being driven in, retreated in the night towards Cairo, leaving a small garrison at Rhamanieh, which on the following day surrendered to the British. of the English on this occasion did not exceed thirty men. About the same time a body of French and Copts, who had moved forward from Cairo to attack the Turks, were defeated by the grand vizier, who was essentially assisted by Colonel Murray and other British officers. The French dred. The loss of the French was calculated in the are said to have lost fifty men, and the Turks about thirty English accounts at three thousand. One of the French in this action. The whole number of French engaged amounted to nearly five thousand, and the Turkish army to about nine thousand.

From various causes, it was the middle of June before the British army under General Hutchinson reached the vicinity of Cairo, where he found the works very much extended, though the garrison did not exceed five thousand in number. The capitan pasha at the same time invested Gizeh, a suburb of Cairo, on the left bank of the Nile, and the grand vizier took a position within cannon-shot of the city. Thus invested on every side, the garrison, on the 22d, sent a flag of truce to the English general, offering to treat for the evacuation of Cairo upon certain conditions. After a negociation of several days, the surrender was finally agreed upon in a convention of twenty-one articles; the substance of which was, that the French army at Cairo and its dependencies were to be con-Deverter to Oldensaal in the retreat of the British troops veyed in the ships of the allied powers, and at their expense, together with their baggage, arms, ammunition, and ed in chief in most of the successful enterprises of the other effects, to the nearest French ports in the Mediterranean; and of this convention General Menou was to be at liberty to avail himself. The port of Alexandria was all that now remained in possession of the French; it was attacked by sea and land, and at length surrendered by capitulation on the 2d of September.

By the time when intelligence of this event reached lers of that country to neglect. Though a man of simple England, the views of men had been turned to a new state of things. Administration had seriously entered into negociations for peace, which were conducted by Lord Hawkesbury on the part of Great Britain, and M. Otto, who resided in London as agent for the French prisoners of war, and who was now intrusted on the part of the French with this important business. The whole was managed with such secrecy, that not even persons who held official situations, except those immediately concerned, were acquainted with the state of the negociation; and the lord mayor of London was the first person out of the cabinet to whom the result was communicated. Thus no unfair advantage could be taken; and this treaty stands almost singular on our records, since, at a period when the practice of gambling in the public funds was, from the wide extension of public credit, more predominant than at any previous crisis, not a single instance occurred of any sinister practice. By the preliminary articles, which were signed at London on the 1st of October, by M. Otto on the part of the French republic, and Lord Hawkesbury on the part of his Britannic majesty, Great Britain agreed to the restoration of all her conquests, the island of Trinidad and the Dutch possessions of Ceylon excepted. ket, with a considerable force from the East Indies, ef- The Cape of Good Hope was to remain a free port to all

Reign of the contracting parties, who were to enjoy the same ad- northern powers had been adjusted. It stated that the Reign of George III. vantages; the island of Malta was to be evacuated by territories of Rome and of Naples; the republic of the Seven Islands was recognised by France; the fishery at Newfoundland was re-established on its former footing; and, finally, plenipotentiaries were to be named, and to repair to Amiens, in order to proceed with the arrangement of a definitive treaty of peace, in concert with the allies of the contracting parties. During the war, negociations for peace had so repeatedly proved unsuccessful, that a general incredulity prevailed with regard to the possibility of such an event; and accordingly all merchants conducted their speculations upon the supposition that there existed no probability of an immediate termination to the war. The state of the present negociation had been so carefully concealed, that, when the official intelligence of its issue was transmitted throughout the country, it excited everywhere the utmost astonishment, but nevertheless produced, almost instantaneously, the most unbounded expressions of joy among all orders of persons. The zealous adherents of the late administration, indeed, were upon the whole rather dissatisfied; but their voice was overwhelmed in the general acclamations which took place, and far surpassed the expressions of joy which had occurred at the termination of any former war; and, as an abundant harvest was at the same time reaped, the prospect of plenty added greatly to the public joy.

## CHAP. XVII.

REIGN OF GEORGE III .- FROM THE PEACE OF AMIENS TO THE RENEWAL OF THE WAR IN 1803.

Meeting of Parliament.—Speech from the Throne.—The Peace impugned by Mr Windham.—Debates on this subject.—Definitive Treaty. - Suspicious conduct of Bonaparte. - Debates on the Definitive Treaty.—General Conduct of Administration.— Effects of the Change of Ministry.—Consequences of the Peace. -Conduct of the French Government.-French Expedition to St Domingo.—Abominable cruelty and oppression practised by the invading force.—Conduct of the French in Europe —Despotism of Bonaparte.—The First Consul and the English Newspapers.—Meeting of Parliament.—Execution of Despard and his Associates.—Difficulties experienced in executing the Treaty of Amiens.—Bonaparte's Conversation with Lord Whitworth. Transference of Louisiana.—Extraordinary Scene between the First Consul and the British Ambassador.—Ultimatum of the British Court.—War renewed.—Declaration in justification of the renewal of the War.-Situation of the Ministry.-State of Parties.—Menace of Invasion.—Preparations for encountering the threatened attack .- Patriotism of all classes .- The army, the militia, the army of reserve, and the volunteers.

Parliament assembled on the 29th of October. By this time the new administration, from the mildness of their conduct, and their successful negociations for peace, had obtained a powerful hold on the affections of the public. but this kind of gratuitous support could scarcely be expected to be very consistent or uniform. Mr Pitt him-

preliminaries of peace had been ratified between us and George III. the British troops, and restored to the order of St John the French republic; that whilst this arrangement maniof Jerusalem; Egypt was to be restored to the Ottoman fested the justice and moderation of our views, it would Porte; the territory of Portugal was to be maintained in also be found conducive to the interests of the country its integrity; the French troops were to evacuate the and the honour of the British character; and that as the provision for defraying the expenses of maintaining an adequate peace establishment could not be made without large additional supplies, all possible attention would be paid to such economical arrangements as were consistent with the security of his majesty's dominions. The speech concluded with applauding the operations of the last campaign, and particularly the glorious issue of the expedition to Egypt, which, however, has deserved and obtained a more fitting commemoration.

In the House of Lords the motion for the usual address passed unanimously. In the House of Commons, both Mr Fox and Mr Pitt declared that they joined in the general joy which the peace had produced, and gave it their approbation. On the other hand, Mr Windham differed as to there being any just cause for general joy and exultation; and he disapproved of the preliminaries of peace signed with France, as well as of the address, in as far as it implied an approbation of them. It behoved him to give his reasons for dissenting on so material a point. To stand as a solitary mourner in the midst of public rejoicings, to wear a countenance clouded with sadness whilst all others were lighted up with pleasure, certainly appeared ungracious. But were the circumstances of this peace such as justified our exultation upon former occasions? To him they appeared in a quite contrary view; and when he was desired to illuminate, he first endeavoured to learn whether it was to light him to a feast or a sepulchre. It was his firm persuasion, that in signing this peace his friends had put their signatures to the death-warrant of the country. He knew the inconsistency of human affairs, nor was he profane enough to set bounds to the dispensations of providence; but neither could he foresee what changes might be wrought in the disposition of the people of England by intrigues from without or convulsions from within; and upon no rational view could he see his way out of the evils it would entail upon this country. The only thing necessary to enable France to divide with us the empire of the seas was a participation of our commerce, and this she would effectually secure by the present peace; whilst, by the surrender of our conquests, we had thrown out of our hands the only means to prevent it, the extension of our colonial system. The motives which induced ministers to conclude these preliminaries, he knew not; some of them he had heard, but was not convinced, as they appeared wholly insufficient. If they were forced to accept this peace through inability, their conduct was the more excusable; and we had to thank them, not for what they had acquired, but saved to their country. If they could prove that, by ceding foreign colonies, they had preserved objects nearer and dearer to us, as Portsmouth, Plymouth, and Ireland, and the soil of England, from ravage and desolation, they were entitled to gratitude instead of censure, and had established, not a ground of apology, but a claim to thanks. When they first came into office they appeared to have But such a plea he did not recognise; and how far they obtained a promise of support from their predecessors; were actuated by necessity, would be a matter for future discussion.

Mr Addington described the observations of Mr Windself continued to give countenance to the minister; but ham as premature, since the articles of the treaty were some of his friends avowed their dissatisfaction on ac- not before the house; and, without referring to the terms count of the treaty with France. The speech from the of the peace, he affirmed, that all we had given up would throne announced the conclusion of the negociations com- have afforded us no sort of security against the dangers menced during the last session of parliament; and ex- apprehended by Mr Windham, and that the best counterpressed much satisfaction that the differences with the poise to the power of France consisted in the preservation

1801.

Reign of our constitution, in our industry and skill, and in the West Indies we had Martinico, Trinidad, and other islands; Reign of George III. right direction of our resources. Mr Sheridan, notwithstanding the unanimity with which the address was consented to, believed, that if men sincerely delivered their opinions, there never was a period of less real unanimity. The peace had been spoken of as glorious and honourable. It was a peace of which every Englishman might be glad, but no one proud; and it involved a degradation of national dignity such as the war might lead us to expect, though perhaps it was as good as any minister could make in the

circumstances in which we were placed. His majesty having by message communicated the preliminary treaty with the French republic, an address of thanks was moved on the 3d of November, when Earl Spencer expressed his regret at differing in sentiment from the ministers, with some of whom it was his pride to have coincided in principles, and co-operated in conduct. The great object of Britain, in former wars with France, had been the preservation of the balance of power. This was the point which had been considered, from king William's confederacy against Louis XIV. to the present time; and to insure the maintenance of such an equilibrium, it was not only necessary that Britain should not be left by the peace in a worse political situation than in the beginning of the war, but that her strength, possessions, or acquisitions, should continue in proportion as high as those of France. In the present war, the acquisitions of France had been infinitely beyond all former conception; she had, by her arts or her arms, subdued the Netherlands, Holland, the left bank of the Rhine, and a great part of Italy; her power, compared with that of Great Britain, exceeded what she had been allowed to retain at any former treaty of pacification; nor could we be secure, when such immense acquisitions had been left to France, without any thing like an equivalent left to this country. He therefore condemned the conditions of the peace now concluded, as of very great inequality, whether with reference to the relative state of France and the Continent, or to that of France and England. Lord Pelham thought that the terms of peace were the best which could be procured, even in favour of our allies. Portugal was safe, the Roman and Neapolitan territories had been released from the French yoke; the French were expelled from Egypt, by which our Ottoman ally had been saved; and with regard to Malta, its retention would have been more injurious than beneficial to England, as a powerful garrison would have been requisite for its protection. In the East and West Indies we had been triumphant by sea and land; and our possessions had received important additions by the conquests we had made. As to the security of the peace, we had every security which could be expected; and besides, it was the policy and interest of France to prea prosperous state, we ought to have obtained more honourable terms of peace, because we were in a condition to demand them. It was far from his intention to undervalue the acquisitions of France; on the contrary, he thought them much more important than was generally esteemed. She had made the Rhine the boundary of the empire, and extended her territories beyond the ambition of her monarchs, having her frontiers protected by dependent republics and tributary kings. On our side we had triumphs no less brilliant and striking. We had multiplied our colonies, and our navy sailed the seas invincible; we had rescued Egypt, captured Malta, possessed ourselves of France and Spain; the Cape of Good Hope, the key of the East, was ours; in the East Indies we had every thing except Batavia, which we might also have possessed had

upon the continent of South America we had an absolute George III. empire, in extent almost equal to that power to which we restored it. Such were the colonial possessions acquired by the war; and if Europe could not have been restored to her pristine state, these ought to have been retained as a counterpoise to the power of France. He denied the fairness of comparing the present treaty with that proposed at Lisle. We now gave up Surinam, Malta, and At no time during the contest was the spirit

of the country so depressed as at the negociation of Lisle. A variety of causes combined to produce that despondency; the stoppage of the bank, the defection of our allies, and, above all, the mutiny in the fleet. The measure, therefore, was defensible on the score of necessity; but this was not the case at present; yet we had given to the French the only thing they wanted, the means of creating a navy, and of rivalling us in our commerce, while we had obtained nothing in return. The Earl of Moira was of opinion, that though the terms of the treaty were inadequate, they were unavoidable. Lord Nelson observed respecting Malta, that when he was sent down the Mediterranean, this island was in the hands of the French; and on his return from Aboukir, it was his first object to blockade it, because he deemed it an invaluable service to rescue it out of their possession. In any other view it

was of no consequence, being at too great a distance from Toulon to watch the French fleet from that port; and in time of peace it would have required a garrison of seven thousand men, and in war as many more, without being of any real utility to us. The address was carried by a

great majority.

When the same subject was discussed in the House of Commons, Lord Hawkesbury ascribed the origin of the war to the interference of France in the affairs of other nations; but the state of that country was now considerably amended, and it was impossible to look at the present condition of France without being convinced that we had at least effected this change. He then expatiated on the advantages we had gained, and the good faith we had maintained with our allies, releasing them from express stipulations when they were exposed to danger by continuing faithful to their engagements. With respect to Minorca, he did not consider that island as an acquisition worth retaining. Of Malta he spoke with less confidence, as, from its impregnable state, it was certainly of political consequence in the Mediterranean; but it was no source of trade and opulence; and, connected with the prosperity of the Levant, its consequence was considerably diminished. In a word, considering the results of the war, if the term glory were not taken into account, we had at least made an honourable peace; serve it. Lord Grenville thought that, as Britain was in we had been engaged in a tremendous contest, and had come out of it, considering the circumstances, with advantage. Earl Temple considered those who had signed the peace as having signed the ruin of their country. Amongst the ill consequences likely to result from it, he lamented the encouragement given to republican principles; and as to the various ostensible objects of the war, not one of them had been accomplished. Mr Pitt said that it was undoubtedly the duty of government, in negociations, to obtain the best possible terms; but it was difficult to know how far insisting on some lesser points might endanger the whole treaty; and he declared that he would rather close with an enemy on any terms of Minorca, and shut up the Mediterranean from the ships not inconsistent with the honour of his country, than continue a war for any particular possession. He did not pretend to state that this peace fully answered all his wishes; but the government had obtained the best we thought it worth the cost of an expedition; in the conditions they could, and the terms for which we con-

George III the war. Mr Fox declared himself satisfied with the terms of the treaty, and asserted, that no perseverance in the war would have enabled us to make peace upon better conditions. There were persons who lamented the peace as glorious for France; but if it were so, and not inglorious to England, it gave him no concern. The opinions of men depended in a great degree upon their conceptions of the causes of the war; if one of its objects was the restoration of the accursed despotism of France, to him it was another recommendation of the peace, that it had been obtained without the accomplishment of such an object. In the terms and tone of the present treaty he perfectly coincided. He approved the terms, and thought the noble secretary had wisely tempered firmness of conduct with moderation of tone; but further than this he could not go. He would by no means agree respecting the time in which the treaty was made: it came many years too late. He would put it to the house, whether, at the time the opposition was most railed against for advising pacific measures, we could not have made peace on terms equally advantageous with the present. Would not France, on the breaking out of the war, have acceded to any? Would she not then have relinquished Holland, and perhaps abandoned her designs on the Netherlands? But, since that eventful period, could we not have negociated better after the surrender of Valenciennes; and again, at Lisle, when we only failed from the extravagant pretensions of administration? In January 1800, the first consul made a direct overture, and we returned an answer, that the most effectual mode of facilitating peace would be to restore the Bourbons. Did we hint then at the possession of Ceylon or Trinidad? Would not Bonaparte have added these? Yes, and the Cape into the bargain. We then might have had Egypt by the convention of El Arish. The gallant Abercromby, indeed, would not have fallen covered with laurels in the lap of victory, nor would our brave army have acquired immortal honour; but we should have gained Egypt without the loss of blood or treasure. The first consul might not perhaps have relinquished the Netherlands, nor the left bank of the Rhine; but in Italy he had only the Genoese territory, and we had nothing then to resist to the southeastward of the Alps, and our allies were victorious on the frontiers of France. At that time the instability of the government operated with us; but neither its stability nor its instability were of any real consequence. None of the convulsions and changes of the French revolution produced any material difference in her relation with foreign powers. She had at the beginning made peace with Prussia, and sedulously preserved it during the stormy times succeeding its ratification. We were told by the ministers to pause, and we did pause from January 1800 to October 1801, and added seventy-three millions to our national debt since we returned that impertinent answer to the overtures of Bonaparte; and this pause cost five times as much as all the Duke of Marlborough's campaigns.

To negociate the definitive treaty of peace, the Marquis Cornwallis went to Paris towards the close of the year, and thence proceeded to Amiens, where the negociations went on very slowly, and were not concluded till the 27th of March 1802. The chief difficulty occurred with regard to Malta. But it was at last agreed that it should be restored to the knights of the order of St John of Jerusalem, under the protection and sovereignty of the king of Naples; that it should be under the guarantee of France, England, Russia, Spain, Austria, and Prussia; and that if the order should not have sufficient troops to defend the island, the guaranteeing powers should each contribute an equal portion of troops, the officers to be appointed by the grand

Reign of tended would not have justified ministers in protracting master. It was settled that Malta should be a neutral Reign of port, that one half of the garrison should be Maltese, and George III. that there should be no French nor English body of knights, or tongue as it is called. The king of Naples, however, was to be invited to garrison the island with two thousand men for one year from the restitution of the knights; which was to take place in three months after the exchange of the ratifications of the treaty. In other respects the definitive treaty differed little from the preliminaries formerly agreed to.

> During the dependence of the negociation, the first consul, Bonaparte, had taken some steps which indicated little moderation, and showed that it would be difficult to remain upon terms of amity with him, while the desire of extensive dominion which at present governed his councils seemed of too restless a character to allow much hope of tranquillity to the world. Without waiting till a definitive treaty of peace had been concluded, he sent a large army to St Domingo, which obliged Britain to dispatch a powerful fleet to the West Indies in order to watch its motions. On the Continent his measures were not less arbitrary. A considerable portion of Lombardy, with Milan as its capital, which had been erected into what was called the Italian or Cisalpine republic, and contained some millions of people, was now united to France, by the form of nominating Bonaparte to the office of president over it; a measure which at any other period would have involved all Europe in war: but at present no state ventured to interpose, and the British ministers finding no power in Europe disposed to resist this step towards the permanent aggrandisement of France, and being themselves anxious to restore peace, did not interruptithe negociations on this account.

On Thursday the 29th of April Lord Pelham, by his majesty's command, laid before the House of Lords a copy of the definitive treaty of peace between his Britannic majesty and the French republic, and his Catholic majesty and the Batavian republic, signed at Amiens on the 27th of March. Several debates occurred in that house upon the subject; and at length, on the 15th of May, Lord Grenville moved the order of the day for the house to take into consideration the definitive treaty. He remarked, that it might be asked of what use was discussion, now that peace was concluded? Was it to abrogate, could it correct the treaty? To this question he answered, that this unfortunate treaty had been ratified by his majesty, and was therefore irrevocable; to its terms, however injurious, we were bound to accede. By evasion we should but add disgrace to disaster, and with the loss of national honour fill up the measure of national calamity. He wished not to impede the execution of the treaty, but to demonstrate to that house its dangerous tendency; to ascertain the situation in which it left the country; to point out the perils which impended, and the safety which yet remained. His objections to the preliminary treaty he had already stated; but to the definitive treaty there were objections yet more formidable. The two bases of negociation, the status ante bellum, which signified the actual situation of the parties previous to hostilities, and the uti possidetis, which referred to their position during the pacification, had both been applied in the most prejudicial manner to this country. With regard to herself, England had adopted the status ante bellum; with regard to her rival, the uti possidetis. England had ceded her own conquests, and confirmed to France her new acquisitions. France possessed dominion on the Continent; we had, to oppose that dominion, the colonies of France and Spain. It would have been just that France should purchase our colonial by her continental sacrifices. He contrasted the definitive treaty with that of 1763. It had been an invariable principle with Lord Chatham to make the prelimi-

Immediately subsequent to the preliminary treaty, France the incapacity of the British ministry had lost. had sent an armament to the West Indies, and obliged England to destine for the West Indies also a naval force more than double any squadrons which had been sent during the war. The necessity of keeping in the West Indies thirtyfive sail of the line was the first fruit of the peace. It was obvious that the definitive treaty contained concessions more important than the preliminary articles; and it was palpably the object of the French government to exclude the commerce of this country from the continent of Europe. With respect to the situation in which Portugal and the Prince of Orange were left by the treaty, it had been said that it was a pity, and that the articles were read with regret. The proposed indemnity to the Prince of Orange was evidently at the option of France; for the Cape of Good Hope, no effort had been made to insure its independence; and Malta, whose independence had been expressly stipulated, with the provision that it should be guaranteed by one of the powers of Europe competent to its protection, was finally placed under the guarantee of six powers, who never could be brought to agree on the subject of it. Its restoration to the order was nominal and futile. The order of Malta was virtually extinct; it would be subject to the nomination, the influence, and the dominion of France. He then proceeded to take a retrospective view of the situation of this country at the commencement of the negociation. With a colonial territory of an immense extent, we had, in the very conquests achieved by our arms, the means of perpetuating our victories. From the West Indies, the produce of which amounted to two millions annually, a considerable revenue had arisen, which was now lost. By our naval superiority we had controlled the movements of the French fleet; they were now at liberty to steer for the West Indies, and we were the states-general promised not to obstruct the navigation under the necessity of sending fleets to watch them. We of British subjects in the Eastern seas. That article was were in possession of resources adequate to the prosecution of the war, and held in our hands the means of extorting a just and reasonable peace. Instead of improving these advantages, we had resigned to France the preponderance of power on the Continent, established her sway in Italy, and annexed to her important possessions in India. Even our right of sovereignty in India was no longer recognised. It had been suggested that this right 1802, to resume the competition to which they were unwas guaranteed by the silence of the definitive treaty; a equal, in 1786, under the existing tariff. With regard to mode of argument which appeared equally strange and singular. He affirmed that the sovereignty of the Cape was necessary to the safety of our territories in India, and instanced the war with Tippoo Sultan, when a corvette had been sent to the Cape, from which fresh troops were immediately dispatched, who landed, marched, and co-operated at the siege of Seringapatam. By ceding the Cape to Holland, we had ceded it to France. In the West Indies we had restored to France Martinique and Tobago, and facilitated the recovery of St Domingo. France was also mistress of Louisiana, and in reality of Florida, which could not, from its vicinity to Louisiana, remain subject to Spain; and she possessed the key of Mexico, which she might enter at any period. If we turned to the Mediterranean, it would be impossible to send a single ship there without the permission of France. We were stripped of Majorca, Minorca, and even of the island of Elba; we were excluded from Leghorn, and deprived of the means of maintaining a fleet in that sea; the king of Sardinia could no longer open to us his ports. The victory obtained by Lord Nelson at Aboukir was to be attributed to the assistance rendered by the king of Naples; and in return for these services, the British government had stipulated

Reign of nary as much as possible the definitive treaty. Our ne- without stipulating that they should not return to them. Reign of George III. gociators had treated with France during a naval armistice. In short, whatever the valour of the British navy had won, George III.

The Duke of Norfolk expressed his hope, that, now the sword was restored to its scabbard, it would not again be unsheathed for the acquisition of a station in the Mediterranean. Lord Auckland, in reply to Lord Grenville, stated, that it was an error to hold that all treaties between nations were annulled by war, and that, to be reinforced, they must be specially renewed on the return of peace. It was true, that treaties, in the nature of compacts and concessions, the enjoyment of which has been interrupted by the war, were thereby rendered null; but compacts which were not impeded by the course and effect of hostilities, such as the rights of a fishery on the coasts of either of the belligerent powers, the stipulated right of cutting logwood in a particular district, were not affected by war. There were also circumstances which might authorize the dissolution of treaties, without any rupture between the two parties. It had therefore been observed by Vattel and other writers, that treaties cease whenever an essential alteration in either of the contracting parties takes place. Applying this doctrine to Savoy, Switzerland, and other countries, the temporary victims of the French revolution, he admitted that the definitive treaty contained not a single provision, direct or indirect, for the renewal of treaties which had subsisted previous to the war; but it was not true that, by the non-renewal of our treaties with Holland, the vessels of that republic would be exonerated from the ancient practice of striking their flag to British ships of war in the British seas; for that practice had existed independently of the treaty of 1782, or even of the treaty of Breda in 1767, which were only recognitions of a previously admitted claim. The same remark was applicable to the sixth article of the treaty of 1764, by which no new grant, but an acknowledgment of a right, and a notification to merchants that they would not be disturbed in the exercise of that right. With respect to France, the commercial treaty of 1786 had expired, but not till it had reached the natural era of decay; nor would he feel solicitude for its resuscitation, unless our negociator at Amiens should prove that the French manufacturers were able, in our sovereignty in India, it had been confirmed and extended by various treaties, recognised by all the powers of Europe and India who had accepted privileges from us, and finally established by undisturbed possession. On the contrary, Lord Carnarvon represented the treaty as pregnant with danger to the country. It had been hoped, that some articles relative to our allies, and involving our own national honour, would be altered; but the definitive treaty, instead of realizing, had annihilated these hopes; concession was heaped on concession, and disgrace on disgrace. By omitting to renew former treaties, ministers had unadjusted all former adjusted disputes, and, without the customary acknowledgment of our rights, had left us to the honour and justice of France. Lord Ellenborough expressed much surprise that the non-renewal of treaties should have been urged as a serious objection to the definitive treaty. To what purpose was this solemn nonsense to be revived? Were not these treaties replete with articles wholly inapplicable to the present political state of Europe? For himself, he could as well think of the revival of the condition of mankind, in some remote period, as of the ancient treaties, which had become inapplicable and obsolete. Our sovereignty in India rested on the rights of that the French republic should evacuate his dominions, conquest in legitimate war, upon the repeated recognition

Reign of of all the powers of Europe, and on the best of all rights, George III. possession.

1802.

The same subject, after being repeatedly alluded to, was finally discussed in the House of Commons on the 13th of May. Mr Windham attacked the treaty in several of its prominent parts. With regard to Malta, he contended, that it must ultimately fall into the hands of the French. The little order of Malta, which contained in itself the great characteristic and distinctive qualities which the French revolution had subverted, was now destroyed. The German knights had already refused to serve in a body so degraded and debased; the Neapolitan soldiers would form no security for the independence of the island; the state of Malta was a virtual surrender, and our position in the Mediterranean untenable. The Cape of Good Hope was ceded, in full sovereignty, to the Dutch, who were thus at liberty to resign it to France. Our Indian empire was our sheet anchor; and whatever was necessary for its preservation was of the last importance. The disadvantages upon our side he then contrasted with the advantages in favour of France. By the restitution of Cochin China to the Dutch, they had acquired the means of annoying our possessions in the East Indies. In defining the boundaries of France and Portuguese Guiana, ministers had enabled France to obtain her great object, the navigation of the river Amazons; and the Portuguese settlements were left exposed to the foe. He deplored the cession of Louisiana to France, which, considering the almost indefinite extent of Guiana, was a surrender of the two greatest rivers in the world; the Mississippi in the north, the river of Amazons in the south of America. In aggravation of this thoughtless prodigality, ministers had abandoned the whole continent of Europe to France. We already knew the French too well to doubt that they would scruple what means they used to accomplish their ends. Had they not fraudulently obtained the restitution of Porto Ferrajo to the king of Etruria, in order to secure it to themselves? Regardless of stipulations and treaties, they had seized on the island of Elba; and, to bestow a compensation on the king of Etruria, had extorted Piombino from Naples. The French were a new race of Romans; and in ten years they had even acquired more than the Romans were able to achieve in fifty-three. On the map of Europe two nations only stood erect; and of these, the one from distance more than from strength. Austria was indeed still rich in resources, but destitute of foreign aid. There was no single power which could enter the lists with France. In the first conflict it would be crushed by her tremendous mace. He repeated, that we had given away two continents, and that the object of France obviously was the attainment of universal empire. He admitted that the peace must be observed, now that it had been entered into; but concluded with a motion for an address, expressive of disapprobation of it.

Lord Hawkesbury observed, that from some observations of Mr Windham's, it would seem that whenever any continental power, however unconnected with us, became involved with France, it was our duty to volunteer our interference and assistance. That we were deeply interested in the destiny of the Continent, he was willing to admit; but he conceived our interference with its commotions to be optional, neither instigated by necessity nor extorted by honour. At the end of nine years of war, we had found ourselves deserted by our allies; and with the first intination which his majesty's ministers received of the new constitution of the Italian republic, they had heard of its acceptance by the courts of Vienna, Berlin, and Petersburg. Under these circumstances, he submitted, whether it was incumbent on us to continue the war on account of the Italian republic The cession of Louisiana by Spain to France

was another ground of complaint. That province had Reign of originally been a French colony, when the Mississippi was George III. the boundary between it and Great Britain; and it had been ceded by France to Spain, in a private convention, between the preliminaries and the definitive treaty of 1763; a proof that conventions of this nature, if not right, were at least not new. The value of Louisiana was at present only nominal; as a naval station it was allowed to be insignificant; and its vicinity to America was calculated to diminish, rather than augment, the attachment of that country to France. Concerning the non-renewal of certain treaties and conventions, he observed, that the principle on which treaties had usually been renewed appeared not to be understood. The treaty of Westphalia formed a distinct era in the history of Europe; and in order to ascertain the relative situations of the different powers, it had been customary to renew that treaty, together with any particular conventions subsequent to it. But it was to be considered, that formerly all preceding treaties had been renewed by the other powers of Europe, whereas in the present war no European power had done so; and consequently, if we had renewed former treaties, we only should be bound whilst other nations were free. By renewing former treaties, we should have been forced to sanction all the recent encroachments of France; and by sanctioning the treaty of Luneville we should have been accessory to the dismemberment of the Germanic empire. His lordship represented the definitive treaty as coinciding with the preliminary treaty which had previously received the sanction of the house. In regard to the permanence of the peace, he was willing to admit, and to deplore, that, in the present state of the world, any peace must be insecure; but the precarious tenure on which this blessing was to be held formed no reason for rejecting it. He concluded with moving an address to his majesty, to testify the satisfaction of the house on the conclusion of the definitive treaty. Mr Dundas also opposed Mr Windham. In his judgment, however, the Cape and Ceylon formed our two great bulwarks, and he never would have consented to the surrender of the former. The cession of Malta was also to him a subject of equal regret; and to the relinquishment of either of those places he should have refused his assent had he continued in administration. But he would not support the address moved by Mr Windham, because it contained an invective against the peace. Sir William Young contended, that when a standing army was deemed essential to the preservation of peace, it was proper that the people should be informed of the state of affairs which justified such a measure. Lord Castlereagh remarked, that our grand object, from the commencement to the close of the war, had been the establishment of general security; and that the gradual extinction of jacobin principles, and the gradual restoration of order and tranquillity, had been given as sureties for the peace. With regard to the territorial acquisitions of France, they might eventually become of infinite importance; but they were not pregnant with immediate mischief, and could only be the sources of distant danger. Mr Addington desired not that the treaty should be praised; he had never regarded it with sentiments of exultation, nor lavished on it panegyric; he was content that the honour of the country was unsullied by the measure which had been adopted. He acknowledged that the territorial acquisitions of France could not be viewed without regret; but there were events which we could not control, and dispensations in which we must acquiesce; and he should rejoice to see the resources of this country economized by peace. Mr Sheridan treated the subject with some gaiety. He said he supported the peace, because he was convinced that ministers could obtain no better; their predecessors

Reign of had left them to choose between an expensive, bloody, George III. fruitless war, and a hollow, perilous peace. He attacked the new oppositionists, who had been supporters of the former administration, and demanded, for what did we go to war? Why, to prevent French aggrandisement: Have we done that? No. Then we are to rescue Holland: Is that accomplished? No. Brabant is the sine qua non: Is it gained? No. Then come security and indemnity: Are they obtained? No. The late minister told us, that the example of a jacobin government in Europe, founded on the ruins of a holy altar, and the tomb of a martyred monarch, was a spectacle so dreadful and infectious to Christendom, that we could never be safe while it existed, and could do nothing short of our last effort for its destruction. For these fine words, which had at last given way to security and indemnity, we had laid out near two hundred thousand lives, and nearly three hundred millions of money -and had gained Ceylon and Trinidad. But one grand consolation remained. Bonaparte was to be the extirpator of jacobinism; the champion of jacobinism was to become a parricide; the child of sin was to destroy his mother; he had begged pardon of God and man, piously restored bishops with the salaries of curates, and penitently extorted of them a solemn oath to turn spies and informers in his favour. It had been said, that France must have colonies to be afraid of war; that that is the way to make Bonaparte love peace. He has had, to be sure, a rough military education; but if you put him behind the counter a little, he will mend exceedingly. When he was reading the treaty he thought all the names of foreign places, Pondicherry, Chandernagore, Cochin, Martinico, all cessions. No such thing; they are so many traps or holes to catch this silly fellow in, and make a merchant of him. At this moment, nobody in Britain knew who was minister, as the present ministers continued to identify themselves with the former. Of the late minister, he said that none more admired his splendid talents than he did. If ever man was formed to give lustre to his country, he was that man. He had no low, little, mean, petty vices; he had too much good sense, taste, and talents, to set his mind upon ribands, stars, and titles; he was not of a nature to be the tool and creature of any court. But great as were his talents, he had misapplied them in the politics of this country; he had augmented our national debt, and diminished our population. He had done more to abridge our privileges, and to strengthen the crown at the expense of the constitution, than any minister he could mention. He concluded by moving, as an amendment to Lord Hawkesbury's address, that it was the opinion of that house, that the omission of various opportunities of negociating peace with advantage to this country, more especially the rejection of the overtures made by the first consul of France in January 1800, appeared to have led to that state of affairs which rendered peace so necessary as to justify the painful sacrifices which his majesty had been advised to make for the attainment thereof. But the address proposed by Lord Hawkesbury was carried by a very great ma-

operation of finance consisted of the repeal of the tax upa degree of moderation and prudence which greatly conciliated towards them the minds of the public. On all occasions they defended the former ministry against the time they did not appear unwilling to enter into political

liament was prorogued on the 28th of June, and dissolved Reign of on the following day. The elections which immediately George III. succeeded exhibited the singular spectacle of an administration which avoided interfering in the choice of the members of parliament. The members and friends, however, of the old administration, together with their oppo-

nents, were abundantly active.

The effect of the change of ministry had by this time been very sensibly felt over the whole of the island. During the preceding ten years the minds of men had, in a greater or less degree, been kept in a state of constant alarm from the fear of plots and conspiracies against the government, and from the apprehension that a most dangerous disaffected party was at all times ready to burst forth into action, and that the British constitution was only preserved in consequence of the suspension of the habeas corpus act and other legislative restraints, aided by the extreme vigilance of administration, and of their friends, in repressing disaffected persons. Hence society existed under a sort of general apprehension and distrust; and persons originally unfriendly to the war suffered in all departments of business, and in every quarter of the country, no inconsiderable degree of political persecution. All this had now passed away. The new ministers suffered the penal and restraining laws quietly to expire, and the constitution to depend for support upon its own strength and the ancient provisions of the law; they gave themselves no trouble about the general sentiments of the people with regard to speculative subjects, and seemed desirous to conciliate the good will of all orders of the state. The consequence was, that the fears and anxieties which formerly existed about the safety of the constitution passed away like a dream; a universal attachment to the institutions of the country sprung up; and political animosities, being no longer fed by alarms artfully excited by the government, were, as if by a sort of enchantment, appeased and forgotten.

With regard to the effects of peace upon the British and French nations, these promised at first to prove favourable to the general interests of humanity. The French had successfully defended their own independence, and in their turn assailed those by whom it had been menaced, with such a persevering energy as secured to them a portion of respect from the British nation; whilst, on the other hand, the maritime triumphs of Britain had been so splendid, and the valour of her troops in Egypt so distinguished, as to secure to this country a high degree of consideration in the eyes of the French. The people of the two countries accordingly seemed eager to unite in habits of the most amicable intercourse; considerable numbers of Frenchmen came over to Britain and multitudes of persons of all ranks hastened from Britain to visit a country which had of late years excited, in so remarkable a degree, the attention of all the nations of Europe, and had been the scene of such extraordinary transactions. On this reciprocal tendency of the two nations to abandon their animosities, a system of commercial intercourse might have been reared of a nature much more simple and perfect During this session of parliament the most important than that which had been created by Mr Pitt's treaty; and there is no reason to believe that any disposition exon income, which gave great satisfaction. Indeed, in their isted, on the part of the British government, to stand aloof whole conduct administration conducted themselves with from France, or to avoid, for any political reason, the extension of our commerce with that country. Such an intercourse would have proved favourable to France in every possible way. It would have enabled her people to deattacks of the old opposition; and, in return, they were rive considerable assistance from the capital of British supported by a very considerable number of the members merchants, which would have been rapidly and liberally of that administration, including Mr Pitt. At the same advanced towards promoting the culture of their most valuable productions; and even in a political point of view connections with the members of the old opposition. Par- France must have been aggrandised by such a connection.

Reign of What she wanted was a navy to defend her colonies, and quillity of the colony apparently re-established, than he Reign of George III. to enable her to cope with Britain in the event of a future war; and this advantage she could only obtain by means of commerce, more especially with Britain.

But it soon appeared that a man may be qualified to lead armies successfully to battle, to overrun provinces, and to attain the envied title of a conqueror, who at the same time possesses but a moderate portion of magnanimity, self-command, or knowledge of the maxims of sound policy and the best interests of nations. The French government, instead of seizing the opportunity thus afforded of encouraging the people to become commercial and acquire wealth, and seeking to form a maritime power by opening their ports, and holding out to Britain a commercial treaty arranged on liberal principles, shut their harbours more closely than during the most violent period of the war. Vainly fancying that in this way they would enable their own manufacturers to rival those of Britain, they in fact only excluded their wines from the British market; and by thus losing a sure and ready mode of attracting riches to their country, they prevented the acquisition of capital by enterprising individuals, and ruined the very industry which they intended to encourage and promote. They idly thought that they were in this way limiting the trade of Britain, which, having all the rest of the world open to its efforts, could not be injured; and, in truth, by their narrow views and illiberal policy they only injured themselves. By similar miscalculation, or from a restless spirit of ambition, the French government sought aggrandisement by those efforts of violence which are only tolerable in the midst of war, but which in peace justly excite the jealousy and indignation of mankind.

One of the first enterprises of Bonaparte, in consequence of the peace, was an attempt to reduce under his power the island of St Domingo. During the revolution that great and fertile island had suffered the most severe calamities, which had terminated in the emancipation of the negroes; and the latter had formed themselves into a sort of regular government, at the head of which was one of their own race, Toussaint-Louverture, a man of humanity, and possessed of considerable talents. Reports were circulated in Europe that he wished to render St Domingo independent of France; but of this there is no proof, and it is probable that his chief offence consisted in the general estimation and personal consequence to which he had attained, and that the despotic spirit of Bonaparte could brook no appearance of independence or rivalry in any part of the French territory. Nor was it unnatural that, under a military government, force should have been employed in preference to any method of conciliation. At the end of the year 1801 an army of twenty-five thousand men was sent to St Domingo; and as single ships and small squadrons continued to sail during the winter, loaded with troops, it is believed that nearly forty thousand men were employed in what might be called the first division of the expedition. The accounts of their proceedings are very defective; but, from all that has transpired, the conduct of the French appears to have been extremely disgraceful. The negro chiefs having refused unconseveral battles; and disunion, as usual, following disaster, Toussaint was at last induced to enter into negociation. The terms of the treaty were concealed; but, as he was still at the head of a respectable force, it is believed that not only the possession of his personal freedom, but the undisturbed enjoyment of his property, was secured to him, and that his followers were promised a full indemnity. This occurred in the beginning of May 1801. The French general, Le Clerc, brother-in-law of the first consul, no sooner found the negro chief in his power, and the tran- boasted of their superiority as a people over their en-

committed one of the basest acts of treachery that ever George III disgraced a government. The abdicated general was accused of a conspiracy, though it was evident that from the period of his submission to that of his seizure he had not had time to meditate, much less to organize, such a measure; and on the 12th of May Toussaint and his whole family were put on board a frigate, and shipped off for France, where he soon died of a broken heart in a prison. The negroes perceived that they were deceived and betrayed; and as an attempt was made to reduce them again into a state of slavery, after they had enjoyed freedom for several years, no doubt could remain as to the real object for which the expedition had been fitted out. The chiefs who had been prevailed on to desert Toussaint, and whose desertion had led to his surrender, now justly fearing that they were destined to share the miserable fate of their deluded associate, betook themselves to flight;—the whole island revolted ;-pestilence came in aid of these avengers of tyranny and falsehood;—and the miserable instrument of the first consul's cruelty fell himself the victim of the climate. After a series of horrors and atrocities, even darker and deeper than those which blacken the memory of Robespierre, Marat, St Just, and Carrier, and which will for ever remain a disgrace to the French character, the republic had to regret the loss of sixty thousand of her best troops, in a vain attempt to subdue a colony which might, with temper and humanity, have been conciliated and retained.

In Europe the conduct of the French government was scarcely less arbitrary. The whole fortresses of Piedmont were dismantled, and that country was ultimately annexed to France; and the duchy of Parma and Placentia was treated in the same way. Meanwhile the Swiss, whose form of government had been altered in imitation of that of France, wished to restore the ancient constitutions of the cantons, under which their ancestors had prospered during so many ages. But their present leaders, who had risen to power under the protection of France, solicited the interference of Bonaparte in their favour; and he accordingly sent a numerous army against Switzerland, and, notwithstanding the remonstrances of the British court, placed the sovereignty in the hands of his own dependents or adherents. After all their struggles for freedom, the French nation also submitted to a confirmed military despotism. When Bonaparte assumed the appellation of first consul, it was under the declaration that the office, in terms of the constitution then promulgated, was to endure for only ten years. But this constitution was now altered, and the assent of the people being demanded to a new one, by which Bonaparte was to remain consul for life, and even to possess the power of nominating his successor, suffrages in favour of this measure were obtained to the number of between three and four millions. The event was celebrated with the greatest magnificence in Paris; and addresses of congratulation were presented from the different courts of the continent of Europe, and even from the emperor of Germany.

These transactions could scarcely fail to be noticed in ditional submission, they were attacked, and defeated in Britain, and to become the subject of animadversion in the public newspapers. In fact the unprincipled ambition of Bonaparte, and the degraded character and state of the French nation, formed topics of frequent discussion in the public journals, and were criticised with unexampled severity. Even the personal character of the first consul was not spared; and it cannot be denied that he was often libelled in the grossest manner. Bonaparte appears to have early become sensitive and irritated on this head. The English, owing to their political freedom, had long

Reign of slaved neighbours of France; and the first consul, no George III. doubt, dreaded lest the vanity of his subjects should be wounded by continual representations, coming from the free press of England, of the degraded state into which it was alleged they had fallen. A great degree of irritation was thus produced in the French government against England; and the first consul even went so far as not only to prohibit the importation of English newspapers into France, but to demand from our government that the best bulwark of British freedom should be destroyed, by imposing restrictions upon the liberty of the press. He was even weak enough, through the medium of the French official journal, to commence a contest of argument, eloquence, and vituperation, against the writers of English newspapers. But in such a warfare he could not fail to be beaten; because they had nothing else to do but to write; and because the obscurity of their situation as individuals enabled them to inflict deep wounds without fear of reprisals. Newspaper writers also had much to gain by the contest, and certainly could wish for nothing more favourable to their interests, than to be enabled, during a dull, monotonous period of peace, to render their lucubrations interesting, and to amuse their readers by engaging in a paper war with Bonaparte. These circumstances, however, added to the restless ambition of this wonderful person, and his obvious want of discernment as to the true interests of France, or of patience to pursue them, left but little reason to hope that the peace so recently concluded would be of any long duration

The new parliament assembled on the 16th of November, and Mr Abbot was chosen speaker of the House of Commons. On the 22d, his majesty, in a speech from the throne, after congratulating the country on the abundant harvest, remarked, that the state of the manufactures, commerce, and revenues of the united kingdom was flourishing beyond example; that the loyalty and attachment which were manifested to his person and government afforded the strongest indication of the just sense entertained of the numerous blessings enjoyed under the protection of our happy constitution; that, in his intercourse with foreign powers, he had been actuated by a sincere disposition for the maintenance of peace; that nevertheless he could not lose sight of that established and wise system of policy by which the interests of the other states were connected with our own, or be indifferent to any material change in their relative condition and strength; that his conduct would be invariably regulated by a due consideration of the actual situation of Europe, and a watchful solicitude for the permanent welfare of his people; and that he would not fail to adopt those means of security which were best calculated to preserve to his subjects the blessings of peace. In both houses the usual address was agreed to unanimously and without debate.

About this time Colonel Despard, and six persons of low rank, were executed for high treason. Despard was an Irishman, and of good family. Having long been under close confinement during the late administration, on suspicion of entertaining criminal designs against the government, his imagination, while under seclusion from society, had become inflamed nearly to madness; and after his liberation, in consequence of the habeas corpus act being no longer suspended, he had associated with a number of mean persons, whom he had induced to imagine that they were capable of overturning the government and altering the constitution. They accordingly took an oath to this effect, and agreed to attack the king at the meeting of parliament, to seize the Tower and the bank, and to incite a general insurrection. But their wild scheme was discovered, and their criminal engagements being fully proved, they were convicted and executed.

1803.

In the meanwhile some difficulties occurred in the exe- Reign of cution of the treaty of Amiens. The British ministry had George III. avoided engaging in a quarrel with Bonaparte on account of his continental usurpation, because they found no power willing to join them in resisting him; but his restless ambition induced him to endeavour to lay hold of the island of Malta; and his impatient spirit prevented his conducting the plan in such a manner as might have enabled him to avoid suspicion and insure success. That island was destined by the treaty to be intrusted to the order of St John of Jerusalem. Without waiting till the British had abandoned it, Bonaparte instantly set on foot negociations with the different countries to which the knights of the order belonged, to procure the abolition of the order, the confiscation of its revenues, and the prohibition of the future enrolment of knights, and their departure for Malta. And having accomplished these objects, he required the British government to deliver up the island to a grand master, appointed, at his instigation, by the pope; or to the king of Naples, who was to receive possession, in the first instance, for behoof of the knights. Strictly speaking, there was thus no longer any order of Malta to defend the island; and as the king of Naples was at all times at the mercy of France, the evacuation of Malta by the British troops would, in the actual posture of affairs, have been equivalent to the transferring it to the latter power. The British ministry had submitted to the late continental acquisitions of France from want of means to oppose them; but they resolved to oppose the seizure of this island, which may be considered as the key of the Mediterranean, because the superiority of the British fleet enabled them successfully to do so. This determination appears to have greatly perplexed the vehement and irritable mind of the first consul. No successful resistance had hitherto been offered to any of his continental enterprises; and as the attempt now made to refuse delivery of the island to the king of Naples, and the nominal grand master of the order of St John, could only be justified by accusing him of having acted fraudulently against the spirit of the treaty, so an acquiescence on his part in the retention of the island, contrary to the express stipulations of the treaty of Amiens, would have been equivalent to a confession of guilt. In this situation he found himself detected in a deceit which he was unwilling to acknowledge; whilst, at the same time, he suffered the additional mortification of having sacrificed his reputation without any profit in return, the irresistible power of the British navy rendering it impossible for him to seize Malta by force. In this dilemma, a conversation occurred between him and the British ambassador Lord Whitworth, which, as the fortunes of Bonaparte have been so extraordinary, it may be worth while to record, in the terms in which it was reported to the British court. In a letter to Lord Hawkesbury, dated the 21st February, Lord Whitworth says:-

"I received a note from M. Talleyrand, minister for foreign affairs, informing me the first consul desired to converse with me, and that I would come to him at the Thuilleries at nine o'clock. He received me in his cabinet, with tolerable cordiality; and after talking on different subjects for a few minutes, he desired me to sit down, as he himself did on the other side of the table, and began. He told me that he felt it necessary, after what had passed between me and M. de Talleyrand, that he should in the most clear and authentic manner make known his sentiments to me, in order to their being communicated to his majesty; and he conceived this would be more effectually done by himself, than through any medium whatever. He said that it was a matter of infinite disappointment to him, that the treaty of Amiens, instead of being followed by conciliation and friendship, the natural effects

which he pretended to have received from England. He placed in the first line our not evacuating Malta and Alexandria, as we were bound to do by treaty. In this he said that no consideration on earth would make him acquiesce, and of the two, he had rather see us in possession of the Fauxbourg St Antoine, than Malta. He then adverted to the abuse thrown out against him in the English public prints; but this, he said, he did not so much regard, as that which appeared in French papers published in London. This he considered as much more mischievous, since it meant to excite this country against him and his government. He complained of the protection given to Georges, and others of his description, who, instead of being sent to Canada, as had been repeatedly promised, were permitted to remain in England, handsomely pensioned, and were constantly committing all sorts of crimes on the coasts of France, as well as in the interior. In confirmation of this, he told me that two men had within these few days been apprehended in Normandy, and were now on their way to Paris, who were hired assassins, and employed by the Bishop of Arras, by Georges, and by Duthiel, as would be fully proved in a court of justice, and made known to the world. He acknowledged that the irritation he felt against England increased daily, because every wind (I make use as much as I can of his own ideas and expressions) which blew from England brought nothing but enmity and hatred against him. He now went back to Egypt, and told me, that if he had felt the smallest inclination to take possession of it by force, he might have done it a month ago, by sending twenty-five thousand men to Aboukir, who would have possessed themselves of the whole country, in defiance of the four thousand British in Alexandria. That instead of that garrison being a means of protecting Egypt, it was only furnishing him with a pretence for invading it. This he would not do, whatever might be his desire to have it as a colony; because he did net think it worth the risk of a war, in which he perhaps might be considered as the aggressor, and by which he should lose more than he could gain, since, sooner or later, Egypt would belong to France, either by the falling to pieces of the Turkish empire, or by some arrangement with the Porte. As a proof of his desire to maintain peace, he wished to know what he had to gain by going to war with England. A descent was the only means of offence he had, and that he was determined to attempt by putting himself at the head of the expedition. But how could it be supposed, that after having gained the height on which he stood, he would risk his life and reputation in such a hazardous attempt, unless forced to it by necessity, when the chances were that he and the greatest part of his expedition would go to the bottom of the sea. He talked much on this subject, but never affected to diminish the danger. He acknowledged that there were a hundred chances to one against him; but still he was determined to attempt it, if war should be the consequence of the present discussion; and such was the disposition of the troops, that army after army would be found for the enterprise. He then expatiated much on the natural force of the two countries. France with an army of four hundred and eighty thousand men (for to this amount it is, he said, to be immediately completed), all ready for the most desperate enterprises; and England with a fleet that made her mistress of the seas, and which he did not think he should be able to equal in less than

ten years. Two such countries, by a proper understand-

ing, might govern the world, but by their strifes might

Reign of peace, had been productive only of continual and in- overturn it. He said, that if he had not felt the enmity Reign of George III creasing jealousy and mistrust; and that this mistrust was of the British government on every occasion since the George III now avowed in such a manner as must bring the point treaty of Amiens, there would have been nothing that he to an issue. He now enumerated the several provocations would not have done to prove his desire to conciliate; participation in indemnities as well as in influence on the Continent, treaties of commerce, in short, any thing that could have given satisfaction, and have testified his friendship. Nothing had, however, been able to conquer the hatred of the British government, and, therefore, it was now come to the point, whether we should have peace or war. To preserve peace, the treaty of Amiens must be fulfilled; the abuse in the public prints, if not totally suppressed, at least kept within bounds, and confined to the English papers; and the protection so openly given to his bitterest enemies (alluding to Georges, and persons of that description) must be withdrawn. If war, it was necessary only to say so, and to refuse to fulfil the treaty."

The result of this conversation, and of some circumstances in the conduct of the French, was, that on the 8th of March, the following message was addressed by the king to the House of Commons. "His majesty thinks it necessary to acquaint the House of Commons, that as very considerable military preparations are carrying on in the ports of France and Holland, he has judged it expedient to adopt additional measures of precaution for the security of his dominions. Though the preparations to which his majesty refers are avowedly directed to colonial service, yet as discussions of great importance are now subsisting between his majesty and the French government, the result of which must at present be uncertain, his majesty is induced to make this communication to his faithful Commons, in the full persuasion, that while they partake of his majesty's earnest and unvarying solicitude for the continuance of peace, he may rely with perfect confidence on their public spirit and liberality, to enable his majesty to adopt such measures as circumstances may appear to require, for supporting the honour of his crown, and the essential interests of his people." On the motion of Mr Addington, the house voted an address, agreeing unanimously to support the crown in the measures proposed. It speedily appeared that the preparations which had been alluded to in the king's message were extremely trifling indeed. Bonaparte had obliged the Spaniards to cede to him the sovereignty of Louisiana; and an armament, with about four thousand troops, was now preparing to leave the ports of Holland to take possession of the territory thus acquired. The government of the United States opposed this measure; and the state of Kentucky sent notice to the president that ten thousand volunteers had enrolled themselves, and were resolved, with or without the aid of the union, to resist the settlement of the French in their neighbourhood. Meanwhile Bonaparte, who probably had no serious intention of effecting such a settlement, sold for a sum of money to the United States of North America the territory of Louisiana; a country inhabited by many independent tribes of savages, and to which, upon the principles of natural justice, neither he, nor the Spaniards, nor the Americans, had any right. But the inhabitants of Europe, and even the Transatlantic race of Euroropeans, had now for some ages been accustomed to regard all foreign countries as unoccupied property, which they might seize and transfer to each other, without regard to the natural inhabitants, whom they considered as beings of a subordinate race and character. Accordingly this transference of Louisiana excited no surprise in Europe.

Meanwhile, as the king's message to the House of Commons, already mentioned, evinced a determination on the part of the British government to prefer a new war rather than suffer Bonaparte to carry further his ambitious pro-

Reign of jects, the mind of that extraordinary person seems to have worth presented the ultimatum of the British government, Reign of seorge III. been wrought up to an extraordinary degree of irritation. In his palace he affected to use all the forms of the ancient French court. At the drawing-room, where he was waited upon by the whole ambassadors of Europe, and by a numerous assemblage of persons of high rank from all countries, he could scarcely observe the ordinary forms of civility to the British ambassador; and Lord Whitworth, in a dispatch dated the 14th of March, which was afterwards communicated to parliament, gave the following ac-

count of the behaviour of the first consul on one occasion at the court of the Thuilleries :-

"He accosted me evidently under very considerable agitation. He began by asking me if I had any news from England? I told him I had received a letter from Lord Hawkesbury two days ago. He immediately said, 'And so you are determined to go to war.' 'No,' I replied; 'we are too sensible of the advantages of peace. We have had war for fifteen years already.' As he seemed to wait for an answer, I observed only, 'We have had too much of it.' 'But you wish to carry it on for fifteen years longer, and you force me to it.' I told him that it was very far from his majesty's intentions. He then proceeded to Count Marcof and the Chevalier Azara, who were standing together at a little distance from me, and said to them, The English wish for war, but if they are the first to draw the sword, I shall be the last to sheath it. They have no regard to treaties, henceforth they should cover them with black crape.' In a few minutes he came back to me, and resumed the conversation by something personally civil to me. He began again, 'Why these armaments?' Against what are these measures of precaution? I have not a single ship of the line in the ports of France; but if you wish to arm, I will arm also. If you wish to fight, I will fight also. You may perhaps destroy, but you will never intimidate France. We wish neither the one not the other. It is our desire to live in good understanding with her.' 'You must regard treaties then. Confusion to those who have no regard to treaties: ('malheur à ceux qui ne respectent pas les traités !') they will be responsible for it to all Europe.' He was too much agitated to make it advisable for me to prolong the conversation. I therefore made no answer; and he retired to his apartment repeating the last phrase. It is to be remarked, that all this passed loud enough to be heard by two hunthere was not a single person who did not feel the impropriety of his conduct, and the total want of dignity as well as of decency on the occasion." The negociations in the mean time proceeded; and Bonaparte still insisted upon the literal fulfilment of the treaty of Amiens. He appears to have flattered himself that the British ministry would not venture to renew the war on account of Malta. Their pacific dispositions were well known; they had suffered him to make great encroachments upon the Continent without engaging in hostilities; they were understood to consist of men who were not the leaders of any party, but had only held a subordinate rank as supporters of Mr Pitt's administration; and they had been loudly accused in Britain by the ex-ministers, and by many of the old opposiapparent tameness with which they had recently acted. they would ultimately give way to his demands. But the good temper and forbearance of administration had the effect of rousing the spirit of the British nation, and of inducing, in a large proportion of the people, a wish to enan odious usurper. Thus encouraged, administration rose in their demands; and on the 12th of May Lord Whit- French republic.

which was in substance that the French government should George IIL engage to make no opposition to the cession of the island of Lampedosa to his majesty by the king of the Two Sicilies; that, in consequence of the present state of the island of Lampedosa, his majesty should remain in possession of the island of Malta until such arrangements should be made by him as might enable him to occupy Lampedosa as a naval station, after which period the island should be given up to the inhabitants, and acknowledged as an independent state; that the territories of the Batavian republic should be evacuated by the French forces within one month after the conclusion of a convention founded on the principles of this project; that the king of Etruria and the Italian and Ligurian republics should be acknowledged by his majesty; that Switzerland should be evacuated by the French forces; that a suitable territorial provision should be assigned to the king of Sardinia in Italy; and, in a secret article, that his majesty should not be required by the French government to evacuate the island of Malta until after the expiration of ten years. The proposed stipulations relative to the king of Etruria, the Italian and Ligurian republics, and the king of Sardinia, were merely inserted as make-weights; and accordingly, in an additional article, it was provided that they might be omitted, but that, if inserted at all, they must be inserted together.

This ultimatum having been rejected, war was announced on the 16th of May, by a message from the king to the two houses of parliament; and on the 21st of May a declaration, justifying this measure, appeared in the London Gazette. As the statements contained in this document exhibit a detail of the public acts alleged to have occasioned the renewal of the war, it may be proper to in-

sert a few of its leading paragraphs.

" As soon as the treaty of Amiens was concluded, his majesty's courts were open to the people of France for every purpose of legal redress. All sequestrations were taken off their property; all prohibitions on their trade, which had been imposed during the war, were removed; and they were placed on the same footing, with regard to commerce and intercourse, as the inhabitants of any other state in amity with his majesty with which there existed

no treaty of commerce. "To a system of conduct thus open, liberal, and frienddred people who were present; and I am persuaded that ly, the proceedings of the French government afforded the most striking contrast. The prohibitions which had been placed on the commerce of his majesty's subjects during the war have been enforced with increased strictness and severity. Violence has been offered in several instances to their vessels and their property; and in no case has justice been afforded to those who may have been aggrieved in consequence of such acts; nor has any satisfactory answer been given to the repeated representations made by his majesty's ministers or ambassadors at Paris. Under such circumstances, when his majesty's subjects were not suffered to enjoy the common advantages of peace within the territories of the French republic and the countries dependent upon it, the French government had recourse to the extraordinary measure of tien, of want of talents and want of spirit, on account of the sending over to this country a number of persons for the professed purpose of residing in the most considerable sea-It seems likely, therefore, that Bonaparte presumed that port towns of Great Britain and Ireland in the character of commercial agents or consuls. These persons could have no pretensions to be acknowledged in that character, as the right of being so acknowledged, as well as the privileges attached to such a situation, could only be derivgage in a war against a man whom they now detested as ed from a commercial treaty, and as no treaty of that description was in existence between his majesty and the

"There was consequently too much reason to suppose George III that the real object of their mission was by no means of a commercial nature; and this suspicion was confirmed, not only by the circumstance that some of them were military men, but by the actual discovery, that several of them were furnished with instructions to obtain the soundings of the harbours, and to procure military surveys of the places where it was intended they should reside. His majesty felt it to be his duty to prevent their departure to their respective places of destination, and represented to the French government the necessity of withdrawing them; and it cannot be denied, that the circumstances under which they were sent, and the instructions which were given to them, ought to be considered as decisive indications of the dispositions and intentions of the government by whom they were employed.

"If the French government had really appeared to be actuated by a due attention to such a system, if their dispositions had proved to be essentially pacific, allowance would have been made for the situation in which a new government must be placed, after so dreadful and extensive a convulsion as had been produced by the French revolution. But his majesty has unfortunately had too much reason to observe and to lament, that the system of violence, aggression, and aggrandisement, which characterised the proceedings of the different governments of France during the war, has been continued with as little disguise since its termination. They have continued to keep a French army in Holland, against the will and in defiance of the remonstrances of the Batavian government, and in repugnance to the letter of their solemn treaties. They have, in a period of peace, invaded the territory and violated the independence of the Swiss nation, in defiance of the treaty of Luneville, which had stipulated the independence of their territory, and the right of the inhabitants to choose their own form of government. They have annexed to the dominions of France, Piedmont, Parma, and Placentia, and the island of Elba, without allotting any provision to the king of Sardinia, whom they have despoiled of the most valuable part of his territory, though they were bound by a solemn engagement to the emperor of Russia to attend to his interests, and to provide for his establishment. It may indeed with truth be asserted, that the period which has elapsed since the conclusion of the definitive treaty has been marked with one continued series of aggression, violence, and insult, on the part of the French government."

With regard to Malta, the declaration proceeded to state, "that when the French government demanded its evacuation, several articles of the treaty of Amiens respecting it remained unexecuted. The tenth article had stipulated that the independence of the island should be placed under the guarantee and protection of Great Briemperor of Germany had acceded to the guarantee, but only on condition of a like accession on the part of the other powers specified in the article. The emperor of Russia had refused his accession, except on the condition King of Prussia had given no answer whatever to the apthe constitution of the order since the conclusion of the treaty of peace. It was to the order of St John of Jerusalem that his majesty was by the first stipulation of the tenth article bound to restore the island of Malta. The existence at the time of the conclusion of the treaty. tual invasion, the whole male population of the kingdom,

The three French langues having been abolished, and a Reign of Maltese langue added to the institution, the order con-George III sisted therefore at that time of the following langues, viz. Arragon, Castile, Germany, Bavaria, and Russia. Since the conclusion of the definitive treaty, the langues of Arragon and Castile have been separated from the order by Spain, and part of the Italian langue had been abolished by the annexation of Piedmont and Parma to France. There is strong reason to believe that it has been in contemplation to sequestrate the property of the Bavarian langue, and the intention has been avowed of keeping the Russian langue within the dominions of the emperor.

The French were also accused of having instigated or effected the whole of these changes, and of thus having rendered it impossible to fulfil that part of the treaty; and it was further remarked, that from a report published by an accredited agent of the French government, Colonel Sebastiani, it appeared that France entertained views hostile to the Turkish empire, the integrity of which had been expressly stipulated, and that this rendered the retention of Malta more necessary. The behaviour of the first consul to Lord Whitworth at his audience was also noticed, together with some other offensive occurrences; and it was observed that "his majesty might add to this list of indignities, the requisition which the French government have repeatedly urged, that the laws and constitution of this country should be changed, relative to the liberty of the press. His majesty might likewise add the calls which the French government have on several occasions made to violate the laws of hospitality, with respect to persons who had found an asylum within his dominions, and against whose conduct no charge whatever has at any time been substantiated. It is impossible to reflect on these different proceedings, and the course which the French government have thought proper to adopt respecting them, without the thorough conviction that they are not the effect of accident, but that they form a part of a system which has been adopted for the purpose of degrading, vilifying, and insulting his majesty and his government.

Administration were now placed in a very singular situation. Mr Fox, who opposed the war, proposed that an attempt should be made to prevail with the emperor of Russia to mediate a peace, upon the supposition that, if his mediation was rejected by France, we might be able to secure an alliance with him; and to this proposal administration acceded; but although Mr Fox opposed the war, almost the whole of the other members of the old opposition, including Mr Sheridan and Mr Tierney, strongly approved of it, while Mr Pitt and the rest of the exministry joined in the opinion. As Bonaparte had threatened to attempt an invasion, the parties out of power laid hold of this circumstance to excite alarm, and industriously tain, France, Austria, Russia, Spain, and Prussia. The represented the actual ministers as men of moderate capacity, unfit to be intrusted with the defence of the empire in a perilous crisis. Mr Pitt and his colleagues, in their speeches in parliament, represented the nation as in danger of being instantly invaded by an innumerable host of expethat the Maltese langue should be abrogated; and the rienced troops, who could not be expected to delay more than a few days the attempt to land upon our shores; the plication which had been made to him to accede to the members of the old opposition held precisely the same lanarrangement. That the fundamental principle upon which a guage; and the views of both probably were in some degree depended the execution of the other parts of the article to terrify the country to call for their services, as men of had been defeated by the changes which had taken place in greater energy than the present rulers. The militia, both ordinary and extraordinary, were called out; a new body of troops was ordered to be raised by ballot, under the appellation of an army of reserve; and corps of volunteers were formed throughout the whole island. An act of order is defined to consist of those langues which were in parliament was also passed for calling out, in case of ac-

Reign of in classes according to their age or their situation in life; make those efforts and sacrifices which the honour and Reign of of the augmentation of the navy, the income tax was restored with certain modifications.

The administration thus found their adversaries, unlike any former opposition, striving with emulation to do their work for them, and to strengthen government by new armaments of every kind. The consequence was, that during the ensuing autumn, ministers seemed to become perplexed by the multiplicity of business in their hands, and to entertain doubts about the propriety of some of the measures in which they had embarked. The plan of raising such numerous bodies of troops by ballot, while substitution was at the same time permitted to those upon whom the ballot fell, became a most unequal mode of raising an army for the defence of the state, as it fell upon their age. But it was attended with one good effect, that as the bodies of volunteers raised by permission of government enjoyed an exemption from certain ballots, this operated, along with the spirit of the country, as a sufficient premium to induce great multitudes of persons to enrol themselves for the purpose of acquiring the military exercise. Ministers at times hesitated to receive the numerous bodies of volunteers who offered themselves; but as they afterwards departed from this reluctance, nearly four hunclusive of the regular army, the militia, and the army of reserve.

In the meanwhile the ports of France were closely blockaded, and the foreign possessions of the French seized; while the only step of retaliation in their power to exert consisted in seizing the electorate of Hanover, which they plundered unmercifully. Bonaparte offered to give up Hanover as the price of Malta; but his offer was refused.

The most inconvenient circumstance to Great Britain, arising out of those political transactions, consisted in the great embarrassment occasioned to persons engaged in commerce, which proved the cause of numerous bankruptcies. Towards the close of the former war trade had found out for itself regular channels; and, in particular, the port of Hamburg had become the great store-house of British merchandise, from which, as a neutral state, it was distributed amongst the countries engaged in the war. The conclusion of a treaty of peace produced the daily expectation of a renewal of the intercourse with France, and therefore put a stop to the circuitous trade by Hamburg. But as no place was substituted instead of the latter, a suspension of operations in some manufactures occurred; and when these difficulties were coming to a close, the renewal of the war produced a new uncertainty as to the channels in which the European trade would hereafter flow. The difficulty was increased in consequence of the invasion of Hanover by the French, and their excluding the British from the navigation of the Elbe, while the latter in their turn blockaded the river with ships of war, and thus excluded all the world.

Parliament assembled on the 22d of November. In the speech from the throne his majesty said,—" Since I last met you in parliament, it has been my chief object to carry into effect those measures which your wisdom had adopted for the defence of the united kingdom, and for the vi-gorous prosecution of the war. In these preparations I have been seconded by the voluntary exertions of all ranks of my people, in a manner that has, if possible, strengthened their claims to my confidence and affection. They have proved that the menaces of the enemy have only served to rouse their native and hereditary spirit; and that all other considerations are lost in a general disposition to

George III- and to meet the expense of these different armaments, and the safety of the kingdom demand at this important and George III. critical conjuncture. Though my attention has principally been directed to the great object of internal security, no opportunity has been lost of making an impression on the foreign possessions of the enemy The islands of St Lucie, Tobago, St Pierre, and Miquelon, and the settlements of Demerara and Essequibo, have surrendered to the British arms. In the conduct of the operations by which these valuable acquisitions have been made, the utmost promptitude and zeal have been displayed by the officers employed in those services, and by my forces acting under their command by sea and land. In Ireland, the leaders and several inferior agents in the late traitorous conspiracy have been brought to justice, and the public tranquillity has experienced no further interruption. I persons not according to their means, but according to indulge the hope that such of my deluded subjects as have swerved from their allegiance are now convinced of their error; and that having compared the advantages they derived from the protection of a free constitution, with the condition of those countries which are under the dominion of the French government, they will cordially and zealously concur in resisting any attempt that may be made against the security and independence of my united king-

The usual address to the throne was unanimously cardred thousand men were trained to the use of arms, ex- ried, though Mr Fox complained that nothing had been said respecting the state of our negociations with Russia. The debates in parliament during the present session were by no means interesting. In the course of the winter, the French government continued to repeat with much confidence their threats of invasion, and the people of Great Britain remained in daily expectation that a landing would be attempted. But nothing of any importance took place. Bonaparte travelled repeatedly from Paris to the sea-coast, and back again to Paris. It was announced that a body of guides had been formed to conduct the invading army after it had landed in England; and the generals and admirals by whom the expedition was to be conducted were said to have gone to their respective posts. Nothing however occurred, excepting the sailing from one French port to another, under the cover of land-batteries, of small parties of flat-bottomed boats, which, at times, evaded the vigilance of the British cruisers, though they were frequently captured, driven ashore, or sunk.

## CHAP. XVIII.

REIGN OF GEORGE III .- RESUMPTION OF HOSTILITIES .-WAR WITH FRANCE AND HER ALLIES.

Parliamentary Proceedings.—Change of Ministry, and return of Mr Pitt to power.—Military Events—Occupation of Hanover.—Boulogne Armament.—Internal Defence.—Volunteer System.—Naval Operations.—Colonial Conquests.—Spain declares War against Britain.—Battle of Trafalgar, and Death of Lord Nelson.—Continental Affairs in 1805.—Surrender of General Mack and his Army at Ulm.—Austrians and Russians defeated at Austerlitz.—Parliamentary Proceedings.—Session of 1805.— Charges against Lord Melville.—Illness and Death of Mr Pitt, 23d January 1806.—New Ministry, called "All the Talents."

—Act for a Limited Term of Military Service.—Budget.—Trial and Acquittal of Lord Melville.—New Parliament.—Lord Henry Petty's Plan of Finance.—Abolition of the Slave-Trade.—Catholic Relia Relia Fell of the Granville or Fell of Trade.—Catholic Relief Bill.—Fall of the Grenville or Fox Administration.—Observations on the Ministry of 1806.—The Ministry of 1807, or Perceval Administration.—Events of the War.—Naval Actions in 1806.—Negociations at Paris.—Failure of these.—Prussia.—War between that Yower and France.— Battle of Jena, and subsequent Military Operations in Poland.—
Battles of Eylau and Friedland.—Treaty of Tilsit, 1st July 1807.
—Expedition to Copenhagen.—Buenos Ayres.—Whitelock's Di-

Reign of George III. 1804.

sastrous Expedition.—Battle of Maida.—Threatened Attack on Constantinople.—Sicily.—Sweden.—Portugal and Spain.—Battle of Vimiero —Convention of Cintra.—Sir John Moore's Campaign.—His Advance and Retreat.—Battle of Corunna.—Session of 1808.—Local Militia.—Orders in Council.—Session of 1809.—Charges against the Duke of York.—Changes in the Cabinet —Campaign of 1809.—Battle of Talavera.—Attack on the French Fleet in Basque Roads .- Movements of Austria. -Expedition to the Scheldt Session of 1810. Walcheren Expedition —Committal of Sir Francis Burdett to the Tower.
—Scottish Clergy and Judicature Acts.—Campaign of 1810 in Portugal and Spain.—Battle of Busaco.—Subsequent Operations.—Advance of Massena.—Lines of Torres Vedras.-treat of the French under Massena.—Battle of Barrosa.

The parliamentary proceedings in the summer session of 1803 were remarkable, as indicating the existence of three or four distinct parties, amidst an almost general concurrence in support of the war. These parties were, first, that of the ministry and their usual followers; secondly, that of the Grenvilles and Mr Windham, who had all along blamed the peace of Amiens, and predicted that it would prove a mere truce; thirdly, that of Mr Pitt and Lord Melville, who, after approving that peace, had, on supporters of war; and, fourthly, that of Mr Fox, with a part of the old opposition, who were of opinion that the war might have been avoided. But the last were so far from being numerous, that a motion, made on the 23d of May, to express the concurrence of parliament in the war, was opposed by a minority of only ten in the Peers and sixty-seven in the Commons. A subsequent measure, in the same spirit, namely, an act for arming a large part of the population, was carried in July by a great majority; and similar ardour was evinced in submitting anew to war taxes, particularly to a five per cent. income-tax. After the adoption of several other measures of a like descripliament was prorogued on 12th August.

The next session opened on the 22d of November, and discovered the same alacrity for the prosecution of the war, mixed, however, with a growing opposition to ministers. Mr Pitt had, from the beginning of the war, foreborne to commend them, and, since the failure of a negociation to bring him into office, had assumed a language occasionally hostile. He continued to support their propositions for the public defence, and frequently improved them in their progress through parliament; but he disclaimed all personal connection with ministers, and at last treated them as incapable of originating any measure of vigour or utility. This disposition could scarcely fail to be turned to account by those busy intermediaries, who find means to combine the efforts even of opposite parties for the purpose of getting into power. On the 15th of March Mr Pitt, aware of the side on which the public was most alive to alarm, brought forward a motion for an inquiry into the management of the navy. On this occasion, severe as was his language in regard to Lord St Vincent, then at the head of the admiralty, he received the support of the opposition, and had on his side a hundred and thirty votes against two hundred and one. From this On the 23d of April Mr Fox brought forward an eagerlyexpected motion on the defence of the country, in which Mr Pitt joined, with great animosity against the ministers. On a division, government had a majority of fifty-two, which, in a second debate, on the 25th of April, was reduced to thirty-seven. Soon after this, ministers resigned, and Mr Pitt, called to the royal presence, was desired

The Grenvilles had recently so connected themselves with Reign of Mr Fox and his friends, that a separation would have been George II1 altogether dishonourable; and their united strength, joined to the occasional support of Mr Addington's adherents, was the cause, during the remainder of the session, of very strong divisions against the new ministers, particularly in Their chief measure, entitled the Addithe Commons. tional Force Bill, was carried by only two hundred and sixty-five to two hundred and twenty-three. The session soon afterwards closed, but not without passing a corn bill, evidently intended to dispose the landed interest to submit to the new taxes, and prohibiting the importation of foreign wheat whenever our own should be at or below sixty-three shillings the quarter.

On the continent of Europe, the only great operation was the invasion, or rather occupation, of Hanover, to which allusion has already been made. War having been declared by us on the 18th May, the French troops advanced from Holland, and entered the electoral capital by the 5th of June. To attempt resistance would have been folly; but in a season when soldiers were so much wanted in England, and so great an expense was incurred in trainthe continued aggressions of Bonaparte, become ardent ing them, it was matter of regret that the Hanoverian troops, in number about fifteen thousand, should not have been marched down to the coast, and embarked in a body, instead of being disbanded and obliged to pledge themselves not to serve against France until exchanged.

On the side of France the aspect of war was displayed in a great encampment at Boulogne, and in the dispatch, from all the ports along the coast, of flotillas of boats to join the armament preparing in that central rendezvous. These petty convoys had instructions to tempt our cruisers to attack them, and to draw them, at fit occasions, under the fire of land-batteries; and they were sometimes successful in doing so. The main object of Bonaparte tion, and a most interesting session of nine months, par- was to excite alarm; a course which, however politic toward some countries, was certainly ill judged in regard to one where the executive power, in its inability to coerce, often seeks support in the apprehensions of the public. The general impression of dread facilitated the measures of defence, and led to the volunteer system, which was carried to an unparalleled extent. Never did a country exhibit so many of the middle and higher classes under arms as England and Scotland in 1803; and never did individuals in these stations make more personal sacrifices for the object of national defence. The result was effectual to as great a degree as the situation of the individuals permitted. The volunteers made as near an approach to regularity of discipline as was practicable in the case of men full of ardour, and submitting for a season to the restraint of military service, but necessarily devoid of experience in the field. The error lay in carrying volunteering too far; for the system ought never to have been allowed to extend to a length that absorbed no inconsiderable part of the time and money of men whose lives were too valuable to be indiscriminately exposed, and whose proper aid to the public cause was the tribute of their industry. The volunteer system was of real use only in as far as it promoted cordiality in the common cause, and, time forward the strength of ministers was visibly shaken. by assuring the maintenance of tranquillity at home, enabled government to dispose of the regulars in the field.

The plan of collecting flotillas of boats, from east to west, in the central depôt of Boulogne, was continued by Bonaparte, during two years, from the middle of 1803 to that of 1805. A great parade was made of the number of troops ready to embark, and of the determination to encounter all hazards; but there was no efficient support to form an administration, exclusive, however, of Mr Fox. by ships of war, until the spring of 1805, when the sailing This peremptory order, and Mr Pitt's too ready acquies- of squadrons for the West Indies took place, first from cence in it, proved the source of the greatest difficulties. Rochefort, and afterwards from Cadiz. These, it was cal-

ously into the calculations of the French ruler. That it did so at this time was positively affirmed by him in conversations held with English gentlemen in the island of Elba, and afterwards in that of St Helena; but these conversations were marked by sundry misrepresentations; for he attributed the non-execution of the attempt entirely to the threatened coalition on the Continent, and would not acknowledge that it was impracticable ;--a matter of nautical calculation, when our government kept our channel fleet at home, instead of sending it, as he had anticipated, to the West Indies.

Such was the aspect of the war during two years, in which our naval superiority led to an easy conquest of several of the Dutch and French West India colonies. St Lucie surrendered on the 22d of June 1803; Tobago, on the 1st of July; Demerara and Berbice, on the 23d of September; and Cape Town, the last spot in the French half of St Domingo, occupied by French troops, capitulated to the Blacks on the 30th of November. Next year was taken the small island of Goree, on the coast of Africa, and soon after the important Dutch colony of Surinam. On the other hand, we were not successful in our attempts on the French flotillas on their own shores. One of these was directed against a convoy on the coast between Flushing and Ostend; another, on a larger scale, and very different plan, was pointed at the Boulogne armament, which it was proposed to blow up by catamarans; an attempt no less unsuited to open and generous warfare than the torpedoes of the Americans. Fortune was more favourable to us in encounters with the enemy in the open ocean, where, in the early part of 1804, a striking proof of the effects of intrepidity was given in the case of a fleet of merchantmen from China, which beat off, or at least deterred from action, a French squadron under Admiral Linois, consisting of a ship of eighty guns and three frigates.

The war hitherto had been with France and Holland only; but a new power was now to be added to the list of our antagonists. Spain had been allowed by Bonaparte to avoid participating in the contest, on condition of paying a large annual contribution; a condition so contrary to real neutrality, that for some time past our government had kept a vigilant eye on the expected arrival of her treasure ships from America. A small squadron of four frigates, sent out to intercept these valuable supplies, met, on the 5th of October 1804, a Spanish squadron of a similar number proceeding towards Cadiz; and the Spanish commodore refusing to surrender, an engagement ensued, attended with the capture of three of the Spanish frigates, and the explosion of the fourth, accompanied with the loss of many lives. This decisive act, approved at home by the advocates of vigorous measures, was productive of the worst impressions in regard to our national honour both in Spain and her colonies, and led soon afterwards to a declaration of war by that power.

Bonaparte was now provided with additional means of threatening our distant possessions. A squadron of five sail of the line escaping from Rochefort, landed a body of nearly four thousand men on the island of Dominica, and burned the chief town; the island of St Kitt's escaped with paying a contribution and the loss of some merchantmen. But this was only a prelude to the arrival of a much more formidable fleet, which, to the number of eighteen sail of the line, French and Spanish, reached the West Indies in the end of May, and spread alarm throughout the islands; an alarm not dispelled till the arrival of a

Reign of culated, might excite alarm for our colonies, and induce Nelson. The hostile fleet soon after set out on its home- Reign of George III. government to send thither a portion of the men of war ward voyage. Intelligence to that effect was opportunely George III. hitherto reserved for home defence; after which the ha- received by Lord Barham, then at the head of the admizardous attempt of a descent might have entered seri- ralty; and a fleet, detached to cruise on their supposed track, had the good fortune to fall in with them on 22d July. An action took place; two sail of the line, Spanish ships, were captured; night terminated the conflict; and though it might have been renewed on the succeeding days, an unfortunate indecision on the part of our admiral, Sir Robert Calder, allowed the enemy to escape. They soon afterwards repaired to Ferrol, whence they sailed with augmented force, and reached Cadiz.

To watch them there, or to engage them on their coming out, was now an object of the highest moment; and it was to Lord Nelson that this important trust was committed. Joining our fleet off Cadiz on the 20th September, he avoided keeping in sight, and even dispensed with the aid of six sail of the line, which he sent to a distance along the coast; judging that the enemy, when apprized of their absence, would be induced to come out. Accordingly, the combined fleet left Cadiz on the 19th of October, to the number of thirty-three sail of the line, eighteen French and fifteen Spanish, commanded by Admiral Villeneuve, and early on the 21st came in sight of the British fleet, consisting of twenty-seven sail of the line, off Cape Trafalgar, about half way between Cadiz and Gibraltar. The enemy, convinced that their former defeats at sea had been owing to the want of concentration and mutual support, now formed a double line, every alternate ship being about a cable's length to windward of her second ahead and astern, so that any of our ships, attempting to penetrate, would be exposed to the fire of two or of three antagonists. Nelson, while yet distant, perceived their arrangement, and understood its object. It was new, but he was satisfied that no concentration in the open sea could prevent our vessels from coming to close action with their opponents, in which case the result could not long be doubtful. He consequently made no alteration in his previous plan, which was to make the order of sailing the order of battle, the fleet being in two lines, with an advanced squadron of eight of the fastest sailing two-deckers; but directed the fleet to advance to the attack in two divisions, one of which, under Admiral Collingwood, intersected that part of the enemy's line which gave it nearly an equal number of ships to encounter; whilst Nelson, with the other division, acted on a similar plan. Such was the only general manœuvre in this great action. By our superior seamanship, and our ships keeping near each other, we had in some cases a local superiority; but the general character of the fight was a conflict of ship to ship; and its decision in our favour was owing to that skill in working the guns, to that dexterity in an occasional change of position, and that confidence of success which characterizes a naval force in a high state of discipline. Our loss, amounting to sixteen hundred men, was in part caused by the riflemen in the enemy's rigging; an ungenerous mode of warfare, which may deprive an opposing force of officers, but can have little effect on the general issue of a conflict. The fighting began at noon, became general in less than half an hour, and lasted from two to three hours; in the case of a few ships it continued longer, but all firing was over by half-past four o'clock. The victory was complete, but purchased by the death of Nelson, who was mortally wounded by a musket ball fired from the mizen-top of the Redoutable, by one of the enemy's riflemen, and expired just as the action closed. Nineteen sail of the line struck; but unfortunately gales of wind, after the action, wrecked part of our prizes, and necessitated the destruction of others. Four sail, however, were preserved; and four more. force inferior by nearly one third, but commanded by Lord which had escaped, under Rear-admiral Dumanoir, were

Reign of met on their northward course, on the 2d of November, Whitbread, was lost by two hundred and seventy-two to Reign of George III and captured off Cape Ortegal, by a squadron under Sir Richard Strachan.

But upon the continent of Europe the course of public events was very different. The year had been ushered in by a letter of Bonaparte to our sovereign, containing pacific expressions couched in general terms. An answer was given, not by the king, but, according to diplomatic usage, by our minister for foreign affairs, to the French minister in the same station, expressing a similar wish for peace, but adding, that it was incumbent on us to consult our allies, particularly the emperor of Russia. The French ridiculed the assertion of our being on confidential terms with that court; but Russia had in fact begun to listen to the proposal of forming a coalition against France on an extensive scale. The basis of this compact was a treaty signed at St Petersburg in April. Russia, Austria, Sweden, Naples, all acceded to it, and hopes were entertained of the co-operation of Prussia. Bonaparte, apprized of this, affected to be absorbed in arrangements for immediately invading England, but secretly prepared to marcin his troops from Boulogne to the Rhine. After throwing on the Austrians the odium of aggression, by allowing them to attack Bavaria before he acted, he proceeded to execute a plan singularly adapted to the overweening confidence of his opponent, General Mack, who by this time had traversed Bavaria and advanced to Ulm. By executing forced marches, and violating part of the neutral territory of Prussia, Bonaparte reached first the flank, and soon afterwards the rear, of the enemy, who clung with blind pertinacity to the position of Ulm. The result to the Austrians was a series of checks in the field, and eventually the surrender, by capitulation, of more than thirty thousand men. The road to Vienna was thus opened to Bonaparte. He marched thither, crossed the Danube, proceeded northward, and at Austerlitz, on the 2d of December, displayed his military combinations in all their lustre, gaining over the Austrians and Russians, with forces not superior, a victory which compelled Austria to immediate peace; and thus by one blow broke up the coalition.

Before the opening of the session of 1805, an over-ture, suggested, it is said, by the sovereign personally, was made to Mr Addington; and, after some discussion, it was accepted, Mr Addington receiving the presidency of the council for himself, and corresponding situations for his friends. With this support ministers met parliament; and in one of the first great questions the approval of the war with Spain obtained the concurrence of three hundred and thirteen votes against a hundred and six. In subsequent divisions, the majorities, though less decisive, were considerable, until the 6th of April, when Mr Whitbread brought forward a most interesting discussion on the tenth report of the commissioners of naval inquiry, which implicated Lord Melville. This question, debated in a full house, produced a division of two hundred and sixteen against two hundred and sixteen, when, after a most anxious pause, the resolutions moved by Mr Whitbread were carried by the casting vote of the speaker. This led immediately to the resignation by Lord Melville of his office of first lord of the admiralty, and was followed by the erasure of his name from the list of privy counsellors. Some time after, his lordship was, at his own desire, heard before the House of Commons; and whilst he acknowledged that temporary irregularities in the appropriation of the public money had taken place when he was treasurer of the navy, he disclaimed, on his honour, the alleged participation in the profits of Mr Trotter, who had acted as his paymaster. But the expectations of the public were raised, and a prosecution, in some shape or other, was indispensable. A motion for an impeachment before the Lords, made by Mr and in Austria.

a hundred and ninety-five; but the Addington party join-George ITL ing opposition in a motion for a criminal prosecution, the latter was carried by two hundred and thirty-eight against two hundred and twenty-nine. Lord Melville and his friends, dreading this more than an impeachment, found means, by a sudden division of the house, to rescind the vote to that effect, and to decide on an impeachment before the Lords. And parliament was prorogued after giving ministers a vote of credit to the extent of three millions, to be applied, if necessary, in subsidies to continental powers.

The proceedings against Lord Melville made a deep impression on Mr Pitt, and deprived him of his only efficient coadjutor, at a time when, from the magnitude of his public cares, he was more than ever in want of support. The consequent fatigue and anxiety made severe inroads on a constitution naturally not strong. His indisposition became apparent in the early part of winter, and, on the meeting of parliament, it was understood to have reached a dangerous height. His death took place on the 23d January 1806. A motion, brought forward a few days after, to grant a public funeral, and to erect a monument to the late excellent minister, excited much discussion. Mr Fox paid a high tribute to the financial merits of his great rival, which, in fact, were extremely questionable; but he could not join in ascribing the epithet of "excellent" to measures which he had so often opposed. Mr Windham also opposed the vote; and the Grenvilles chose to be absent. Still the motion was carried by two hundred and fifty-eight against a hundred and sixty-nine. To a subsequent proposition for a grant of L.40,000 for the payment of Mr Pitt's debts, no opposition was made.

The public attention was now fixed on the approaching change of ministry. The king, in concurrence, it is said, with the death-bed recommendation of Mr Pitt, sent for Lord Grenville, desired him to form a ministry, and made no opposition to the admission of Mr Fox into the cabinet; but he is said to have expressed a desire that the Duke of York should retain the office of commander-in-chief The new administration was formed on a broad basis, comprising the friends of Lord Grenville, those of Mr Fox, and those of Lord Sidmouth. But hardly had they entered upon office when circumstances occurred which placed in a striking light the different conduct of men when in and out of power. Lord Grenville thought fit to hold the incompatible offices of first lord and auditor of the treasury, and the chief justice was admitted to a seat in the cabinet, whilst Mr Fox consented to come forward

as the vindicator of both.

The defence of the country against the great military power of France being still the most anxious consideration, the first measure of a comprehensive nature was brought forward by Mr Windham, whose station in the new ministry was the war department. It proposed the repeal of Mr Pitt's additional force bill, and a plan for improving the regular army, by substituting a limited for an unlimited term of service, and by granting a small increase of pay after the expiration of the prescribed term. These propositions, brought forward in the end of April and beginning of May, were warmly opposed: they passed, however, by a great majority in both houses, and would, doubtless, have conduced materially to the improvement of our army had they received a fair trial; but the succeeding ministries sought, during the whole war, to procure enlistments for life. In France, since 1817, the rule is, to be scrupulous about the character of recruits, to give little or no bounty, but to limit the period of service, and to increase the pay after the expiration of the specified term. The same principle, differently modified, prevails both in Prussia

Of the budget, the most remarkable feature was an in-George III. crease of the property-tax from six and a half to ten per cent., the odium of which ministers sought to lessen by the appointment of a board of auditors to examine the long-standing arrears in public accounts. In regard to trade, the principles of this ministry, though little understood, and even disliked by the great majority of merchants, were entitled to much attention. They attempted to introduce into our practical policy some of the doctrines of Dr Smith, doctrines which Mr Pitt had studied in his early years, but to which circumstances had not allowed him to give an extensive application. The letter of our navigation laws forbade all intercourse between our colonies and other countries; but our West India colonies were, in time of war, so dependent on the United States for provisions, that it had been customary with the island governors to take on themselves the responsibility of infringing these acts, and to obtain regularly a bill of indemnity from parliament. Mr Fox now brought in a bill termed the American Intercourse Act, the purport of which was, to authorize the governors of our colonies to do, during the remainder of the war, that which they had hitherto done from year to year, and to dispense with any application for indemnity. This bill, moderate and politic as it in fact was, met with keen opposition in parliament, and with still keener out of doors from the shipping and commercial interests. It passed into a law; but it was denounced as a glaring infraction of our navigation code, and contributed, more than any other measure, to shake the popularity of ministers.

The trial of Lord Melville before the House of Peers began on the 29th of April 1806. The charges against him, little understood by the public at large, related to an infraction of his official duty, not as a member of the cabinet, but in his early and inferior station of treasurer of the navy. These charges may be comprised under the following heads: That he had allowed Mr Trotter, his paymaster, to take the temporary use and profit of sums of money lodged in the bank for the naval expenditure; that he had himself participated in such profits; and, finally, that he had applied certain sums of the public money to his private use. All participation in the speculations or profit of his paymaster his fordship positively denied, but he acknowledged a temporary appropriation of the sum of L.10,000 in a way which private honour and public duty forbade him to reveal. The trial closed on the 12th of June. The articles of impeachment had been extended to the number of ten, and on all of them there was a majority of peers for his acquittal; but whilst in regard to the charge of conniving at stock speculations by Trotter, or converting the public money to his private use, the majorities were triumphant, the case was otherwise in regard to his lordship's permitting an unauthorized appropriation of the public money by Trotter, and receiving from him temporary loans, the records of which were afterwards

Though the present parliament had completed only four sessions, ministers determined on a dissolution, doubtless from a wish to have the benefit of the government influence in the new elections. They knew their weakness at court, and flattered themselves that a decided ascendency in parliament would enable them to press, with greater confidence, measures for which they could not boast the cordial concurrence of their royal master. For the time of the new election they chose the moment of national excitement caused by the recal of our ambassador from the French capital. The first debate in the new House of Commons related to the abortive negociation for peace; and although the publication of the official papers excited some surprise, and showed that Bonaparte had at one bation of the bill to ministers, who endeavoured to modify

time carried his offers of concession considerably farther Reign of than the public had supposed, there prevailed so general George III a distrust towards him, that Mr Whitbread stood almost alone in the opinion that the negociation ought to have been continued. After some renewed discussions on Mr Windham's military measures, Lord Henry Petty, then chancellor of the exchequer, brought forward a plan of finance, which, assuming the expense of the current year as equal to that of subsequent years of war, professed to provide, without new taxes, for a contest of fourteen years or more. This plan contained an anticipated calculation of the loans necessary for several years to come, and supposed that a sum equal to ten per cent. on each loan should be appropriated from the war taxes, of which five per cent. should serve to pay the interest of the loan, and the other five per cent. form a sinking fund, which, by the operation of compound interest, would redeem the capital in fourteen years; leaving the whole ten per cent. again applicable to the same purpose should the war continue. That this plan possessed, no more than those of Pitt or Vansittart, the merit of increasing the productive power of our revenue, has been already shown by Dr Hamilton in his well-known Treatise on the National Debt. Its merit, had it been tried, would have been found to consist, as that of such plans generally does, in a support, perhaps a temporary increase, of public credit. It may even be questioned whether the same ministry, had they continued in office, would have restricted themselves to a limited expenditure in 1808, when the Spanish struggle called forth such a burst of national enthusiasm. There cannot, however, be a doubt that they would have avoided the orders in council, which, by depriving us of the unseen but powerful aid of neutral traffic, gave the first great blow to our bank paper, and consequently to our public funds.

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The bill for the abolition of the slave-trade was now brought forward with all the weight of government support, and carried by triumphant majorities; in the Lords by a hundred to thirty-six, in the Commons by two hundred and eighty-three to sixteen. This prompt termination of a struggle of twenty years showed how easily the measure might have been carried had not Mr Pitt declined to give it ministerial support; a course suggested to him probably by a dread of offending the West India planters, but founded in a great measure on misapprehension, since the most respectable part of that body, the proprietors of long-settled estates, were far from being adverse to the abolition, calculated as it was to prevent that superabundance of produce which to them is the most serious of evils. This proved the last important bill of the Grenville ministry, whose removal from office took place very unexpectedly, in consequence of a difference with the so-

vereign about the Irish Catholics.

The bill which produced this sudden change was introduced by Lord Howick on the 5th of March, and entitled, " A bill to enable his majesty to avail himself of the services of all his liege subjects in his naval and military forces in the manner therein mentioned;" that is, by their taking an oath contained in the bill, after which they should be left to the free exercise of their religion. Here, as in the case of the American intercourse with the West Indies, the intention was less to introduce a new practice, than to permit by law what was already permitted by connivance. The draught of the bill had been previously submitted to the king, and returned by him without objection; but the royal attention was more closely drawn to it on its introduction into parliament, and on a vehement opposition from Mr Perceval, who described it as part of a system of dangerous innovation, and as a precursor of the abolition of all religious tests. The king now intimated his disappro-

Reign of it, but still without succeeding in rendering it acceptable effects had not been most beneficially displayed in the ad-Reign of the proposed measure, and of bringing it forward at a future period. This minute was unfortunately couched in terms too positive, if not disrespectful to the king, who, always tenacious on the Catholic question, and never personally cordial with Lords Grenville and Howick, insisted that they should pledge themselves in writing never to press him again on the subject. Ministers declining to comply, the king consulted with Lord Eldon about forming a new ministry, and, receiving a ready assurance of the practicability of such a measure, refused to listen to a modified acquiescence with his late order, offered rather tardily by Lord Grenville. Ministers gave up the seals of office on 25th March; and next day the change and the causes which led to it were fully discussed in parliament. A short adjournment now took place, after which there occurred some remarkable trials of strength between the two parties. An independent member, Mr Brand, with reference to the conditions on which the ministry had come into office, made a motion, that it was contrary to the duty of members of the cabinet to restrain themselves by a pledge from advising the king on any subject. This motion produced a very long debate, but was lost by two hundred and fifty-eight against two hundred and twentysix; while a corresponding motion in the Lords was lost by a hundred and seventy-one to ninety. A subsequent proposition, to express the regret of the house at the removal from office of so firm and stable an administration, was lost by two hundred and forty-four against a hundred and ninety-eight; and it became apparent, that in parliament, as at court, the fall of the Grenville ministry was decided.

It remains to make a few observations on their conduct when in office; and here an impartial inquirer will not be long in discovering that both their merits and demerits have been greatly exaggerated. Their war measures proved unimportant, particularly in the point which, in the then ardent state of the public mind, superseded all others -the annoyance of France; and the result was, an unconsciousness in the greater part of the people of what was really valuable in their views and conduct. Yet Mr Fox brought to the department of foreign affairs an intimate knowledge of continental politics, and an exemption from national prejudices, far, however, from being accompanied, as the vulgar supposed, by an indifference to our national interests. Lord Grenville, if naturally less conciliating, and less fitted for grand views, possessed a practical knowledge of business, and had become aware in retirement of the various errors which had arisen from a too early introduction into office. They had a liberal feeling towards Ireland and the United States; and though by no means lukewarm in their resistance to Bonaparte, they all held the impracticability of making any impression on his power by force of arms, until the occurrence of some combination of circumstances which should justify a grand and united effort. In what manner they would have acted had they been in power when the general insurrection in Spain burst forth, the public have no means of judging; so different is the language, and even the feeling, of politicians when in and out of office. Several of their measures, such as the introduction of the lord chief justice to a seat in the cabinet, and the assent to the appointment of such a commander as Whitelocke, were singularly ill-judged. To place Lord Grey, and after him Mr T. Grenville, at the head of the admiralty, was to declare to the public that professional knowledge was unnecessary in that high station, as if its

George III to their sovereign. They then felt the necessity of with- ministration, short as it was, of Lord Barham. Finally, George III. drawing the bill, but inserted in the cabinet minutes a their intemperate declaration in the cabinet minute of the declaration, reserving to themselves two points: the liber- 12th of March evinced a strange miscalculation of their ty of delivering their opinion in parliament in favour of strength, when put in opposition to the personal will of the sovereign and the existing prejudices of the public. The result was, that their fall caused no regret to the majority of the nation, and that the errors of their successors excited no wish for their recal.

Of the new ministry, the efficient members were, Mr Perceval, chancellor of the exchequer; Mr Canning, minister for foreign affairs; Lord Castlereagh for the war, and Lord Liverpool for the home department. One of their first measures was a prorogation of the parliament, followed by a dissolution, which gave them, in the elections, the advantage so lately enjoyed by their predecessors, with the further advantage of an alarm, strangely excited in the public mind, on the ground of popery. The new parliament met on the 22d of June, and, after passing the bills requisite for the army, navy, and other current business, was prorogued on the 14th of August.

The alternation of fortune by sea and land was so great, that 1806 had hardly commenced when fresh successes were obtained over the French navy. A division of the Brest squadron, after landing troops in the Spanish part of St Domingo, was overtaken by a superior force, and three sail of the line captured and two burned. Admiral Linois, returning from India, was captured in the Marengo of eighty guns; and, at a subsequent date, of a squadron of frigates detached from Rochefort for the West Indies, four fell into our hands.

It was under these circumstances that a negociation for peace was for some months carried on at Paris. It began in consequence of an overture from Talleyrand, eagerly embraced by Mr Fox; and Lord Yarmouth, who happened to be under detention in France, was made the first medium of communication and conference. In its more advanced stage, the negociation was intrusted to Lord Lauderdale; and at one period, namely, in September, the conciliatory tone of the French inspired a hope of peace; a hope soon disappointed, when it was found that the offers of Bonaparte were followed by the demand of Sicily, and that, whilst professing an ardent wish for peace, he was extending his usurpations in Germany, and secretly preparing to subvert the power of Prussia.

The humiliation of Austria left Bonaparte at liberty to direct his manœuvres, both diplomatic and military, against her northern rival. Affecting great indignation at the friendly disposition shown by Prussia, in the preceding autumn, towards the coalition, he demanded the cession of a portion of her territory in the south-west, and, in return, transferred to her Hanover, in the hope of kindling the flame of discord between her and England. The Prussians accordingly entered Hanover; the local government making no resistance, and our cabinet taking no retaliatory measure, except the detention of vessels bearing the Prussian flag; a measure adopted, not in the spirit of hostility, but to satisfy popular clamour in England. The discussions between France and Prussia continued during the summer of 1806, and, from the blind confidence of one party, and the artifice of the other, assumed at last a serious aspect. War was declared; the battle of Jena deprived Prussia of her army, her capital, and her fortresses; and her court was fugitive in the north of Poland, ere there had been time to send, or even to concert the sending of succours from England. The Grenville ministry, less eager than their predecessors to embark in continental war, confined themselves to sending a general officer, Lord Hutchinson, to the Russian head-quarters, and to the grant of a limited subsidy. For some time the difficulties of the country, and the firm

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resistance of the Russians, particularly at Eylau, encou- reached England, the popular notion that Buenos Ayres Reign of raged the hope of arresting the progress of Bonaparte; but this hope was disappointed by the battle of Friedland, and still more by the approximation of the court of Russia to

The treaty of Tilsit excited alarm, less from its specific provisions, than from the probable consequences of the co-operation of the contracting powers. Among these, some persons reckoned, or pretended to reckon, the equipping against us of the Danish navy, a force of sixteen sail of the line, not manned or ready for sea, but capable of being fitted out without a great sacrifice. The ministry of 1807 founded their claim to public favour on a system of vigour,—on a course altogether opposite to the cautious calculations of their predecessors. No sooner were they apprized of the treaty of Tilsit, than, without waiting for its effect on the Danish government, they determined on the as yet unexampled measure of taking forcible possession of a neutral fleet. A powerful armament of twenty thousand troops and twenty-seven sail of the line, prepared ostensibly against Flushing and Antwerp, was directed to proceed to the Sound, there to await the result of a negociation opened at Copenhagen. This negociation was intrusted to a special envoy, who represented the danger to Denmark from France and Russia, and demanded the delivery of the Danish fleet to England, under a solemn stipulation of its being restored on the termination of our war with France. The Danes, justly offended at this proposal, and aware that their agreeing to it would expose neral Sir John Stuart, in the beginning of July 1806, to them to the loss of the continental part of their territory, refused: our envoy returned on board our fleet: our army was landed, and Copenhagen invested by sea and land, while a part of our fleet cut off all communication between the continent and the island on which it stands. After a fortnight passed in preparations, a heavy fire was opened on the city, and continued during two days with very great effect. A capitulation now took place; the citadel, dockyards, and batteries were put into our hands, and no time was lost in fitting out the Danish men of war for sea. All stores, timber, and other articles of naval equipment, belonging to government, were taken out of the arsenals, embarked, and conveyed to England.

The expedition to Copenhagen excited much discussion and difference of opinion in England, particularly when it ground was, to acknowledge at once that the Danes had given no provocation whatever; that their conduct had been strictly neutral; but that they would evidently have been unable to defend themselves had Russia and France united against them. Still it was extremely questionable, whether we, to ward off a contingent annoyance, should have committed a present aggression. The success of our attempt, considering our naval superiority, the insulated position of Copenhagen, and its unprepared state, admitted of little or no doubt. But this was not all. remained further and more important considerations; the odium that would be thus excited against us in the Danish nation, and that closer approximation of Russia to France, ments of the Baltic.

The Cape of Good Hope surrendered in January 1806 to an armament sent from England. After this, Sir Home Popham, who commanded the naval part of the expedition, ventured to make, without the sanction or even knowledge of government, an attempt on Buenos Ayres. Our troops, although under two thousand in number, effected a landing,

would prove a great market for our manufactures, induced George III. government to take measures for completing the new conquest. And though the inhabitants soon rose and drove out the feeble detachment under Sir Home Popham, an armament, which arrived in January 1807, under the command of Sir Samuel Auchmuty, attacked the strongly fortified town of Monte Video, and carried it by assault, which was conducted with great skill and gallantry. But a very different fate awaited our next enterprise, an attack on Buenos Ayres, planned by General Whitelocke, an officer wholly unfit for this or any other kind of service. Our troops, eight thousand in number, were, under every disadvantage, successful in some parts; but failing in others, the result was a negociation, and a convention that we should withdraw altogether from the country, on the

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condition of our prisoners being restored.

But in another part of the world, and against an ene my in general far more formidable, our arms had been attended with success. Naples had been engaged in the coalition of 1805, with a view to assail the French on the side of Lombardy; but an Anglo-Russian army, landed for that purpose, had been prevented from marching northward by the disastrous intelligence from Germany. They were subsequently re-embarked, the British withdrawing to Sicily, and Palermo becoming once more the refuge of the Neapolitan court. That court, eager to excite insurrection against the French in Calabria, prevailed on Gelead thither a detachment of our troops. They landed, and soon after received intelligence, that at Maida, distant only ten miles from our encampment, was a French corps, already equal to our own, and hourly expecting considerable reinforcements. Our troops marched to attack them on the morning of 4th July, and at nine o'clock drew near to their position, which had a river in front. But General Regnier, who commanded the French, having received his reinforcements the preceding evening, and seeing that our small army was unprovided with cavalry, caused his men to march out of their camp, and advance to charge us on the plain. Our force, including a regiment landed that morning, was nearly six thousand; that of the enemy above seven thousand. The French, who knew our troops only by report, marched towards them with great confidence, was avowed that ministers had no evidence of an intention not expecting them to stand the charge. Our line, howin Russia to coerce Denmark, and still less of a disposition in ever formed, faced the enemy, and advanced; the forward Denmark to give way to such coercion. The only tenable movement of the opposing lines lessening the intervening distance in a double ratio. On a nearer approach the enemy opened their field-pieces, but, contrary to the usual practice of the French artillery, with little effect. Not so the British; for when our artillery opened, every shot told, and carried off a file of the enemy's line. The lines were now fast closing, being within three hundred yards distance, and a fire having commenced between the sharpshooters on the right. At this moment the enemy seemed to hesitate, halted, and fired a volley. The British line also halted, returned the salute, and having thrown in a second volley, advanced at full charge. The enemy, apparently resolved to stand the shock, kept perfectly steady, till, intimidated by the advance, equally rapid and firm, of which could hardly fail to follow so open an affront to a an enemy whom they had been taught to despise, their power professing to take a lead in the political arrange- hearts failed, and they faced about and fled, but not in confusion. When they approached within a short distance of their second line, they halted, fronted, and opened a fire of musketry on our line, which did not follow up the charge to any distance, but halted to allow the men to draw breath, and to close up any breaks in their formation. They were soon ready, however, to advance again; and the order to charge having once more been given, our and occupied the town. Intelligence to this effect having brave troops rushed forward to the onset, the enemy, as

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George III. But their courage again failed them; they would not stand the shock; and giving way in greater confusion than before, their first line was thrown upon the second, and both became intermingled in great disorder. Seeing himself thus completely foiled in his attack on the front, and being driven back more than a mile, Regnier now made an attempt to turn the left flank; but this was defeated by the British second line, which, refusing its left, opened an admirably directed and destructive fire, which quickly drove back the enemy with great loss. Their efforts were equally unsuccessful against the right of our line, which also charged in the most gallant and decisive manner, and the field of battle remained entirely in our possession.1 The French loss in killed and wounded was upwards of two thousand; ours only between three hundred and four hundred. This brilliant exploit produced the evacuation of part of Calabria by the French, but had no other result; our small force returning soon afterwards

> Our next operation in the Mediterranean was an unsuccessful menace of the Turkish capital. That court refusing to enter into our plans of hostility to France, our ambassador withdrew, and re-entered the Straits of the Dardanelles with a squadron of seven sail of the line, exclusive of frigates and bombs. They suffered considerably in passing the narrow part of the straits, between the ancient Sestos and Abydos, now called the castles of Romania and Natolia. Anchoring at a distance of eight miles from Constantinople, our admiral, Sir J. Duckworth, threatened to burn the seraglio and the city, but in vain. The Turks continued adverse to our demands, and employed the interval, wasted by the British commander in useless negociations, in strengthening the formidable batteries of the Dardanelles. It soon became indispensable therefore to withdraw, and to repass the straits; but this was not accomplished without a considerable loss in killed and wounded, the cannon at the castles being of great size, and discharging granite balls, one of which, weighing eight hundred pounds, cut in two the mainmast of the Windsor man of war. A descent made soon after in Egypt was equally unfortunate. A detachment of troops landing at Alexandria, occupied that town, but suffered a severe loss at Rosetta, and eventually withdrew, on the Turks consenting to give up the prisoners they had taken. Peace was soon after concluded with the Turks, and our opera-Ionian Islands from the French. Zante, Cephalonia, Ithaca, and Cerigo, were taken by a small expedition in 1809, and Santa Maura the succeeding year.

> On the side of Sicily, our commanders, though pressed by the court of Palermo, refused to make descents on Calabria, which could lead to nothing but partial insurrections, followed, on the return of a superior force, by the death of the most zealous of our partisans. We took, however, in June 1809, the small islands of Ischia and Procida, nearly four thousand Italians, who had landed on this oced to our decided naval superiority, put an end to all attempts of the kind.

The hostility of Russia consequent on her connection with France produced a menaced invasion of Sweden, now our only ally in the north. To aid in repelling it, Sir John

Reign of before, making a show of determination to remain firm. sand men. This force did not land; but the general, repairing to Stockholm, entered into communications with the king, and had the mortification of finding that prince wholly incapable of rational conduct, and bent on projects which would necessarily involve the sacrifice of the British troops. On this he lost no time in returning to Gottenburg, and soon afterwards brought back the armament to England, to be employed on a more promising service.

The influence possessed by Bonaparte over Spain had long inspired him with the hope of overawing Portugal, and of obliging that country to dissolve her alliance with England. To this hope the humiliation of Germany, and his new alliance with Russia, gave double strength; and, in the latter part of 1807, the most peremptory demands were made on the court of Lisbon. To part of these, implying the exclusion of British merchantmen from the harbours of Portugal, compliance was promised; but the demand of confiscating English property, and detaining the English resident in Portugal, was met by a decided refusal. A French army now marched towards Lisbon, and threatened openly to overthrow the house of Braganza; but the latter, after some momentary indications of indecision, took the determination of abandoning their European dominions, and proceeding to Brazil. This spirited, and by many unexpected measure, was carried into effect in the end of November, and Lisbon was forthwith occupied by French troops. A few months afterwards occurred the transactions at Bayonne, and the general declaration of hostility by the Spaniards to Bonaparte. Our cabinet now determined to postpone all other projects to that of a vigorous effort in Spain and Portugal. With that view, an armament of ten thousand men, collected at Cork, and said to be intended for Spanish America, sailed in July for the Peninsula, and offered its co-operation to the Spaniards in Galicia. They, however, thought it best that we should confine our aid to Spain to arms and money, directing our military force against the French army in Portugal. Accordingly, our troops, after passing an interval at Oporto, were landed to the southward, in Mondego Bay, where, after receiving the co-operation of another division of British, and of a few Portuguese, they proceeded on their southward march towards Lisbon. The first actions took place with French detachments at the small town of Obidos, and at Rorica. Neither was of much importance: the French, inferior in number, retreated; but their commander at Lisbon was Junot, an officer trained in the school of tions in the Levant were confined to the capture of the revolutionary enterprise, and disposed, like most of his brethren at that time, to make light of British land forces. He determined forthwith on assuming offensive operations, advanced from Lisbon, and reaching the British army on the 21st of August 1808, attacked it in its position at the small town of Vimiero. The force on either side was about fourteen thousand men. The French marched to the onset in columns, with their wonted confidence; but they had to encounter an enemy equally firm with Germans or Russians, and far superior in discipline, equipnear the coast of Naples; and, in the autumn of 1810, rement, and activity. The principal column of the enemy, pelled an attempt of Murat to invade Sicily. A body of headed by General Laborde, and preceded by a multitude of light troops, mounted the face of the hill forming the casion, were driven back with loss; a failure which, join- crest of the British position, with great fury and loud cries, and, forcing in our skirmishers upon the lines, crowned the summit; but, shattered by a terrible fire of the artillery, breathless from their exertions, and riddled by a discharge of musketry from the fifteenth regiment at half-pistol shot distance, they were vigorously charged in front and flank, Moore was sent to Gottenburg with a body of ten thou- and overthrown.2 Equal success attended our efforts in

² Napier's History of the Peninsular War, vol. i. p. 213.

Stewart's Sketches and Military Service of the Highland Regiments, vol. ii. p. 265 et seqq. 2d edition.

Reign of other parts of the line, and the loss of the enemy was three George III. thousand men and thirteen pieces of cannon. The object now ought to have been to follow up our success, before the French had time to recover themselves, and fortify the almost impenetrable mountains on the road to Lisbon. In vain did Sir Arthur Wellesley urge this, first on Sir Harry Burrard, who had now taken the command, and next day on Sir Hew Dalrymple, who arrived and replaced him. Reinforcements were daily expected; and, till their arrival, neither of these officers could be persuaded to incur hazards for the attainment of an advantage which, from their unacquaintance with localities, they were not competent to appreciate. A precious interval was thus lost. The French occupied the passes, opened their negociation in a tone of confidence, and obtained, by the treaty called the Convention of Cintra, a free return to France on board of British shipping. The ministry, though disappointed, determined to defend this convention; judging it indispensable, partly from the communications of Sir Hew Dalrymple, more from its bearing the unqualified signature of Sir Arthur Wellesley, who was, even then, their confidential military adviser. The public, however, called for inquiry; ministers felt the necessity of acceding; the three generals were ordered home from Portugal; and, after a long investigation, and divided opinions, the chief error was found to consist in stopping General Ferguson in the career of victory, when about to cut off the enemy's retreat to Lisbon, and in the loss of the twenty-four hours which followed the battle of Vimiero.

The public disappointment at the convention of Cintra was soon counterbalanced by gratifying intelligence from the Baltic. Bonaparte, whose plan was to subjugate all Europe, by making one nation instrumental in overawing another, had sent the Spanish regiments in his service into Denmark; but he could not prevent their receiving intelligence of the rising spirit of their countrymen, and the vicinity of a British fleet happily facilitated their evasion. Ten thousand Spaniards were thus brought off, and carried, with their arms, stores, and artillery, to join the standard of their country.

Meantime the command of our troops in Portugal was vested in Sir John Moore, and arrangements were made for moving them forward into Spain. But from the badness of the roads, it was necessary to advance in two divisions, one marching due east, and another north-east; while a further force, which had arrived from England at Corunna, was instructed to hold a south-east course. The lateral divisions received, in their progress, orders to adapt the direction of their march to existing circumstances; but the result was, that both converged towards the central division, conducted by Sir John Moore in person.

In their march our officers had an ample opportunity of witnessing the fallacious and exaggerated impressions entertained in England with regard to the supposed enthusiasm of the Spaniards. They saw a country wretchedly cultivated and thinly peopled; a nation hostilely disposed, indeed, to the French, but unaccustomed to exertion, and incapable of combination. Instead of recruits, supplies of provisions, or offers of voluntary service, all was inactivity and stagnation; and, amidst the general poverty, our commissariat had great difficulty in obtaining provisions. Another great source of perplexity was the want of information. The natives, whether in the civil or military service, were too ignorant and credulous to be capable of detecting exaggeration, or of distinguishing truth from falsehood; and our officers were obliged to judge for themselves under the most contradictory rumours.

Sir John Moore reached Salamanca on the 13th of November, aware that the Spaniards had been defeated at Burgos, and soon after apprised that a French corps was advancing

to Valladolid, within sixty miles of his front. In this situ- Reign of ation he received from Madrid the most urgent solicitations George IIL to advance thither with his army, either in whole or in part. He knew the ardour of his country for the cause of Spain, and directed his movements in the view of complying, as far as should be at all advisable, with the representations pressed on him; but day after day the intelligence became more discouraging. At last, the fall of Madrid, ascertained by an intercepted letter of General Berthier, removed every doubt, and left him no other plan but that of uniting his three divisions, and determining on a retreat; but, as his army was now augmented to twenty-five thousand men, he determined, if possible, to strike a blow against the detached French army under Soult, stationed at some distance to the north-east. With this view, cur troops advanced on the 11th of December towards the small town of Sahagun, and a partial action, which took place between the opposite vanguards, was to our advantage; but intelligence arriving that Bonaparte was directing, by the passes of the Guadarama, a superior force on a point in rear of the British, it became indispensable to make a prompt and uninterrupted retreat. Bonaparte. pressing forward with his vanguard, reached our rear at Benavente, saw, for the first time, British soldiers, and witnessed a cavalry action, in which several squadrons of his guard were very roughly handled, and their commanding officer, Lefebre Desnouettes, made prisoner. Meanwhile, Soult, marching by a different road, hoped to cross our line of retreat at Astorga; and the Spaniards having abandoned the position which covered the access to that town, it required both prompt and skilful exertion to enable our army to occupy it before the enemy. Here, pressed as we were, it became necessary to destroy a great part of our camp equipage. Our army was ahead of the enemy, but had before it a long and difficult march over the mountains of Galicia. The weather was severe, provisions scanty, the inhabitants cold and unfriendly; while privations and disappointment relaxed the discipline of our soldiers, who called loudly to be led to action, as the close of their distress. Retreat, however, was unavoidable; and, in this state of suffering and insubordination, the army performed a march of more than two hundred miles; the general keeping in the rear to check the French, who followed with their usual audacity. At Lugo, about sixty miles from Corunna. circumstances seemed to justify our awaiting the enemy, and fighting a general battle. Our soldiers repaired with alacrity to their ranks, but Soult did not accept the challenge, and the retreat was continued. It closed on the 12th January 1809, having been attended with the loss of many men, from disorder, and the sacrifice of many horses, from want of forage, but without losing a standard, or sustaining a single check in action. On the 13th, 14th, and 15th, the sick and artillery were embarked on board our men of war; while the troops remained on shore, to await the enemy, and to cover the reproach of retreat by some shining exploit. This led to the battle of Corunna. On that day our position was good on the left, but very much otherwise on the right; thither, accordingly, the French pointed their strongest column, and thither also Sir John Moore repaired in person. He directed the necessary movements, first to obstruct, and afterwards to charge, the advancing enemy. These orders were gallantly executed, and the attack of the French repelled; but our lamented general received a wound, which soon after proved mortal, from a cannon ball, that struck him on the shoulder, and knocked him off his horse. Subsequent attacks, first on our centre, and next on our left, were equally foiled; and, in the evening, we occupied an advanced position along our whole line. Enough having now been done for the honour of our arms, the embarkation was continued on the 17th, and

Reign of completed on the 18th, after which the whole set sail for campaign, and the retreat of our army under Sir John Reign of George III. England.

1809.

The session of 1808 was opened on 31st January by a speech of uncommon length, which enlarged on the Copenhagen expedition; our relations with Russia, Austria, and Sweden; the departure of the royal family of Portugal to Brazil; and our orders in council respecting neutrals. The chief debates of the session related to these subjects. The Copenhagen expedition was much canvassed, as unprovoked by Denmark, and incompatible with the honour of England. Still that measure received the support of a great majority, Mr Ponsonby's motion for the production of papers relating to it being negatived by two hundred and fifty to a hundred and eight, and a similar motion in the House of Lords by a hundred and five to fortyeight. Even a motion for preserving the Danish fleet, to be restored, after the war, to Denmark, was negatived in both houses.

The volunteer system had, since 1804, been greatly relaxed, and the country evidently stood in need of a more constant and efficient force. The Grenville ministry, adverse to the volunteer system, had determined to let it fall into disuse, and to replace it by a levy of two hundred thousand men, to be trained to act, not in battalions, but separately, and as irregulars, on the principle that local knowledge was the chief recommendation, and a continuance of previous habits the proper exercise, of such a force. The new ministry, however, pursued a different course, and passed an act for a local militia; a body which, with the exception of the officers, was composed of the lower orders, pledged to regular training during one month in the year, and subjected to all the strictness of military discipline. Such of the volunteers as chose were to remain embodied; the total of the local militia was about two hundred thousand, and the mode of levy was by a ballot of all persons, not specially exempted, between the age of eighteen and thirty-one.

The orders in council were frequently discussed during this session, but they were as yet imperfectly understood either in their immediate operation or in their consequences. Unfortunately for the advocates of moderation, Bonaparte now lost all regard to justice, and committed the most lawless of all his acts, the seizure of the Spanish crown. Indignation at this atrocity, and a firm determination to support the Spanish cause, were manifested by men of all parties, among whom were remarkable, as habitual members of opposition, the Duke of Norfolk and Mr Sheridan; the latter making, on this occasion, one of the most brilliant speeches of his latter years.

The session of 1809 was opened on 13th January by a speech declaring a decided determination to adhere to the

Moore. The intelligence that arrived soon after the death George III. of that commander drew from the house a unanimous eulogy of his character, and regret for his fall. There still prevailed, both in parliament and the public, a strong attachment to the Spanish cause; and, in the various motions made by the opposition to censure ministers for mismanaging our armaments, or ill planning our operations, the minority seldom exceeded a third of the members

But the attention of parliament and the public was withdrawn even from this interesting question, and absorbed by the charges against the Duke of York, brought forward by Colonel Wardle, on evidence given or procured by Mrs Mary Anne Clarke, a forsaken mistress of the duke. Ministers, unaware of the extent of the proofs, brought the inquiry before the house instead of referring it to a committee, and a succession of singular disclosures were thus made to parliament and the public. Of these the most remarkable were produced by the friends of the duke persisting in examinations begun under an impression of his entire innocence. It is hardly possible to describe how much this subject engaged the public attention during the months of February and March. Of the influence of Mrs Clarke in obtaining military commissions from the duke, and of her disposing of them for money, there could be no doubt. The question was, whether the duke was apprised of this traffic; and though he might not be aware of its extent, there seems hardly room to doubt that, in certain cases, he suspected its existence. The debate on the collective evidence was uncommonly long, being adjourned from night to night, and exhibited a great difference of opinion on the part of the speakers. Several resolutions, varying in their degree of reprehension, were proposed; and though those finally adopted condemned only the immorality of the connection formed by the duke, without asserting his knowledge of the pecuniary abuses, the result was his resignation of the office of commander-

The success of this investigation prompted an inquiry into other abuses, particularly the sale of East India appointments, and disclosed a negociation of Lord Castlereagh to barter a nomination to a Bengal writership, for the return of a member to parliament. The house declined to proceed to any resolution against his lordship, or to entertain a motion relative to the interference of the executive government in elections. A bill for parliamentary reform, brought in by Mr Curwen, was not directly opposed, but so materially altered in its progress as to be nugatory when it passed into a law. The further business of the session consisted in the annual votes for the public cause of the Spaniards, notwithstanding the failure of the service, and in motions by Sir Samuel Romilly, on a sub-

The following masterly defence of the necessity as well as the conduct of this celebrated retreat, is extracted from Napier's His-

tory of the Peninsular War, vol. i. p. 525.

"Lord Bacon observes, that 'honourable retreats are no ways inferior to brave charges, as having less of fortune, more of discipline, and as much of valour.'

That is an honourable retreat in which the retiring general loses no trophies in fight, sustains every charge without being broken, and finally, after a severe action, re-embarks his army in the face of a superior enemy without being seriously molested. It would be honourable to effect this before a foe only formidable from numbers, but it is infinitely more creditable, when the commander, while struggling with bad weather and worse fortune, has to oppose veterans with inexperienced troops, and to contend against an antagonist of eminent ability, who scarcely suffers a single advantage to escape him during his long and vigor-

ous pursuit. All this Sir John Moore did, and finished his work by a death as firm and glorious as any that antiquity can boast of "Put to Lord Bacon's test, in what shall the retreat to Corunna be found deficient? something in discipline, perhaps, but that fault does not attach to the general. Those commanders who have been celebrated for making fine retreats were in most instances well acquainted with their armies; and Hannibal, speaking of the elder Scipio, derided him, although a brave and skilful man, for that, being unknown to his own soldiers, he should presume to oppose himself to a general who could call to each man under his command by name; thus inculcating, that unless troops be trained in the peculiar method of a commander, the latter can scarcely achieve any thing great. Now Sir John Moore had a young army suddenly placed under his guidance, and it was scarcely united, when the sirperior numbers of the enemy forced it to a retrograde movement under very harassing circumstances; he had not time, therefore, to establish a system of discipline; and it is in the leading events, not the minor details, that the just criterion of his merits is to be sought for.'

Reign of ject which has been but lately followed up with effect, the George III amendment of our criminal law, by lessening the severity, evening by three regiments of infantry, was at first success. George III but insuring the application, of punishments.

The failure, in autumn, of the expedition to the Scheldt, and the resignation of the Duke of Portland when on the verge of the grave, led to the disclosure of a remarkable secret in cabinet history—the attempts made, during several months, by Mr Canning, to obtain from the Duke of Portland the removal of Lord Castlereagh from the war department, on the ground of incompetency to the station. On making this mortifying discovery, the complaint of Lord Castlereagh was, not that his brother minister should think with slight of his abilities, but that, during all the time that he laboured against him, he should have maintained towards him the outward manner of a friend. This led to a duel, followed, not by serious personal injury, but by the resignation of both; causing, in the ministry, a blank which, to all appearance, could be filled only by bringing in the leaders of opposition. An overture to this effect, whether sincere or ostensible, was made by Mr Perceval. Lord Grenville, on receiving it, came to London; Lord Grey, more indifferent about office, answered it from his seat in Northumberland; but both declared a determination to decline taking part in the administration so long as the existing system should be persisted in. Marquis Wellesley, who had gone as ambassador to the Spanish junta, now returned, and was invested with the secretaryship for foreign affairs. Mr Perceval was appointed premier; and the new ministry, feeble as they were in talent, received the support of a decided majority in parliament; so general was the hatred of Bonaparte, and the conviction that our safety lay in a vigorous prosecution of

Our failure in the campaign of 1808-9 was far from discouraging our government from new efforts. Austria was preparing to attack the allies of Bonaparte in Germany; and the Spaniards, though repeatedly beaten in close action, continued a destructive warfare in the shape of insulated insurrections. Sir Arthur Wellesley was accordingly sent with a fresharmy to Lisbon, and General Beresford with a commission to discipline the Portuguese forces. They found the French threatening Lisbon in two directions; from the east, with a powerful force under Victor; from the north, with a less numerous body under Soult. Sir Arthur Wellesley advanced against the latter, drew near his rear guard on the banks of the Douro, drove it over that river, and crossing immediately after, forced Soult to a precipitate retreat from Oporto. Returning to the southward, our commander obliged the force under Victor to draw back; and having, some time after, effected a junction with a Spanish army, took the bold determination of moving forward in the direction of Madrid by the valley of the Tagus. The French now sent reinforcements to the army of Victor, and the opposing forces met at Talavera de la Reyna, a town to the north of the Tagus, near the small river Alberche. The British force was nineteen thousand, and that of the Spaniards above thirty thousand; the French army amounted to upwards of forty-seven thousand men. Lord Wellington was too distrustful of the discipline of his allies to venture an attack on the French, but he saw no imprudence in trying, as at Vimiero, the chance of a defensive action. Stationing the Spaniards on strong ground on the right, he occupied with the British a less strong but yet favourable position on the left. Against the army thus posted the French advanced in the afternoon of 27th July, driving in our advanced post, and attacking an eminence on our left. This eminence, the key of the position, would have been assailed from the beginning by Bonaparte, with a formidable column; but the rifle corps and a single battalion sent against it by Victor were speedily necessary for the allied army to retire; the French divi-

ful, but it was soon repelled by a fresh division of British troops. The main body of the French, surprised at this failure, waited impatiently for morning to renew the attack; they advanced, marched through a destructive fire to the top of the rising ground, approached our cannon, and were on the point of seizing them, when our line rushed forward with the bayonet, and drove them back with great loss. Their commanders now determined to suspend all attacks on the right of the position, and to bring a mass of force against the front and flank of the British left. A general attack took place at four in the afternoon, and the troops directed against the height now consisted of three divisions of infantry, or about eighteen thousand men. Crossing the ravine in their front, the first division scaled the height amidst volleys of grapeshot; but its general fell, a number of officers shared his fate, and retreat became unavoidable. No attempt was now made to carry the eminence in front; attacks were made on its left and right, but all were ineffectual. The left, indeed, was the weak part of the British position; but an event, unfortunate in its immediate results, served to check their audacity in this quarter, and to prevent the renewal of any serious attempt against this part of our line. Sir Arthur Wellesley having observed a French division (Villatte's), preceded by grenadiers, and supported by two regiments of light cavalry, advancing up the valley against the left, while another (Ruffin's) was directing its march towards a mountain which flanked the left transversely, in order to turn it, directed Anson's brigade of cavalry, consisting of the twenty-third light dragoons and the first German hussars, to charge the head of these co-The order was instantly obeyed; the brigade moved off at a canter, and increasing its speed as it advanced, rode headlong against the enemy; but in a few moments it came upon the brink of a cleft which was not perceptible at a distance. The French threw themselves into squares, and opened their fire. Colonel Arentschild, commanding the German hussars, promptly reined up, exclaiming, " I will not kill my young mens;' and it would have been well if the twenty-third had followed the example of the experienced veteran. But English impetuosity was not to be restrained. The twenty-third rode wildly down into the hollow; men and horses fell over each other in dreadful confusion; yet the survivors, still untamed, mounted the opposite banks by twos and threes; and Major Ponsonby rallying all who came up, they passed through the midst of Villatte's columns, reckless of the musketry from each side, and fell with inexpressible violence upon a brigade of French chasseurs in the rear. The combat was fierce but short. Attacked by Victor's Polish lancers and the Westphalian light horse, exposed on both sides to the fire of the squares of infantry, and engaged with the chasseurs in front, they were at length broken; and those who were not killed or taken escaped behind a Spanish division, leaving behind about half the number which went into action. But, however unfortunate in its circumstances, the desperate fury of this charge appalled the French, and effectually checked their advance on a point where the chances of success were otherwise much in their favour. This battle, which was one of hard, honest fighting, reflected little credit on the generalship of either party. The loss on both sides was unusually severe; that sustained by the British, in the two days' fighting, amounting to upwards of six thousand in killed and wounded, and that of the French to about seven thousand four hundred.

Notwithstanding this dear-bought success, it became

1809.

Reign of sions in the north-west of Spain having united and begun capable of discriminating the causes of success or failure Reign of George III. to march in a direction which would soon have brought them on our rear. Our army crossed the Tagus at Arzobispo, and held a south-west course till it reached Badajos, where it remained during the rest of the year, in a position which covered that fortress, and showed the Spaniards that we had not abandoned their cause, however dissatisfied with their co-operation, and convinced of the impracticability of combining offensive operations with such allies.

While by land the fortune of war was thus chequered, at sea the French experienced nothing but disasters. Eight ships of the line in Brest, eluding our blockade, sailed southward to Basque Roads, near Rochefort, where they were joined by four sail of the line from that port. Our fleet blockaded them in their new stations; and preparation having been made to attempt their destruction by fire-ships, Lord Cochrane sailed in with these dreadful engines on the evening of the 11th of April 1809. Our seamen broke the boom in front of the French line, disregarded the fire from the forts, and, after bringing the fire-ships as near to the enemy as possible, set fire to the fusees and withdrew in their boats. The French, surprised and alarmed, cut their cables and run on shore. Four sail of the line that had accompanied Lord Cochrane attacked them, and though the main body of our fleet was prevented by the wind and tide from coming up, the result of our attack, and of the effect of the fire-ships, was the loss of four sail of the line, and one frigate burned or destroyed. At a later period of the year a French convoy of three sail of the line and eleven transports, proceeding from Toulon to Barcelona, was attacked and destroyed by a division from Lord Collingwood's fleet.

Doubtful as was the aspect of the great contest in Spain, it employed a large portion of Bonaparte's military establishment, and revived the hope of independence in Germany. Prussia was too recently humbled, and too closely connected with Russia, at that time the ally of France, to take up arms; but Austria was unrestrained, and thought the season favourable for a renewal of the contest. Her troops took the field in April, and invaded Bavaria under the Archduke Charles, but were worsted at Eckmuhl, after a series of the most splendid military combinations, and Vienna was a second time entered by Bonaparte. His impatience to attack the Austrian army on the north side of the Danube led to his failure in the sanguinary battle of Aspern, and necessitated the advance of almost all his regular troops into the heart of Germany, at a distance of several hundred miles from the coast. But the battle of Wagram at length decided the fate of the campaign, and placed Austria again at the feet of France.

Of the naval stations exposed in consequence of the withdrawal of the troops, by far the most important was Antwerp, situated on a part of the Scheldt of as great depth and as accessible to ships of the line as the Thames at Woolwich. From Antwerp to the mouth of the Scheldt is a distance of about fifty miles. The first fortified town, on coming in from the sea, is Flushing, the batteries of which, though formidable, are not capable of preventing the passage of ships of war through a strait of three miles in width. Our armament, consisting of nearly forty sail of the line and thirty-eight thousand military, was the most powerful that had ever left our shores. It crossed the narrow sea with a fair wind; and, in the morning of the 30th of July, the inhabitants of the tranquil coast of Zealand were astonished by an unparalleled display of men of war and transports. Our troops landed and forthwith occupied Walcheren and the islands to the north. No resistance was offered except at Flushing; but our com-

mander, the Earl of Chatham, showed himself wholly in-

when he stopped to besiege that place. It ought only to George III. have been watched, whilst the main body of the troops should have landed in Dutch Flanders, on the south of the Scheldt, and marched straight to Antwerp, which, even with artillery, might have been reached in a few days. The French, never doubting the adoption of this plan, and conscious of their weakness, had moved their men of war up the river, beyond the town, previous to setting them on fire. But a delay of a fortnight took place before Flushing, and time was thus given to the enemy to strengthen the forts on the river, and to collect whatever force the country afforded. Still, as an attack by water was not indispensable to success, there yet remained a chance; ten days more, however, were lost; the relinquishment of the main object of the expedition became thus unavoidable; and the only further measure was to leave a body of fifteen thousand men in the island of Walcheren. There, accordingly, they remained during several months, suffering greatly from an unhealthy atmosphere, and doing nothing except destroying, on their departure, the dockyards of Flushing. Never was a gallant force more grossly misdirected; the choice of our general was as unaccountable as the choice of Mack in 1805; and the historian, were he to reason from the inferior numbers of the enemy, might pronounce this expedition as inglorious to our arms as the battles of Poitiers and Agincourt were to our enemies of a

The session of 1810 opened on the 28th of January, and the leading subject of debate was our unfortunate expedition to Walcheren and the Scheldt. A motion leading to inquiry was carried after a close division, namely, a hundred and ninety-five to a hundred and eighty-six; and the investigation was conducted chiefly at the bar of the House of Commons, a secret committee being appointed for the inspection of confidential papers. The Earl of Chatham, and other officers concerned in planning or conducting the expedition, were examined. The inquiry lasted several weeks, and disclosed, clearly enough, the imbecility of our commander; but the speeches of the opposition were pointed, not against the management of the expedition, but against its expediency as an enterprise; not against the general, but the cabinet. In this they were not seconded by the majority of the house. On the policy or impolicy of the expedition being put to the vote, the former was supported by two hundred and seventy-two in opposition to two hundred and thirty two; and even the less tenable ground of keeping our soldiers in an unhealthy island for three months after relinquishing all idea of an attempt on Antwerp, was vindicated by two hundred and fifty-three votes against two hundred and thirty-two; a decision too remarkable to be forgotten, and which has since stamped this with the name of the Walcheren Parliament. The only ministerial change consequent on the inquiry was the removal of Lord Chatham from his seat in the cabinet, and from the master-generalship of the ordnance; but this was in consequence of privately delivering a statement to the king, professing to vindicate himself at the expense of Sir Richard Strachan and the navy. The resolution adopted on this occasion was, " that the house saw with regret that any such communication as the narrative of Lord Chatham should have been made to his majesty, without any knowledge of the other ministers; that such conduct is highly reprehensible, and deserves the censure of the house.

The exclusion of strangers from the gallery of the house during the Walcheren inquiry gave rise to a discussion which, though at first unimportant, soon engaged much of the public attention. A Mr John Gale Jones, well known among the demagogues of the age, and at that

Reign of time president of a debating club, animadverted on the above twelve miles in breadth, having the sea on the Reign of George III. House of Commons in a handbill, in a style which induced the house to order his commitment to Newgate. A few weeks after, Sir Francis Burdett brought in a motion for his liberation, on the broad ground that the house had no right to inflict the punishment of imprisonment in such a case. Baffled in this way by a great majority, Sir Francis wrote and printed a letter to his constituents, denying this power, and applying contemptuous epithets to the houses. This imprudent step provoked a debate, which ended in a resolution by the House of Commons to commit Sir Francis to the Tower. The speaker issued his warrant, and the serjeant at arms carried it to the house of Sir Francis, but withdrew on a refusal of Sir Francis to obey. Next day the serjeant repeated his demand, accompanied by messengers; but the populace had by this time assembled in crowds near the baronet's house, and prevented his removal until an early hour on the 9th, when the civil officers burst into his house, put Sir Francis into a carriage, and conveyed him to the Tower in the midst of several regiments of horse. Sir Francis brought actions against the speaker and other officers; but they fell to the ground by non-suits, and he continued in confinement during the remainder of the session.

Among the further acts of this session were two which regarded Scotland; one for the increase of the smaller church livings, of which none in this part of the kingdom are now under L.150; the other relative to judicial prosion had been previously divided into chambers by an act passed in 1808; and the trial by jury in civil causes was introduced into Scotland by an act of 1815.

We turn with impatience from the banks of the Scheldt to a scene more honourable to our arms. Our troops under Sir Arthur Wellesley, now Lord Wellington, had passed the winter in the interior of Portugal, moving northward as spring advanced, but delaying active operations. Offensive war was unsuited to our situation, and the French awaited reinforcements from the north. Bonaparte's determination now was to make Massena penetrate into Portugal, and to expel those auxiliaries who were the mainspring of the obstinate resistance experienced by him in Spain. The first enterprise of the French army was the siege of the frontier fortress of Ciudad Rodrigo, which surrendered on the 10th of July. The next object of attack was the Portuguese fortress of Almeida, which was invested in the end of July, and taken unfortunately too soon, in consequence of the explosion of the magazine. Soon after, the French army, now a formidable body, advanced into Portugal, Lord Wellington retiring before them, but determined to embrace the first opportunity of fighting on favourable ground. This occurred when occupying the highest ridge of the mountain of Busaco, directly in face of the enemy. The French, always impetuous, and not yet aware of the firmness of our men. marched up the mountain; one division reached the top of the ridge, where they were immediately attacked by a corps of British and Portuguese, and driven from the ground. In other parts the same result took place before the French reached the top. The loss on our side was a thousand men, that of the enemy between two and three thousand. Massena desisted from further attacks; but turning the flank of our position by a mountain, Lord Wellington, instead of heading the enemy's columns as they debouched from the defile, retreated in the direction of Lisbon, till he reached the ground which he had previously determined to occupy at Torres Vedras, in order to cover that capital.

west and the Tagus on the east; the ground is extremely George III. mountainous, and accessible only by passes, which were occupied by our troops and by batteries. Massena felt all the strength of this position, and the repulse at Busaco made him beware of a second encounter on disadvantageous ground. It was now for the first time that the impetuous bands of Bonaparte stopped short in their career: the armies remained opposite to each other above four months, during which time the French were greatly straitened for provisions and forage, being obliged to get convoys of biscuit under escort from France, whilst the command of the sea secured abundance to the British. Still Massena persisted in keeping his position, hoping to combine his operations with the army of Soult, then advancing from the south-east of Spain; an army which was but too fortunate, having attacked and taken by surprise a Spanish camp on the banks of the Guadiana. A number of boats had been constructed by Massena to cross the Tagus and co-operate with Soult; but in the beginning of March intelligence arrived that a convoy of biscuit long expected from France had been intercepted by the Guerillas. There was now an end to all offensive projects, and there remained only the alternative of retreat. It began on the 5th of March; the British followed; and the movements of either army, during a very long march, afforded an admirable exemplification of the rules of war. Our advance was so rapid that the French were frequently obliged to ceedings, and reducing the heavy expenses caused by the compulsory extract of office papers. The court of sest their best troops in the rear, collected in solid bodies, and affording no opening to our vanguard. The retreat lasted a month, and closed near the fortress of Almeida, on the frontier of Spain. The French, however, were soon again in a condition to act. and advanced to relieve Almeida, of which we had now begun the siege. The chief fighting took place on the 3d and 5th of May, near a village called Fuentes de Honor, which was repeatedly taken and retaken; but all their efforts were ultimately ineffectual, and Almeida was left to its fate. The chief part of the garri son, however, found means to escape by a nocturnal march

1811

Meanwhile the south or rather the south-west of Spain was the scene of very active operations. A body of Spaniards and British, marching northward from Gibraltar, approached the south-western extremity of the line occupied by the French troops engaged in the blockade of Cadiz. General Graham commanded the British, and on 5th March, at noon, was drawing near to the close of a long march, when he received intelligence of the advance of a French force. Knowing the height of Barrosa, which he had just left, to be the key of the position, he immediately countermarched his corps, and had proceeded but a short way when he found himself unexpectedly near to the enemy, whose left division was seen ascending the hill of Barrosa, while their right stood on the plain within cannon-shot. To retreat was wholly unadvisable; an immediate attack was therefore determined on by General Graham, though unsupported by the Spaniards, and inferior to the enemy. A battery opened against the right division of the French caused them considerable loss, but they continued to advance until a charge with the bayonet drove them back with great slaughter. With the other division on the ascent of the hill there took place a similar conflict with a similar issue; both sides fought with courage, and both sustained a heavy loss; that of the British was above twelve hundred, and that of the enemy nearly double. The action lasted an hour and a half; our success was owing partly to the effect of our guns, but more to the firmness of the troops, who showed themselves determined rather to fall than yield.

About the same time, but at a distance of two hundred The track of country to the north of Lisbon is not miles to the north of Cadiz, the important fortress of Ba1811.

Regency dajos fell into the hands of the French. This painful intelligence reached Lord Wellington when following up the retreat of Massena; and no time was lost in detaching a hody of troops to the south of Portugal, to enable Marshal Beresford to advance and form the siege of Badajos. This called from the south the army of Soult, twenty-three thousand strong. On their approach Marshal Beresford raised the siege of Badajos, and prepared to meet the enemy with a force numerically superior, but of which only seven thousand consisted of British troops. Soult quitted Seville on the 10th May 1811, but Beresford remained in a state of two regiments of hussars, drew further down the river to uncertainty till the 12th, when he commenced raising the siege. On the 13th he held a conference with the Spanish at Valverde, where it was agreed to receive battle at the village of Albuera. The 14th was spent in a variety of movements; and in the morning of the 15th the British occupied the left of the position of Albuera, a ridge about four miles long, having the Aroya Val de Sevilla in rear, and the Albuera river in front. This position was now occupied by thirty thousand infantry, above two thousand cavalry, and thirty-eight pieces of artillery, eighteen of which were nine-pounders; but a brigade of the fourth division being still absent, the British infantry, "the pith and strength of the battle," did not amount to seven thousand. The French had fifty guns and above four thousand veteran cavalry, but only nineteen thousand chosen infantry; yet being of one nation, obedient to one discipline, and animated by one spirit, the excellence of their composition amply compensated for the inferiority of numbers. Soult examined Beresford's position on the evening of the 15th, and having learnt that the fourth division was left before Badajos, and that the corps of Spaniards under Blake would not arrive before the 17th, he resolved to attack the next morning. We shall now adorn our pages with the incomparable description of this conflict, given by the great historian of the peninsular war.

"The hill in the centre, commanding the Valverde road, was undoubtedly the key of the position if an attack was made parallel to the front; but the heights on the right presented a sort of table-land, trending backwards towards the Valverde road, and looking into the rear of the line of battle. Hence it was evident that, if a mass of troops could be placed there, they must be beaten, or the right wing of the allied army would be rolled up on the centre and pushed into the narrow ravine of the Aroya: the Valverde road could then be seized, the retreat cut, and the powerful cavalry of the French would complete the victory. Now the right of the allies and the left of the French approximated to each other, being only divided by a wooded hill, about cannon-shot distance from either, but separated from the allies by the Albuera, and from the French by a rivulet called the Feria. This height, neglected by Beresford, was ably made use of by Soult. During the night he placed behind it the artillery under General Ruty, the fifth corps under Girard, and the heavy dragoons under Latour Maubourg; thus concentrating fifteen thousand men and forty guns within ten minutes' march of Beresford's right wing, and yet that gesion as to the real plan of attack.

"The light cavalry, the division of the first corps under General Werlé, Godinot's brigade, and ten guns, still remained at the French marshal's disposal. These he formed in the woods extending along the banks of the Feria towards its confluence with the Albuera; and Godinot was ordered to attack the village and bridge, and to bear strongly against the centre of the position, with a view to attract Beresford's attention, to separate his wings, and to double up his right at the moment when the principal attack should be developed.

"During the night Blake and Cole arrived with above Regency. sixteen thousand men; but so defective was the occupation of the ground, that Soult had no change to make in his plans from this circumstance, and, a little before nine o'clock in the morning, Godinot's division issued from the woods in one heavy column of attack, preceded by ten guns. He was flanked by the light cavalry, and followed by Werle's division of reserve, and, making straight towards the bridge, commenced a sharp cannonade, attempting to force the passage; at the same time Briché, with observe Colonel Otway's horse.

"The allies' guns on the rising ground above the village answered the fire of the French, and ploughed through their columns, which were crowding without judgment towards the bridge, although the stream was passable above and below. But Beresford, observing that Werle's division did not follow closely, was soon convinced that the principal effort would be on the right, and therefore sent Blake orders to form a part of the first and all the second line of the Spanish army on the broad part of the hills, at right angles to their actual front. Then drawing the Portuguese infantry of the left wing to the centre, he sent one brigade down to support Alten, and directed General Hamilton to hold the remainder in columns of battalions, ready to move to any part of the field. The thirteenth dragoons were posted near the edge of the river, above the bridge; and, meanwhile, the second division marched to support Blake. The horse artillery, the heavy dragoons, and the fourth division, also took ground to the right, and were posted; the cavalry and guns on a small plain behind the Aroya, and the fourth division in an oblique line about half musket shot behind them. This done, Beresford galloped to Blake, for that general had refused to change his front, and, with great heat, told Colonel Hardinge, the bearer of the order, that the real attack was at the village and bridge. Beresford had sent again to entreat that he would obey, but this message was as fruitless as the former; and, when the marshal arrived, nothing had been done. The enemy's columns were, however, now beginning to appear on the right, and Blake, yielding to this evidence, proceeded to make the evolution, yet with such pedantic slowness, that Beresford, impatient of his folly, took the direction in person.

"Great was the confusion and the delay thus occasioned, and ere the troops could be put in order the French were amongst them. For scarcely had Godinot engaged Alten's brigade, when Werlé, leaving only a battalion of grenadiers and some squadrons to watch the thirteenth dragoons and to connect the attacks, countermarched with the remainder of his division, and rapidly gained the rear of the fifth corps as it was mounting the hills on the right of the allies. At the same time the mass of light cavalry suddenly quitted Godinot's column, and crossing the river Albuera above the bridge, ascended the left bank at a gallop, and, sweeping round the rear of the fifth corps, joined Latour Maubourg, who was already in face of Lumley's squadrons. Thus half an hour had sufficed to render neral could neither see a man nor draw a sound conclu- Beresford's position nearly desperate. Two thirds of the French were in a compact order of battle on a line perpendicular to his right, and his army, disordered and composed of different nations, was still in the difficult act of changing its front. It was in vain that he endeavoured to form the Spanish line sufficiently in advance to give room for the second division to support it; the French guns opened, their infantry threw out a heavy musketry, and their cavalry, outflanking the front and charging here and there, put the Spaniards in disorder at all points; in a short time the latter gave way, and Soult, thinking the whole army was yielding, pushed forward his columns,

Regency. while his reserves also mounted the hill, and General Ruty third were standing in any. Ammunition failed, and, as Regency.

placed all the batteries in position.

"At this critical moment General William Stewart arrived at the foot of the height with Colonel Colborne's brigade, which formed the head of the second division. The colonel, seeing the confusion above, desired to form in order of battle previous to mounting the ascent; but Stewart, whose boiling courage overlaid his judgment, led up without any delay in column of companies, and attempted to open out his line in succession as the battalions arrived at the summit. Being under a destructive fire, the foremost charged to gain room; but a heavy rain prevented any object from being distinctly seen, and four regiments of hussars and lancers, which had passed the right flank in the obscurity, came galloping in upon the rear of the line at the instant of its development, and slew or took two thirds of the brigade. One battalion only (the thirty-first) being still in column, escaped the storm and maintained its ground; while the French horsemen, riding violently over every thing else, penetrated to all parts. In the tumult a lancer fell upon Beresford, but the marshal, a man of great strength, putting his spear aside, cast him from his saddle; and a shift of wind blowing aside the mist and smoke, the mischief was perceived from the plains by General Lumley, who sent four squadrons out upon the lancers and cut many of them off.

"During this first unhappy effort of the second division, so great was the confusion, that the Spanish line continued to fire without cessation, although the British were before them; whereupon Beresford, finding his exhortations to advance fruitless, seized an ensign and bore him and his colours by main force to the front; yet the troops would not follow, and the man went back again on being released. In this crisis the weather, which had ruined Colborne's brigade, also prevented Soult from seeing the whole extent of the field of battle, and he still kept his heavy columns together. His cavalry, indeed, began to hem in that of the allies; but the fire of the horse artillery enabled Lumley, covered as he was by the bed of the Aroya, and supported by the fourth division, to check them on the plain, while Colborne still maintained the heights with the thirty-first regiment; the British artillery, under Major Dickson, was likewise coming fast into action, and William Stewart, who had escaped the charge of the lancers, was again mounting the hill with General Houghton's brigade, which he brought on with the same vehemence, but, instructed by his previous misfortune, in a juster order of battle. The weather now cleared, and a dreadful fire, poured into the thickest of the French columns, convinced Soult that the day was yet to be won.

"Houghton's regiments soon got footing on the summit, Dickson placed the artillery in line, the remaining brigade of the second division came up on the left, and two Spanish corps at last moved forward. The enemy's infantry then recoiled, yet soon recovering, renewed the fight with greater violence than before; the cannon on both sides discharged showers of grape at half range, and the peals of musketry were incessant and often within pistol shot; but the close formation of the French embarrassed their battle, and the British line would not yield them one inch of ground nor a moment of time to open their ranks. Their fighting was, however, fierce and dangerous. Stewart was twice hurt, Colonel Duckworth of the forty-eighth was slain, and the gallant Houghton, who had received many wounds without shrinking, fell and died in the act of cheer-Still the struggle continued with unabated fury. Colonel Inglis, twenty-two other officers, and more than four hundred men out of five hundred and seventy

the English fire slackened, the enemy established a column in advance upon the right flank; the play of Dickson's artillery checked them a moment, but again the Polish lancers charging, captured six guns. And in this desperate crisis, Beresford, who had already withdrawn the thirteenth dragoons from the banks of the river, and brought Hamilton's Portuguese into a situation to cover a retrograde movement, wavered! destruction stared him in the face, his personal resources were exhausted, and the unhappy thought of a retreat rose in his agitated mind. Yet no order to that effect was given, and it was urged by some about him that the day might still be redeemed with the fourth division. While he hesitated, Colonel Hardinge boldly ordered General Cole to advance; and then riding to Colonel Abercrombie, who commanded the remaining brigade of the second division, directed him also to push forward into the fight. The die being thus cast, Beresford acquiesced, and this terrible battle was con-

"The fourth division had only two brigades in the field; the one Portuguese under General Harvey; the other, commanded by Sir W. Myers, and composed of the seventh and twenty-third British regiments, was called the fuzileer brigade. General Cole directed the Portuguese to move between Lumley's dragoons and the hill, where they were immediately charged by some of the French horsemen, but beat them off with great loss: meanwhile he led

the fuzileers in person up the height.

"At this time six guns were in the enemy's possession, the whole of Werle's reserves were coming forward to reinforce the front column of the French, and the remnant of Houghton's brigade could no longer maintain its ground; the field was heaped with carcasses, the lancers were riding furiously about the captured artillery on the upper part of the hill, and on the lower slopes a Spanish and an English regiment in mutual error were exchanging volleys; behind all, General Hamilton's Portuguese, in withdrawing from the heights above the bridge, appeared to be in retreat. The conduct of a few brave men soon changed this state of affairs. Colonel Robert Arbuthnot, pushing between the double fire of the mistaken troops, arrested that mischief; while Cole, with the fuzileers, flanked by a battalion of the Lusitanian legion under Colonel Hawkshawe, mounted the hill, dispersed the lancers, recovered the captured guns, and appeared on the right of Houghton's brigade exactly as Abercrombie passed it on the left.

"Such a gallant line, issuing from the midst of the smoke, and rapidly separating itself from the confused and broken multitude, startled the enemy's heavy masses, which were increasing and pressing onwards as to an assured victory; they wavered, hesitated, and then vomiting forth a storm of fire, hastily endeavoured to enlarge their front, while a fearful discharge of grape from all their artillery whistled through the British ranks. Myers was killed; Cole, and the three colonels, Ellis, Blakeney, and Hawkshawe, fell wounded; and the fuzileer battalions, struck by the iron tempest, reeled and staggered like sinking ships. Suddenly and sternly recovering, they closed on their terrible enemies; and then was seen with what a strength and majesty the British soldier fights. In vain did Soult, by voice and gesture, animate his Frenchmen; in vain did the hardiest veterans, extricating themselves from the crowded columns, sacrifice their lives to gain time for the mass to open out on such a fair field; in vain did the mass itself bear up, and fiercely striving, fire indiscriminately upon friends and foes, while the horsemen hovering on that had mounted the hill, fell in the fifty-seventh alone, the flank threatened to charge the advancing line. Nothing and the other regiments were scarcely better off; not one could stop that astonishing infantry. No sudden burst of

Regency. undisciplined valour, no nervous enthusiasm, weakened the him without restriction was supported by two hundred Regency. stability of their order; their flashing eyes were bent on the dark columns in their front; their measured tread shook the ground; their dreadful volleys swept away the head of every formation; their deafening shouts overpowered the dissonant cries that broke from all parts of the tumultuous crowd, as foot by foot and with a horrid carnage it was driven by the incessant vigour of the attack to the farthest edge of the hill. In vain did the French reserves, joining with the struggling multitude, endeavour to sustain the fight; their efforts only increased the irremediable confusion, and the mighty mass giving way like a loosened cliff, went headlong down the as-The rain flowed after in streams discoloured with of six thousand unconquerable British soldiers, stood triumphant on the fatal hill!"

Lord Wellington reached the army some time after the battle of Albuera, and determined to renew the siege of Badajos. Breaches were made in the walls, and two attempts at assault were hazarded (6th and 9th June), but in vain; the advance of the French army from the north, in concert with that of the south, necessitated the raising of the siege. Here ended the active operations of the year. Our army remained some time encamped in the central part of Portugal, after which Lord Wellington marched northward and threatened Ciudad Rodrigo, but retreated before a superior force collected by the French.

## CHAP. XIX.

## THE REGENCY .- WAR WITH FRANCE.

The Regency.—Campaign of 1812.—Battle of Salamanca.—Consequences of this victory.—Session of 1812.—Overtures to the Opposition.—Orders in Council.—Session of 1812-1813.—Princess of Wales.—East India Charter.—Campaign of 1813 — Operations in the east of Spain.—Failure of the attempt on Tarragona.—Operations in the West.—Battle of Vittoria.— Siege of San Sebastian.—Battles of the Pyrenees.—Invasion of France.—Battles of the Nive, Nivelle, Orthès, and Toulouse. Session of 1813-1814.—General Pacification and Settlement of Europe.—Origin of our differences with the United States of America.—Suspension of Neutral Trade.—War declared 18th June 1812.—Naval Operations.—Operations in Canada.—American Campaign of 1813.—Affair at Sackett's Harbour.—Campaign of 1814.—Operations on the Lakes.—Operations in the central parts of the United States.—Attack on New Orleans.—Peace.—Ruinous effects of the war.—Session of 1814-1815.— Corn Laws.—Return of Bonaparte from Elba.—Effects of this extraordinary attempt.—Military Operations.—Campaign in the Netherlands.—Battle of Quatre Bras.—Battle of Ligny. Battle of Waterloo, and Overthrow of Napoleon .-- Advance of the Allies, and Second Treaty of Paris. Reflections on the War.—Session of 1816.—Loss of the Property-Tax Bill.— Battle of Algiers.—Session of 1817.—Suspension of Habeas

The session of 1810-11 opened in November 1810, more early than was intended, in consequence of the mental indisposition of the king. Repeated adjournments, however, took place in the vain hope of a recovery, and it was not till the 20th of December that resolutions for a regency were moved in both houses. They formed the chief subject of discussion during the ensuing month. Their principal characteristics consisted in the restrictions imposed on the prince for the succeeding year, during which he was not permitted to confer the rank of peer, to grant an office in reversion, or even a place or pension, except during the king's pleasure; whilst the management of the royal household was vested in the queen. Resolutions so obnoxious to the prince called forth a strong opposition; and right were both driven from the field. The darkness and a motion that the royal power should be conferred on prevented our making prisoners, but a body of cavalry join-

against two hundred and twenty-four. But the divisions in favour of ministers became stronger after the question of the regency was settled, and great part of the session passed without any contest between government and the opposition, the latter considering the present arrangement as temporary; an opinion in which they were confirmed by the language of the regent, who entered on his functions by declaring, that he continued ministers in office solely from a feeling of filial respect. Among the successive topics of discussion were the county meetings of the Catholics in Ireland, and the steps taken by government to repress them; an act to authorize government to send English militia into Ireland, and Irish militia into England; blood, and fifteen hundred unwounded men, the remnant and finally, the re-appointment of the Duke of York to his office of commander-in-chief; a step which excited some surprise, but received the decided support of parliament, a motion made to censure it being negatived by two hundred and forty-nine to forty-seven. But the most anxious topics of parliamentary and public attention were the distress of trade and the state of our paper currency. Towards the relief of the former, an issue of exchequer bills was authorized under certain limitations; and to support

the credit of the latter, a law was passed which, when join-

ed to former enactments, had nearly the effect of making

bank-notes a legal tender.

The campaign of 1812 commenced very early, Lord Wellington investing Ciudad Rodrigo on the 8th of January. The siege was pressed with activity, and a breach being made, the town was carried by storm on the 19th of January, though with a great loss, particularly in officers, among whom was General Mackinnon. So prompt had been our operations, that the French army approaching to the relief of the place would not at first believe the news of its capture. Soon afterwards Lord Wellington turned his forces to the south, and invested Badajos, already the scene of such obstinate contests. Here, also, the operations were pressed with great rapidity, that they might be brought to an issue before the arrival of the French army from Cadiz. On the night of the 6th April, Badajos was attacked on several points by escalade; but we were repulsed in every direction except at the castle, which was fortunately carried; and as it commanded all the works, the consequence was the surrender of the town next day, after a siege which, short as it had been, cost us very nearly five thousand men. Secure on the south, Lord Wellington now marched towards the north, and detached Sir Rowland Hill to make a sudden attack on the French station at Almaraz, where the bridge over the Tagus served as the chief military communication between the northern and southern army. The expedition was successful, the entrenchments being stormed and destroyed. Lord Wellington now marched against the French army in the north, commanded by Marmont, and reached Salamanca on the 16th of June. The forts in that town being taken after some sharp fighting, the French retreated to the Douro: but being soon reinforced, resumed the offensive, and obliged our army to retreat in its turn. These movements continued several weeks, Lord Wellington being obliged to yield ground to his opponent, but ready to attack him on the commission of any material fault. Such an opportunity at last occurred on 22d July, near Salamanca, when the French, rendered confident by our continued retreat, extended their left, and presented an opening, which was instantly seized by their vigilant adversary. Columns were sent forward against the enemy's left and centre; the former succeeded completely, the latter met with much opposition. Great gallantry was shown, and heavy loss sustained on both sides. At last the French centre

Regency. ing in the night, the hostile rear-guard was attacked next namely, the claims of the Irish Catholics, the orders in coun-Regency three thousand British and two thousand Portuguese; that of the enemy in killed and wounded was at least equal, and we took between six and seven thousand prisoners. The British force in the field was twenty-two thousand.

The consequences of the victory of Salamanca were the pursuit of the French army; the occupation of Madrid on the 12th of August by the allies; the abandonment by the French of the works constructed at vast expense against south of Spain. But as this loss of territory was not attended by a loss of troops, it became incumbent on Lord Wellington to prepare against a vigorous attack from forces that were rapidly concentrating. He made repeated attempts to take the castle of Burgos, and the military stores collected there; but this fort, defended by a strong garrison and a vigilant commander, General Dubreton, baffled all our efforts, and proved the cause of a considerable sacrifice of lives. Meantime the approach of Soult from the south, and of the army that had fought at Salamanca from the east, obliged Lord Wellington to adopt the alternative of retreat. He began his march on the 20th of October, and proceeded westward, in a line nearly parallel to the Douro, taking above three weeks to recross the country to the scene of his victory at Salamanca. There, united with General Hill, and at the head of fifty thousand men, he remained on ground lately so propitious, hoping that an opportunity might offer to attack the enemy, though now increased, by the junction of their two armies, to the number of seventy thousand. But Soult's positions were found too strong for attack, and the interval afforded him by Lord Wellington was diligently employed in pushing forward detachments to cut off our communications with Portugal. Retreat now became indispensable; and here, amidst hasty marches, and a scarcity of five days, there occurred scenes of insubordination which recalled all the disorders of our march to Corunna, and drew from Lord Wellington a most severe censure in general orders. Fortunately, similar privations on the side of the French prevented them from making many prisoners, and, on 20th November, on the frontier of Portugal, was closed this eventful campaign.

The session opened on the 7th of January, and the early discussions related to arrangements for the royal household, and to a motion by Mr Brougham to exclude the droits of admiralty from the civil list. In this he was unsuccessful; and a similar fate attended a motion by Lord Morpeth, for an inquiry into the state of Ireland, with a view to admitting Catholics to the enjoyment of political rights. The next measures of general interest were two acts against framebreaking; a practice which the Nottingham workmen, pressed by the loss of the American market, and the consequent fall of wages, had carried to an alarming length. The public attention was soon after engaged by ministerial changes. Marquis Wellesley finding himself unable to lead the cabinet, or to prevail on his colleagues to extend the scale of our operations in Spain, resigned in February the secretaryship of foreign affairs, and was succeeded by Lord Castlereagh. The restrictions on the power of the regent now drawing to a close, consistency required an overture for the admission into office of the leaders of the opposition, intimate as they had been in former years with his royal highness. This prompted the well-known letter of the 13th February from the prince to the Duke of York, professing a wish to unite with the present ministers "some of those persons with whom the early habits of his public life had been formed." The answer of Lords Grey and Grenville explained their reasons for declining a union with an administration differing so much from them in the most important points of national policy,

morning, and obliged to surrender. Our loss was about cil, and the over-issue of bank paper. With this explanation the correspondence closed, and the ministry proceeded unchanged until the assassination of Mr Perceval, when Lord Liverpool succeeded to the first station, and was directed by the prince to make an overture to Marquis Wellesley and Mr Canning. This led to nothing; and a motion made in the House of Commons to address the regent, praying him to appoint an efficient administration, was carried by a hundred and seventy-four against a hundred and Cadiz: the evacuation of Andalusia, Grenada, and all the seventy. This most unexpected vote necessitated a second overture to the opposition, the management of which was committed, first to the Marquis of Wellesley, and afterwards to Lord Moira. It now seemed highly probable that the opposition would come in; yet the negociation entirely failed, in consequence partly of existing animosities, partly of the stiffness of Lord Grey, partly, perhaps, of a secret reluctance in the court to admit the opposition. Lords Liverpool and Castlereagh remained in office with all the benefit of a declared readiness on their part, and of an apparent unreasonableness in the demands of opposition.

> The most urgent question now before parliament was the continuation or repeal of the orders in council. The distress of the manufacturers had become general, and had led, among the lower orders, to commotion and riot; among the higher, to petitions to parliament complaining of our pertinacious adherence to these orders as the cause of the loss of the great market of the United States. An inquiry was instituted on the motion of Mr Brougham. It was conducted by him with astonishing knowledge and talent during several weeks, and every step in its progress gave the evidence a more serious aspect. Still there was a prevailing disposition to cling to those measures, when the accession of Lord Liverpool to the leading station in the cabinet produced their repeal, though unfortunately too late to prevent the American war.

Though parliament had sat during five years only, the victory of Salamanca and our other successes in Spain afforded ministry a favourable opportunity for appealing to the people. A dissolution was proclaimed on the 29th of September; and on the 30th of November the new parliament was opened by the regent in person, who spoke for the first time from the throne. Our partial reverses in the close of the campaign in Spain, and the murmurs of Marquis Wellesley and Mr Canning at the inadequacy of our financial contributions to the peninsular contest, were silenced by the cheering intelligence from Russia, from which Bonaparte was now retreating with tremendous loss. In the progress of the session the attention of the house and of the public was strongly excited by an appeal from the Princess of Wales to parliament, demanding an investigation of her conduct. This led to a motion for a copy of the report delivered by the noblemen charged with the inquiry of 1806; and this motion being negatived, the result was the publication in the newspapers of a succession of papers relating the whole transaction. These papers, however indicative of want of discretion on the part of her royal highness, produced, on the whole, an impression in her favour, as unjustly attacked in her honour. The most interesting debates of the session related to the Catholic question, and the renewal, with important changes, of the charter of the East India Company. The new charter, granted for twenty years from 1814, reserved to the Company the exclusive trade to China, but laid open to the public, with slight qualifications, the trade to all other parts of the East. Among the minor proceedings of the session were an act for lessening the endless delays of chancery, by appointing a vice-chancellor; and an act, which, if it did not enforce clerical residence, held out a strong inducement to it, by obliging incumbents to increase

liberal vote of credit, parliament was prorogued on the 22d of July, amidst a general hope of favourable intelligence from the Continent; Spain being nearly delivered from the invaders, and the Germans having risen with ardour to as-

sert their independence.

The campaign of 1813 opened in the east of Spain, by an attack on the allied army under Sir John Murray, stationed not far from Alicant. The ground it occupied was strong, but the length of the position, two miles and a half, made Suchet, who commanded the French, conceive the hope of penetrating it at one point or another. In this, however, he was foiled with a loss of from two to three thousand men; this being the only check of importance received by that commander in all his campaigns in Spain. Soon after this success, our army was engaged in the bold plan of proceeding by sea to Catalonia, and besieging Tarragona. The wind proved favourable; the main body was landed near Tarragona; and a detachment succeeded, by great exertion, in taking Fort St Philip on the mountain called the Col de Balaguer, which blocked the nearest road for the arrival of the French from the south. Suchet, however, lost no time in marching northwards; and our general, Sir John Murray, considered his force, which was chiefly Spanish, as unable to withstand the French. He therefore embarked and returned to Alicant, a measure which incurred censure, but appears fully justified by circumstances, and still more by the conduct of his successors in the command.

Suchet, though successful on this occasion, soon found himself unable to retain his extensive line of occupation. The battle of Vittoria brought a new enemy on his rear, and obliged him to withdraw, first from Valencia, and subsequently as far as Barcelona. Our army now advanced by land, and resumed the siege of Tarragona, with the power of retreating, not, as before, by sea, but on the country behind; an alternative to which a second advance by Suchet soon compelled our new commander, Lord William Bentinck. The French, however, unable to occupy an extended position, blew up the works of Tarragona and retired. Our army advanced anew, but was again checked and obliged to draw back, exhibiting a striking proof of the impracticability of opposing an active enemy with a mixed force, of which the Spaniards formed a large pro-

We now turn to the western part of the peninsula, the field of the commander-in-chief, and of the far larger portion of our force. Lord Wellington, averse to open the campaign till every part of his troops was ready to co-operate with efficiency, did not move from quarters till after the middle of May. He knew that he would have much ground to traverse, retreat being evidently the policy of the French, weakened as they were by the recall of twenty-five thousand veterans, who had been feebly replaced by a body of conscripts. Lord Wellington was now, for the first time, at the head of a superior force, which he wielded with consummate skill. The strength of the enemy lay in the line of the Douro, which they expected to defend with advantage, so far at least as to make us purchase dearly its acquisition; but all this was prevented by Lord Wellington making his left division cross the river on the Portuguese territory, and advance along its northern bank; whilst he and Sir Rowland Hill, at the head of separate corps, marched, after several feints, in a diagonal direction, so as to support this movement, and effect a junction in an advanced position. The French, threatened with being taken in the rear, evacuated one town after another, and, even at Burgos, declined to fight on ground where late recollections would have been so animating; they continued to retreat, increasing from time to time their numbers by

Regency. the stipends of their curates. After granting ministers a the garrisons of the evacuated towns, until at last they took Regency. a position at Vittoria, a town in Biscay, near the north-east frontier of Spain.

The position of the French extended from north to south, and was of great length. Their left rested on heights; part of their centre also occupied heights, and their right was near the town of Vittoria. The Zadorra, a stream of considerable size, but crossed by several bridges, ran nearly parallel to their front. Both armies were numerous, particularly that of the allies. It was the first time that nearly forty thousand British had fought together in Spain. Lord Wellington acted on the offensive throughout, and began active operations by taking possession of the heights near the extreme left of the enemy. This was easily effected; but their importance being soon perceived by the French, a strong effort was made to recover them; and an obstinate contest took place, but the British on the heights repelled every assault. Under cover of these heights our right wing advanced and took a village (Sabijana) in front of the enemy's centre. It was in vain that the French attempted to retake this village. The centre of the allies crossed the river near it, and the centre of the French withdrew from their position, retreating to the town of Vittoria. At first this retreat was effected in good order; but an alarming account soon reached the French from their right. That part of their position had been defended by the river and two tetes-de-pont; but the troops of our left wing had taken, first the heights commanding these forts, and soon after the forts themselves, baffling every effort of the enemy to retake them. The great road leading to the north was thus in possession of the allies; hence general alarm and confusion spread throughout the French army. Their reserve was hastily withdrawn from its position, and pressed, with the whole army, along the only remaining road to the eastward; abandoning all their artillery, their ammunition, and their baggage. The loss of the battle was imputed by the French to Jourdan, whom Bonaparte, in a luckless hour, had allowed his brother to substitute for Soult, and who here, as at Talavera, was too late in discovering the importance of commanding positions. The loss in men was not particularly severe; that of the allies in killed and wounded was under four thousand, and that of the French probably not much greater. The temptation afforded by the plunder of the baggage prevented our troops from making many prisoners; but the spirit of the enemy was shaken, and the loss of their artillery and stores obliged them to retreat across the Pyrenees.

The next operation of consequence consisted in the siege of San Sebastian, a frontier fortress of great importance, which the French made the most vigorous efforts to relieve. Their army, provided anew with ammunition and cannon, advanced under the command of Marshal Soult, and, after some sharp actions, drove back the British corps posted in the passes of the Pyrenees. Our troops retreated to the vicinity of Pamplona, where, on the 27th, and still more on the 28th, they sustained a succession of impetuous attacks from the enemy. On the 29th Lord Wellington resumed the offensive, drove the French from their position, strong as it was, and obliged them to retrace their steps through the Pyrenees. Our loss in these actions was about six thousand men in killed and wounded; that of the enemy was still greater, exclusive of about four thousand prisoners.

At San Sebastian we had been repulsed in an assault on the 25th of July; the siege was continued, and a final assault, on the 31st of August, led to the capture of the place, though with the loss of two thousand five hundred men. The further operations were, the entrance of our army on the French territory on 7th October, the capitulation of Pamplona on the 26th, and a general attack on the position

which they retreated across the Nivelle. But this mountainous country afforded a number of positions, and our bated in both houses; and a motion relative to it, made in 1814. next task was to drive the enemy from behind the Nive, a large river flowing northward from the Pyrenees. This was partly accomplished on the 9th of December; but on several succeeding days the French, commanded by Soult, made impetuous attacks on the allied army, all anticipated by Lord Wellington, and all repulsed with heavy loss. Still the rains of the season, and the size of the mountain streams, retarded our operations. In January 1814 our army made some further progress, and, on the 25th of February, attacked the French in a position near Orthès, behind the Gave de Pau, another large river flowing from the Pyrenees. This attack was successful; and the retreat of the French was followed by the desertion of a number of their new levies. Soult's army now drew back, not in a northerly, but easterly direction, to join detachments from the army of Suchet in Catalonia. At Tarbes, on the 20th of March, the fighting was of short duration; but a sanguinary battle took place at Toulouse on the 10th of April; a battle attended with a loss to the allies of nearly five thousand men, which, as well as a great sacrifice of lives on the part of the French, might have been prevented had earlier intelligence arrived of the overthrow of Bonaparte, and the change of government at Paris.

The causes of this great change will be fully explained under another head. They are but partly to be found in the operations above described; for although the Spanish war had proved extremely injurious both to the finances and military establishment of Bonaparte, his power was so great, that nothing could have shaken it but a vast and sudden catastrophe. From the moment that he lost his armies in Russia, there existed substantial grounds for hope; and after the accession of Austria to the coalition, there was little reason to doubt his overthrow. The resources of France continued indeed unreservedly at his disposal; and the dread of a counter-revolution gave him the support of the majority of a nation long disgusted with his domineering spirit and never-ending wars. But the preponderance of military means was irresistible; in vain did he struggle against it in Saxony in 1813, and in Champagne in 1814. His partial successes served only to excite a temporary illusion; and the occupation of Paris by the allies proved, like its possession by successive parties in the revolution, decisive of the fate of France.

The cheering expectations with which parliament separated were happily realized in the course of the autumn; and parliament re-assembled on the 4th of November with the knowledge that the victory at Leipsic had secured the independence of Germany, and enabled our allies to shake the throne of the usurper. There was but one opinion, that at such a juncture every exertion, whether financial or military, should be made to complete the deliverance of the Continent. All the propositions of ministers were adopted; and on the 17th of November parliament adjourned to the 1st of March, evidently in the hope that before that period the advance of the allied arms into France would lead to a general pacification. This result, justified by sound calculation, was delayed by the precipitancy of the Prussians, and the consequent checks received by them and their allies; so that parliament, when it met on the 1st of March, adjourned to the 21st; and, on their assembling at that date, Lord Castlereagh being still absent on the Continent, the business transacted during several weeks was of inferior interest. Next came the discussions on the corn trade, the budget of the year, and an additional measure for the preservation of tranquillity in Ireland. A general pacification had by this time taken place; and the ar-

Regency. of the French near St Jean de Luz on 10th November, after version, except as to the compulsory transfer of Norway Regency. from Denmark to Sweden. That question was warmly dethe House of Lords by Earl Grey in a speech of uncommon eloquence, received the support of eighty-one votes against a hundred and fifteen. The further proceedings of the session were an address, praying the regent to interest himself with foreign powers for a prompt and general abolition of the slave-trade; a vote of L.400,000, in addition to the L.100,000 of the preceding year, to the Duke of Wellington; and grants, but on a far smaller scale, to Generals Graham, Hill, and Beresford, who were now raised to the peerage. On the Princess of Wales a settlement of L.35,000 was definitively made.

We have now arrived at the period when, after a contest which, as far as regards England and France, may be termed a war of twenty years, Europe was restored to a condition which promised long-continued peace. The principal provisions of the treaty of Paris in 1814, and the congress of Vienna in 1815, were as follow:-

France was circumscribed within her former territory, with the addition of part of Savoy, which, however, was relinquished in 1815 to the king of Sardinia.

Austria recovered Lombardy, and added to it Venice with its adjacent territory, possessing thus a population of twenty-nine millions, being very nearly equal to that of France, and considerably greater than that which she possessed in 1792.

Germany was declared a great federal body, as before the French revolution, with the distinction that a number of petty districts and principalities were incorporated into the larger, such as Bavaria, Wirtemberg, Hesse-Cassel, and Hesse-Darmstadt; and with the further distinction, that there is now no imperial head, but an understood division of influence between the two great powers, Austria being the protectrix of the south, and Prussia of the north. These are progressive advances towards consolidation; and to them may be added the formation of a diet, still devoid of unity and slow in deliberation, but not altogether so tardy or disunited as its predecessors at Ratisbon.

Russia has during the present age suffered no reduction of her territory, but has proceeded in a regular course of acquisition. Her power, though less colossal than is vulgarly supposed, has received a substantial addition by the acquisition of Finland and of the greater part of Poland. Two thirds of what once was Prussian Poland, and a part of Galicia, were formed in 1815 into a kingdom, which, however, has recently been overthrown.

Prussia, on the other hand, has exhibited a striking example of the mutability of political greatness. Raised by the talents of Frederick II. to a rank above her real strength, but making after his death successive additions to her territory by the dread of her arms, and by diplomatic combinations, she saw the whole fabric overturned by Bonaparte in one fatal campaign. From 1807 to 1813 her dominions continued circumscribed, and her population hardly exceeded six millions. But the arrangements of 1814 restored to her a third of Russian Poland, and a valuable tract of country on the Lower Rhine; and her population is now above ten millions.

Of her colonial conquests from France, England retained Tobago, St Lucie, and the Isle of France. The peace confirmed also our possession of Malta and the Cape. Of the other Dutch settlements, Surinam and Java were restored; but Demerara, Berbice, and Essequibo, containing a number of British settlers, were retained; the merchants of Holland, however, enjoying certain privileges of trade with these colonies. On the continent of Europe we effected a long-desired, though (as the event has shown) rangements of ministers afforded little opening for animad- insecure measure, the union of the seven Dutch and ten

detached state, presented too tempting an object for France,

and would have proved the cause of repeated wars, in which England, from her interest in the independence of

participate.

The losses of Denmark rank among the most painful consequences of the wars of the French revolution. To strip that pacific and inoffensive kingdom, first of its navy, and next of a kindred country, governed by the same sovereign during four hundred years, were acts that called forth the regret and condemnation of every unprejudiced observer. The transfer of Norway was opposed by the inhabitants; and we add with regret, that our navy was ordered to take part against them by blockading their ports. At last the affair was terminated by a convention pronouncing the union of Sweden and Norway under the same sovereign, but reserving to the latter her separate constitution. Pomerania was transferred from Sweden to Prussia, and Denmark received a small territory to the south of Holstein.

Sweden had enjoyed during many years the advantage of neutrality, and, like Denmark, increased gradually her shipping and trade. Deviating from this in 1805, and becoming a party to the coalition against France, she was saved from hostilities by the rapid overthrow of Austria; and Pomerania was not attacked until 1807, when Gustavus IV. chose to refuse peace at the time when he had not the support of a single continental ally. This and other acts of madness led to his deposition in 1809; and the year after, Europe saw with surprise the nomination of Bernadotte as the efficient head of the Swedish government. This choice, attributed at first to the interference of Bonaparte, was due, it seems, to the personal exertions of Bernadotte himself. The acquisition of Norway, and the introduction into Sweden of various improvements by an active-minded foreigner, are advantages of magnitude, and calculated to form some counterpoise to the loss of Finland and the increased danger from Russia.

Spain and Portugal preserved their territory unaltered; both had received rude shocks from the invader, but in both the reign of superstition and indolence seemed so firmly fixed as to bid defiance to political change, whether introduced by mild or by harsh means. The events of 1820, however, have shown, that in Spain there exists that sense of the abusive nature of their institutions, and that desire of reform, which in France produced the revolution; while in Portugal, notwithstanding her degraded condition, results ultimately favourable may be expected from the natural course of events.

Switzerland, without being made a province of France, had been obliged to furnish a military contingent in the wars of Bonaparte. The arrangements of 1814 maintained her as a federal state, but with nineteen cantons instead of thirteen; an increase derived, not from extended territory, but from the independent form acquired by certain districts, such as the Pays de Vaud, incorporated formerly with the original cantons.

The king of Sardinia was restored to Piedmont, and his other continental possessions, with the addition of the territory of Genoa.

The country of all Europe most likely to profit by the occupancy of the French was Italy. The substitution of an efficient government for the feeble administrations of Naples and Rome, the diminution of superstition, the increase of industry, the extirpation of robbery on the high ways, and the new modelling of the military establishment, were all objects of the highest importance. To these was added a hope of blending all the states of the peninsula into a common union; a union most ardently desired by

Regency. Belgic provinces into one kingdom. The latter, in their the Italian nation, and calculated, above all things, to pre- Regency. serve their country from war and the intrusion of foreigners. The selfish policy of Bonaparte, whose object was merely to extract from every country the utmost possible supply Holland, and her dread of invasion, could hardly fail to of revenue and recruits, prevented the adoption of this grand measure, until the re-assumed sway of foreigners, in particular of the Austrians, removed it to an indefinite distance, and reinstated the territorial divisions of Italy on the footing of 1792, with the exception of the republics of Venice and Genoa.

The royal family of Naples remained in Sicily during 1814; but Murat was not recognised by the Bourbons, and dreaded, with reason, that the allies would deem their task incomplete if they did not restore the crown of Naples to the ancient family. He armed in self-defence, and no sooner did he hear of Bonaparte's entrance into Lyons, than he advanced against Lombardy, and called upon all the Italians to unite in the assertion of their national independence. But his troops were unable to cope with the Austrians; after some partial successes they were obliged to retreat; and finding, in some sharp actions on their own territory, the continued superiority of their opponents, the eventual result was, the dispersion of the Neapolitan army, and the surrender of their capital on the 22d of May. The royal family now returned from Palermo to Naples, and resumed their sovereignty. Murat then escaped to Toulon; but, after the second return of the Bourbons, he proceeded to Corsica, and conceived the wild project of landing in the Neapolitan territory at the head of a feeble detachment, in the hope of being joined, like Bonaparte on returning from Elba, by thousands of his ancient followers. He disembarked in Calabria, but was forthwith attacked by the inhabitants, taken, and shot by order of the royal family, who were thus left in undisturbed possession of the crown.

Turkey was no party to the treaty of 1814, but remained on the footing on which the treaty with Russia in 1812 had placed her. Stationary in an age of change, and inflexible in her adherence to traditionary usages, she saw the French revolution pass without sustaining any injury from it; or rather she was indebted to it for a relaxation in the shocks to which the European part of her empire is exposed from Austria and Russia. The peace of 1790 had been preserved uninterrupted by Austria; that of 1791 was infringed by Russia by only one war, viz. from 1807 to 1812. The temporary occupation of Egypt by the French, and the more permanent establishment of England in the Ionian Islands, have had no effect on the interior of the Turkish empire.

We must now proceed to record military operations conducted in a very different quarter, and involving considerations very distinct from those which animated the contest on the continent of Europe. The United States of America continued on friendly terms with us during several years after the beginning of the war of 1803. There existed discussions, and of rather a serious nature, between the two countries, particularly in regard to the practice of our naval officers of impressing American seamen on suspicion, or pretended suspicion, of their being British subjects; but these contests were happily confined to diplomatists. Meantime the navigation of the Americans was in a course of rapid extension; for their neutral flag enabled them to act as carriers to the continental belligerents, and, in particular, to convey to Europe the produce of the French and Spanish West Indies. The depression of our West India trade in 1805, though the unavoidable result of too great a growth of produce for a system of monopoly, was attributed to the successful rivalship of the Americans in the continental markets. Mr Pitt was assailed by our ship-owners, and prevailed on to take measures which obliged the Americans to forbear the direct passage

character by carrying them in the first instance to their own ports. The Grenville ministry maintained what Mr Pitt had done, and went no farther; but they were succeeded by men actuated by different views. A parliamentary committee, appointed in June 1807 to inquire into the distress of our West India colonies, received evidence calculated to strengthen an impression already very general, that a total stop ought to be put to the conveyance of French or Spanish colonial produce in neutral bottoms. No sooner did the successful termination of the Copenhagen expedition give popularity to the system of vigour than we issued the orders in council of November 1807, the object of which, however disguised, was to put a stop to neutral traffic, except when carried on by license from our government; thus assuming the power of restricting or extending that traffic as we should find beneficial to our interest, or rather, as we should imagine to be beneficial, since, in questions of commerce, the real is frequently far different from the anticipated result.

In this explanation of these ill-understood orders, we exclude from the motives of ministers all participation in four hundred and seventy-eight. Even the Java, though that jealousy of America which actuated so many of our a large frigate, had only three hundred and sixty-seven countrymen. We consider them as acting from conviction, men, her opponent four hundred and eighty. The inequaas seeking in this measure only a source of benefit to our lity in weight of metal was still greater, each of these Amecommerce, and of annoyance to our enemies in Europe; rican frigates having been originally intended for a ship of yet, even with these qualifications, the orders in council have contributed more than any other measure in the present age to the distress which afterwards afflicted our coun- 1st 1813, than the superiority was found to rest with us. try. Their first practical result was a suspension of the navigation of the Americans by a general embargo im- the Americans, and directed to the conquest of Canada, posed by their own government; and this preliminary mea- of which the frontier adjoins their northern states, extendsure was in a few months succeeded by a non-intercourse ing in a long line from south-west to north-east. The act, which continued in operation above a year, during boundary consists in a great measure of water, being formwhich our exports to America were greatly reduced, and our manufacturers distressed to a degree that ought to by the course of the St Lawrence. On the south-west have served as a warning of the consequences of a further part of this frontier a body of two thousand three hundred contest with our best customers. In 1809, in consequence Americans, regulars and militia, advanced in July 1812 of a temporary arrangement, the intercourse was resumed, from the small fort of Detroit. Their operations, at first and exports from England to America took place to a great successful, were soon checked by a British detachment; amount. But the offensive part of our system was soon retreat became unavoidable, and our troops assuming the afterwards revived; the Americans were prevented from offensive in their turn, the result was the surrender, on the trading with France, Italy, or Holland, and the only con-ciliatory answer given by our government, was a promise the fort of Detroit. Not discouraged by this failure, ano-to recall our orders in council whenever the Americans ther detachment of Americans assembled near Niagara; should obtain from Bonaparte the repeal of his Berlin and but, after a sharp action on the 13th of October, were Milan decrees. This repeal was in some measure obtain- obliged, like their countrymen, to surrender. A further ed in 1810, but nothing could wean our ministry from their attempt, on the part of the Americans, to force the Niapredilection for what they accounted a grand political mea-gara frontier on the 28th November was likewise unsucsure; and those who inspect the official communications of cessful; whilst, in a different quarter, at a distance of nearthe two governments, will see with surprise the expedients ly three hundred miles to the north-east, the advance of devised, and the promises held out, to gain time and to their main body to Champlain proved ineffectual, the predelude the Americans, while, in fact, there never was an parations on our side necessitating their retreat. Lastly, intention of recalling the obnoxious decrees. The Ameria a detachment advancing, in January 1813, in the hope of cans offered explicitly to recall all hostile edicts "if we retaking Fort Detroit, were themselves attacked by a Brirevoked our orders;" but this not being complied with, tish division, and obliged to surrender. their ports were definitively shut against us, and our manufacturers reduced to great distress; a distress pourtrayed activity or courage, but of impatience and insubordination, in colours unfortunately too impressive in the parliamen- the restraint of discipline being ill suited to a nation that tary papers on the orders in council, printed in the early part of 1812. But no change could be effected in our measures till the accession of Lord Liverpool to the first ministerial station, when a repeal took place, but un happily too late, the Americans having declared war before this intelligence could reach them. From this time forward the impartial narrator finds it his duty to transfer the different quarter, on the Miami, a river falling into Lake

Regency across the Atlantic, and to give such cargoes a neutral now a minister aware of the evil tendency of our orders in Regency council, and prepared to make reasonable concessions to the Americans; whilst they, heated by the contest, and 1814. attributing the change to the dread of losing Canada, refused our offers of accommodation.

The naval conflicts in the first year of the war were of a nature greatly to surprise the public, accustomed as it was to our almost uninterrupted triumphs at sea. The Guerrière frigate was captured on 19th August 1812, by the Constitution American frigate; and the Macedonian on the 25th of October by another American frigate called the United States. If these losses could in any degree be attributed to the fault of our officers, no such charge could be brought in the case of Captain Lambert of the Java, a brave and intelligent commander, who, after a dreadful conflict, was obliged, on the 29th of December, to strike to the Constitution. In this, as in the preceding actions, the real cause of failure lay in the disproportion of strength; the Guerrière having only two hundred and sixty-three men, her antagonist four hundred and seventysix; the Macedonian only three hundred, the United States the line. No sooner did the two nations meet on an equal footing, in the case of the Chesapeake and Shannon, June

The operations by land were offensive on the part of ed partly by the immense lakes Erie and Ontario, partly

These repeated failures were the result, not of a deficient acknowledges no master. But, in the next campaign, the Americans took the field with augmented forces and an improved plan of action. A strong division crossing Lake Ontario, landed on the 27th April at York, the chief town of Upper Canada, and took it, with its stores and part of the garrison. A check was indeed given to them in a very charge of aggression from England to America. We had Erie; but next month a strong body of Americans pene-

Regency. trated the Niagara frontier; and an attempt made by the ing up the Patuxent, destroying a flotilla in that river, and Regency. British on Sackett's harbour, a port in Lake Ontario, fail- landing a military force under Major-General Ross, which ed through the misconduct of the general. Still the progress of the American main body into Canada from the ington, drove them from their ground, and entered the Niagara was obstructed, and checks experienced by them capital in the evening. Here private property was rein a way that clearly demonstrated the inexperience of spected; but of the public buildings there were destroyed their troops. They forbore, therefore, to advance by land, not only the arsenal, the dock-yard, and the war office, but and directed their efforts to a naval superiority. On Lake Erie, the more remote of the two from our Canada settlements, this superiority was acquired in September, after the capture of our petty squadron under Captain Barclay; and the consequence was our abandoning the more distant posts in Upper Canada. On Lake Ontario the naval contest was long maintained; and an attempt made, in November, by a strong division of Americans, to descend the St Lawrence in small craft, and to threaten Montreal, was rendered abortive by the activity of our troops. The campaign was then closed by our opponents without making any serious impression on Canada, though their force exceeded twenty thousand men. On our part, the campaign terminated by taking Fort Niagara by surprise, and repulsing, near the small town of Buffalo, a corps of two thousand men brought forward to check our advance. The town was burned in retaliation for a similar excess committed by the Americans.

The inclemency of an American winter suspended hostile operations for some months. The first exploit of consequence in next campaign took place on Lake Ontario, and consisted in an attack by a British division and squadron on Fort Oswego, which, with its stores, fell into our hands. In the beginning of July an American division, five thousand strong, crossed the Niagara, already so often traversed, and obliged the opposing force to retreat. But the opportune arrival from Bourdeaux of some regiments which had served in France soon enabled our troops to make a stand; and on the 25th of July there took place an action more obstinate, and better sustained on the part of the Americans, than any that had yet occurred in the war. They were finally repulsed, but the loss was heavy on both sides. Some time after, a sally made by the garrison of Fort Erie against a detachment of British entrenched in the vicinity, though at first successful, was eventually repulsed. But a very different result attended an offensive enterprise, on a large scale, attempted by us on the side of Lake Champlain. For this purpose our commander, Sir G. Prevost, assembled all his disposable force, amounting, with the reinforcements from Europe, to nearly fifteen thousand men, crossed the American frontier, and marched southward to attack Plattsburgh, a fortified town on Lake Champlain. The attack on the land side was combined with that of a flotilla, consisting of a frigate and several smaller vessels, which, coming within sight on the 11th of September, engaged an American flotilla of nearly equal force. Unfortunately our commanding officer rights of neutral traffic, a topic so often urged among us. was killed, and our flotilla captured; a check which, to make a sudden retreat. This retreat, in the face of so inferior an enemy, was altogether inexplicable, and exthe operations on the side of Canada, each party having entirely relinquished the idea of offensive war.

Americans, our government had avoided offensive operations, and kept the command of our fleet in that station in the hands of Sir John Borlase Warren, an officer who

attacked the American division posted to defend Washthe houses of the senate and representative body, the residence of the president, and the bridge across the Potowmac. Our troops, being few in number, retreated soon

after; and embarking anew, proceeded against Baltimore, where they landed, drove the defending force of the Americans from their position, and approached the town. But the entrance to the harbour being closed by a barrier of sunk vessels, co-operation on the part of the navy was impracticable, and our troops were re-embarked without any loss of consequence, except that of their commander General Ross. A better result had been obtained in an expedition against Alexandria, a trading town on the Potowmac, whence a quantity of stores and shipping was brought away. Success also attended an expedition in a very different quarter, namely, in the river Penobscot, at the northern extremity of the United States, adjoining the British province of New Brunswick. Far different was the result of an expedition on a larger scale, directed against New Orleans. Our troops disembarked from the Mississippi, repelled an assault by the Americans, moved forward, and came within six miles of the town, where they found the enemy posted behind a canal, with a breast-work in front, and their right flanked by the Mississippi. After a fortnight passed in mutual preparations, a night attack was at last determined on; but, unexpected difficulties retarding it till day-light, the fire of the Americans from behind their breast-work was pointed with unerring aim, and proved extremely destructive. In the short space of twenty minutes, our three principal officers, and nearly two thousand privates, were killed or wounded; and though, on the opposite side of the river, our attack had been successful, it was determined to relinquish the expedition, and re-embark the troops. This distressing failure was poorly compensated by the capture of Fort Mobile, the last land operation of the war. At sea, our final exploit was the capture of the American frigate President, of fiftyfour guns and four hundred and ninety men. The peace was signed at Ghent, on the 24th of Decem-

ber 1814, and its terms afforded a curious exemplification of the futility of warlike struggles. The territorial possessions of both countries were, with a very trifling exception, left on the same footing as before the war; and not the slightest notice was taken of the questions which had most strongly excited the spirit of hostility on both sides,—neither of the impressment of seamen, a point so important to the Americans, nor of the limitation of the

The United States, in no respect a manufacturing counthough in itself of no great moment, induced our general try, purchased from us merchandise to an extent annually increasing, and which, in 1807, had reached the amount of L.12,000,000 sterling. Every addition to their capital, cited general surprise and disappointment. With it closed every year that they passed in peace and prosperity, increased their value to us in a commercial sense; while every blow given to their productive funds necessarily operated As long as there remained a hope of treating with the in diminution of their purchases and payments. But, far from acting on these impressions, the ministry of 1807 eagerly seized the opening given them by the violence of Bonaparte to assail the trade of America, and issued, in joined diplomatic to nautical habits. At last, however, it November, those orders which "prohibited all direct inbecame necessary to replace him by one whose spirit of tercourse from a neutral port to France, or her tributary enterprise was more conformable to the impatient ardour states, unless the neutral vessels intended for such voyages of our navy. Admiral Cochrane arrived, and lost no time touched first at a port in the British dominions, and paid a m concerting an attempt on the American capital, by sail- duty" This singular measure was vindicated, not as legal-

Regency. in itself, but as a trespass on neutral rights justified by the admissible when our own should he at or below eighty shil- Regency. previous trespasses of the French government. It would, it was argued, distress that part of the Continent subject to Bonaparte, and excite discontent against his government; but the real motive was to cramp and control the trade of neutrals. That the Americans would not submit to such humiliating conditions, our government was well aware; but it knew also that they had neither army nor navy, and would not, at least for several years, resort to the alternative of war. So far our calculation was correct; but the question of national advantage we entirely misconceived. For what was the practical operation of these restrictive edicts? The trade of the Americans with the Continent was suspended, and the remittances formerly made to us from the sale of their goods—remittances not overrated at four or five millions a year-were made no more. Our bank paper fell, more from that than from any other cause, into a discredit which occasioned a loss of twenty, thirty, and eventually nearly forty per cent. on all subsidies and other government expenditure on the Continent. The mercantile insolvencies in America which followed the orders in council recoiled, in a great degree, on England, whose exporting merchants were the chief creditors of the bankrupts. Next came the burdens and the havoc of war; and of every million of American capital thus diverted from productive industry, the half at least was lost to the British manufacturer. But this was not all; the suspended intercourse, and the subsequent appeal to arms, induced the Americans to attempt to manufacture for themselves. This for several years excluded our goods; and when, upon the return of peace, British merchandise was poured into the United States, at prices so low as to defy competition, the consequence, particularly in the year 1819, was a scene of general insolvency in the States, which once more recoiled with the most distressing effects on the British creditor. All this was the result of a policy bad in every point of view, and which neither had nor could have any decisive influence on the grand contest in Europe.

We now return from this necessary digression to the ordinary course of our narrative. Parliament assembled on the 18th November, and, after the transaction of some business, relative chiefly to keeping the English militia embodied, and preserving the peace of Ireland, adjourned on the 2d December. They met again on the 9th February, and were soon after called on to discuss a most important department of home policy, namely, the corn laws. The prospect of the return of peace, and of large imports of corn from the Continent, had early excited the attention of the landed interest; and a committee, appointed in the spring of 1813, had made a report to parliament recommending the prohibition of foreign corn, except when wheat at home should be at or above the very high price of a hundred and five shillings the quarter. No proceedings on the subject took place that session, and next year the sense of the public was so unequivocally declared against this extravagant proposition, that a great reduction was indispensable; and, on bringing forward the resolutions connected with the subject, it was proposed to allow the importation of foreign wheat whenever our own should be at or above eighty-seven shillings. Still this limit appeared too high; the debates were warm; the petitions against the bill numerous; and, ministers suspending their support, the main part of the question was in consequence adjourned to next year. In the summer and autumn corn underwent a great fall, and the farmers experienced much distress; the consequence of which, and of the evidence given before the parliamentary committees, was, that government determined to support a corn ing his opponents separate and unsupported. Intelligence bill on a reduced scale, foreign wheat being rendered in- of the first movements of the French reached Lord Wel-

lings. Resolutions to that effect were moved on the 17th February, and a bill founded on them was soon afterwards brought in. It still experienced opposition, particularly from Mr Baring and others, who argued that the limitation price ought not to be permanent, but subject to a graduated abatement during a series of years, till at last the corn trade should arrive at that unrestrained state so essential to commerce at large. But notwithstanding these arguments, and a tumultuous opposition without doors, the bill was carried by large majorities in both houses of parlia-

But from discussions of internal policy, the attention of parliament was suddenly directed to a more urgent topic; we mean the return of Bonaparte from Elba, and a notice of an immediate augmentation of our forces. An address to the regent, in support of this augmentation, was carried by great majorities; and a subsequent motion by Mr Whitbread, to prevent our interference for the reinstatement of the Bourbons, was lost by two hundred and seventythree against seventy-two. Finally, the addresses in approbation of the treaties with the continental powers were supported by Lord Grenville, Mr Grattan, and other oppositionists; the numbers in the Lords being a hundred and fifty-six against forty-four; and in the Commons, three hundred and thirty-one against ninety-two. The further proceedings were an approval of the treaty of peace with America, and of the very questionable transfer of Genoa to the king of Sardinia. The session was concluded by a repeal of the law for fixing the price of bread in London by assize.

The ratification of the peace with America had not been received from the other shore of the Atlantic, when Bonaparte returned from Elba and raised in Europe a fresh alarm of war. He ventured to land with a force barely sufficient to secure his personal safety in a march, and to supply emissaries for mixing with the opposite ranks. The French soldiers are fond of glory, and their attachment revived at the sight of their leader. They first refused to oppose, and soon after pressed forward to join him; and he proceeded in a rapid and unresisted march to the capital. Ought England to participate in the coalition formed to expel this intruder, and to reinstate the Bourbons? On this question there existed, either in parliament or the public, very little difference of opinion; so great was the enmity inspired by Bonaparte, and such the dread of incessant war under his sway. Our ministry soon took their determination; our continental allies were unanimous in the cause; and not a day was lost in preparing for the invasion of France. The Netherlands, it was evident, would be the first scene of operations. Thither the Prussians pressed with all the ardour inspired by recent wrongs and a present desire of vengeance; thither were conveyed from England troops, ammunition, and stores, with all the dispatch afforded by the undisputed command of the sea. By the end of May or beginning of June the Prussian and British force in the Netherlands was superior to any that could be mustered by Bonaparte. It was not till the second week of June that his disposable force, to the number of a hundred and fifteen thousand men, was collected in front of the allied line. This was effected with great secrecy and dispatch. He joined the camp on the 14th, and caused his troops to march early on the 15th, driving in successively the Prussian outposts at Charleroi and Fleurus. From the point whence he marched to Ligny, the Prussian head-quarters, the distance was thirty miles; to Brussels, the head-quarters of Lord Wellington, was nearly twice as far; and all Bonaparte's hope rested on fight-

Regency. lington in the afternoon of the 15th, and made him forth- two and three o'clock, by the French gaining possession Regency with prepare for the march, which, however, he delayed of the village of St Amand, on the Prussian right. To reuntil the arrival of a second courier from the Prussians, and of advices from his own outposts, which should show whether there was any serious attack on other points. In the evening accounts arrived which left no doubt that the absence of which was so bitterly regretted by Ney. The mass of the French army was directed against the Prussians; and orders to march were in consequence issued in all directions, so as to reach even remote stations between three and four in the morning. Our troops began their march from almost every point at day-light, all moving on to Quatre Bras, a spot where four roads meet, and distant seven miles from Ligny. After marching between six and seven hours, several of the divisions stopped to take rest and refreshment; but they were hurried from their unfinished meal by dragoons dispatched to accelerate their advance, for Lord Wellington had by the way received intelligence of the rapid approach of the French. Proceeding promptly with his escort, he had time to reach the head-quarters of the Prussians, and to learn from their impatient commander, that, without knowing the numbers of the French, or their plan of attack, he was determined to accept battle on that day, and upon the ground which he then occupied. Lord Wellington had no controlling power. All he could do was to lessen the pressure on his allies, by pushing, as much as possible, such part of the French as might be opposed to the British. This interview took place between one and two o'clock; and his lordship, returning forthwith to Quatre Bras, found the French tirailleurs already in possession of the wood which skirted and commanded the road. Immediate orders were given to drive them out, a task which devolved on the highlanders arriving from Brussels, and the guards from Enghein, each after a march of twenty-five miles. They succeeded in expelling the French; but the want of artillery and cavalry, neither of which came up till late at night, prevented them from pushing forward with effect. Fresh bodies of the French were now seen advancing; and, on the other hand, regiments of British successively reached the ground. The conflict spread, and was maintained with great gallantry on both sides, but with hardly any other plan than that of fighting straight forward. At first the French possessed considerable advantages, and their cavalry, charging rapidly through the fields of rye, a grain which grows in Flanders to a great height, came unexpectedly on some of our battalions, which suffered severely in consequence, but fairly repelled their antagonists. As our reinforcements came up, the superiority was progressively acquired by us. The French were driven back, and Ney, who commanded, sent to order up a body of twenty thousand men, which had arrived within three miles of Quatre Bras; but the answer was, that they had countermarched to Ligny by order of Bonaparte. They were soon afterwards ordered back, but were unable to join Ney until nine at night, when the fighting had ceased, and the field of action remained in possession of the British. The force engaged on either side did not exceed twenty-five thousand men. Our loss amounted to about five thousand; whilst that of the French appears to have been considerably greater. Both sides fully expected a new battle the next morning. The British, by the arrival of all their divisions, now formed a large army. The French, still strangers to the firmness of our troops, attributed their failure to accidental causes, and declared that their cavalry had been repulsed, parce qu'ils n'avaient pas franchement abordé l'ennemi.

Meanwhile there had been fought at Ligny a battle on a larger scale, and with greater preparation. On the slope of a rising ground, which, however, was much exposed, a Prussian army, of no less than eighty thousand men, awaited the attack of Bonaparte. The fighting began between

occupy this village Blucher made repeated efforts; and it was during one of the most furious of these that Bonaparte is understood to have ordered round the corps, the battle now raged fiercely along the whole line. The masses of Prussian infantry drawn up on the slope were much thinned by the French artillery; but in the village of Ligny, which was repeatedly taken and retaken, the slaughter was peculiarly great. Such was the course of the engagement till the evening at half-past eight o'clock, when the French reserve, marching forward in columns, obliged the Prussians to leave the long-contested field. Their loss on this dreadful day was little short of twenty thousand; that of the French exceeded ten thousand.

Next day Bonaparte adopted the plan of detaching under Grouchy a body of thirty-four thousand men to follow the retiring Prussians, whilst, with the mass of his force, seventyone thousand in number, he turned against the British, in the hope of fighting a battle at the head of superior numbers. Lord Wellington knew not the retreat of his allies till morning, when a similar measure on his part became indispensable; but as his army was in the best state, and as the Prussians had just received a reinforcement, retreat was necessary only until reaching a position favourable for fighting, and for awaiting the co-operation of his allies. Waterloo, he well knew, presented these advantages: his march thither met with no annoyance from the French; and the only fighting which took place on the 17th was at Genappe, in a cavalry action begun by our rear-guard. Bonaparte following with his van-guard, reached the ground opposite to our position, and in the evening ordered a partial cannonade to ascertain if we occupied the latter with an intention to remain. Concluding in the affirmative, he began arrangements for a battle; and next morning he continued under a similar impression, although in his army there was a general belief that we would not venture to await their onset. At ten o'clock he perceived by his glass, in march at a great distance, a corps which he immediately concluded to be Prussians. This necessitated his posting a body of above eight thousand men on his right to receive them; a disposition which deprived him of his numerical superiority, and caused the battle of Waterloo to be fought between equal or nearly equal forces. It began soon after mid-day by an attack on the post of Hougoumont, a chateau or country-seat in front of our right, surrounded by an orchard. The possession of this point would have favoured the approach of the French to our right wing; but though they drove us from the orchard, all their efforts proved ineffectual against our troops, a detachment of guards, stationed in the building and within the court wall. This attack, though very obstinate and sanguinary, was in the eye of either commander only a prelude to the great onset in the centre, which commenced towards two o'clock, being planned by Bonaparte, and conducted by Ney, whose station during the action was in the high road leading straight to our centre. Our army made little show, the battalions being formed in squares, and partly concealed from view by the sinuosities of ground; whilst between each square there were openings sufficient to en. able the battalions to deploy into line, as well as to afford our cavalry space to advance and charge. The squares were further placed en echiquier, like a chess-board, so that the enemy's cavalry, in venturing through an opening, exposed itself to a fire in front from the opposite square, and to a double flank fire from the squares which it had passed. Yet this firm array did not appal the French cuirassiers, who, confiding in past successes and in the protection of their armour, repeatedly tried the deadly experiment of

conspicuous, and never was it more effectually opposed, whether we consider the firmness of our troops, the judgment of our general, or the efficiency of our artillery. The only ground gained by the French was the central point of La. Haye Sainte and the space immediately in front of our line,—the whole being attended, said Ney, by a carnage the most dreadful he had ever seen. Meanwhile Bonaparte watched anxiously the moment when a partial breach or disorder in our line should afford him a favourable opportunity of attacking with his reserve. Ney repeatedly intimated an expectation of great success, but could report no positive advantage, even after the double charge made by the imperial horse guards at five in the afternoon. It became, however, indispensable to act, and Bonaparte could hardly doubt that the long-continued conflict must by this time have greatly weakened our line. Accordingly, between six and seven o'clock, the imperial foot guards, to the number of nearly thirteen thousand, were drawn from behind the ridge which had hitherto covered them from our fire; directed to advance along the high road leading to our centre; and harangued by Bonaparte, whom they answered with reiterated cries of Vive TEmpereur. We are now come to the decisive part of the battle, that part in which, till now, whether at Marengo, at Austerlitz, or at Ligny, success had uniformly attended the charge of a fresh and numerous corps. By what means did it fail at Waterloo? The answer is, that our line, though thinned, was nowhere disordered; that our battalions, though reduced, were firm in their position. Besides, the duke, apprised of the approach of his allies, moved round an additional force from his left to his centre, and directed our battalions to deploy from their squares into a line four deep. Its formidable aspect, and the knowledge of the approach of the Prussians, prevented Ney from attempting the last resource, namely, a bayonet charge by the guards. Their ranks, however, were rapidly thinned, for the fire from the British line was much more extensive and destructive than that of the columns of the enemy. It was now that the duke perceived the approach of the Prussian main body, and ordered a general forward movement; the French retired, at first slowly and in good order; but seeing that behind them all was falling into confusion, the artillerymen and waggon train cutting the traces of their horses, and pressing to gain the high road to which the Prussians were fast advancing, the retreat soon became a rout. Our troops advanced over the field of battle, crossed the hollow beyond it, and towards nine at night reached the ridge occupied by the French staff during the day. Their task was now fulfilled, and the Prussians were left to pursue the flying enemy. The loss on our side amounted to thirteen thousand men; that of the French opposed to us, exclusive of the loss caused by the Prussians, was about twenty thousand.

This great battle displayed no manœuvring; the plan was formed, and the whole was a succession of impetuous attacks and obstinate repulses; but the talents of either commander were not the less conspicuously displayed; the one in making no fruitless application of his force, the other in never permitting the ardour of his troops to lead them from their ground or to deviate from a defensive plan. Bonaparte committed two errors; first, throwing away his superb cavalry so early in the action; and, secondly, as a consequence of this, ordering the advance of his guards, who, though they might penetrate our line at a particular point, had no chance of gaining a victory when unsupported by cavalry, and were besides likely to be soon wanted as a rear-guard to their own army. In the battle Lord Wellington appears to have committed no error. On the preceding days his fault lay in supposing Blu-

Regency, attack. Never was the impetuosity of the French more cher likely to act with discretion, and in remaining per-Regency. sonally at Brussels instead of keeping near to his impatient coadjutor. Had the latter avoided fighting on the 16th, and retreated only twelve or fifteen miles, the allied forces would have been completely in co-operation; and their numbers, a hundred and sixty thousand, would have deprived Bonaparte of every chance of success.

From Waterloo to Paris, the advance of the allies was an almost uninterrupted march; marked on our part by the capture, by escalade, of two towns, Cambray and Peronne, and on that of the Prussians by an unremitting pursuit of the enemy. On one occasion (the 2d of July, near Versailles), a corps of French cavalry re-asserted their claim to fame, and taught the Prussians the hazard of a precipitate advance; but the success was partial, the evacuation of Paris unavoidable, and resistance hopeless, now that almost all Europe was pouring her armies into the French territory. Hence the second treaty of Paris, concluded after many vain appeals to the generosity of the allies, and which burdened France with contributions to the amount of nearly thirty millions sterling, exclusive of the support of an allied army on her frontier. This army, amounting at first to a hundred and fifty thousand men, was reduced in 1817 to a hundred and twenty thousand, and withdrawn in the end of 1818, when all bore the as-

pect of continued tranquillity on the Continent. The time is scarcely yet arrived for viewing, with the calm impartiality of history, our war against Bonaparte; but the more reflecting part of our countrymen can hardly fail to regret our participation in the war of 1793.

Those who know the inoffensive state of the French nation at that time, their general wish for peace, and the reduced condition of their army, can have no doubt that the efforts which subsequently poured forth such a host of combatants owed their existence solely to the threats of the allied powers. Without these the jacobins would not have triumphed, nor would a military adventurer, like Bonaparte, have had the means of acquiring an ascendency. Louis XVI. might have been brought to the scaffold, and republican visions might have prevailed for a season; but the eyes of the people would have been opened to the blessings of a constitutional monarchy much earlier than when threatened with invasion, and obliged, in self-defence, to throw undue power into the hands of their new rulers. The first great error, that of the coalition of 1792, was the act of Austria and Prussia; but of the continuance of the continental war after 1795 we were almost the sole cause. Belgium and Holland had, it is true, fallen into the hands of France, and to recover them was an object of the highest interest; but in attempting this, our ministers made no adequate allowance for the jealousies, the prejudices, we may add the incapacity, of the governments whose aid was indispensable to success. In 1803 circumstances had become extremely embarrassing. France was confirmed in the possession of the Netherlands and Italy, and at the disposal of an ambitious ruler, who studied in peace only the means of fur-ther encroachment. What course was our government to follow? Were they to continue in peace, and to trust for our eventual safety to the progressive extension of our resources and the improvement of our army; or were they to resort to immediate war, and present, by our declared hostility, a rallying point to other powers? An experienced government would have preferred the former; the ministry of 1803 adopted the latter, not from views of ambition, but from yielding to that popular impulse, which it would not, however, have been impracticable to guide and control. As to the course of the war, it was, during the first two years, a contest without decided success on either. side. In its third year, an ill-conducted coalition gave to

France that superiority which was to be expected in the

Regency. case of a great military power directed by a single head. had been adopted and promulgated relative to negro sla- Regency. unexpected change in the calculations of politicians, and showed, in an encouraging light, the power of popular resistance; still its effects, aided even by our military means, produced little decisive of the grand objects of the war. We were proceeding with great zeal and gallantry, but without any definite hope or object, when a catastrophe, as little expected by ourselves as by the French, entirely changed the aspect of affairs, and made it incumbent on us to omit no exertion, financial or military, to redeem the independence of Europe. The success was complete; but aware of the amount of the sacrifices which had been incurred in its prosecution.

Parliament met on the 1st of February, and, after some business of minor importance, proceeded, in March, to discuss the interesting question of our military peace establishment. The navy had been reduced with sufficient promptitude; but there seemed, on the part of government, a disposition to keep the army on a scale neither required by the general tranquillity of Europe, nor justified by our financial means, which exhibited several symptoms of decline. Yet a motion for so moderate a reduction as ten thousand from the proposed number of land forces was negatived by two hundred and two to a hundred and thirty; and, in long debates which ensued relative to the army estimates, ministers carried every point, and were likely to keep up the whole upon an expensive scale; when, on the 18th of March, after a long and animated discussion, the question of continuing the property-tax, modified to five per cent., was decided against them by a majority of thirtyseven; there being two hundred and thirty-eight against general reduction of expenditure, which we should have in vain expected from the reason or reflection of our rulers.

Another measure of importance was the regulation, after a long investigation, of the civil list, on a footing which was adopted as a standard in the beginning of the present reign. This was followed by acts for the consolidation of the English and Irish exchequers, and for the exemption of the bank from cash payments during two years; and, finalthe minor proceedings of the session may be mentioned a grant of L.60,000 a year to the Princess Charlotte and her husband, with a provision, unfortunately too soon required, of L.50,000 to the latter in the event of her demise.

This year was distinguished by an important naval operation, namely, the attack upon Algiers. A project had been submitted to the sovereigns assembled at Vienna in 1814, and at Paris in 1815, for the expulsion of the Turkish militia from the Barbary states; but the representatives of the cabinet of London opposed this proposition, on the pretext that the existence of these states had been guaranteed by treaties; and as the scheme for expelling the Turks had been coupled with an absurd proposal to replace the janissaries with the conventual and military order of the knights of Malta, the success of the English opposition excited no regret. It was generally agreed, however, that an end ought to be put to Christian slavery. however, that an end ought to be put to Christian slavery. vessels of war. At Gibraltar six Dutch frigates, under This was a necessary consequence of the principle which the orders of Vice-admiral Van Capellen, requested to

Such, in a further degree, was the result of the continental very; and England, which had procured the recognition operations of 1806 and 1807. In 1808 Spain occasioned an of the one, undertook the honourable task of effecting the other. But the measures at first resorted to were by no means adequate to the accomplishment of the end in view, and of course failed. An attempt was made to mediate between the regency of Algiers and the kingdoms of Sardinia and Naples; and Lord Exmouth, with a fleet of twentysix ships, of which six were of the line, was employed to superintend this negociation. His Lordship accordingly appeared before Algiers in the month of April 1816; the dey yielded; and peace was re-established between these powers " en favorisent l'avarice du gouvernement Algéit was not till the close of the struggle that we became rien." But all of a sudden the English government assumed a higher tone, and transmitted orders to Lord Exmouth to demand of the dey, first, the immediate liberation of all Christian slaves; secondly, restitution of the sums which had been paid by the courts of Naples and Sardinia for the ransom of such of their subjects as had been dragged into slavery; thirdly, the renunciation for ever of the practice of reducing to slavery the subjects of the Christian powers of Europe; fourthly, an obligation to treat the subjects of Hanover on the same footing and in the same manner as those of Great Britain.

The situation of Lord Exmouth was disagreeable and embarrassing; inasmuch as he was called upon to present, in the month of May, conditions altogether different from those which had been tendered and accepted in the month of April immediately preceding. But the die was now cast. Omar Pasha indignantly rejected the new propositions which the admiral was commanded to submit to him; and having assembled a general divan, obtained the concurrence of the tchiorbagis, the odobachys, and the yoldaches, who rent the air with their ferocious cries, detwo hundred and one. This signal and unexpected defeat claring that they would rather perish than submit to pronecessitated a relinquishment of the war malt-duty, and a positions so humiliating. Pressed by the admiral, however, to give a distinct and categorical answer, the dey had recourse to finesse. He was a subject, he said, of the Ottoman Porte. The question at issue was one of the highest importance, and could not be resolved in a definitive manner by him and the militia of Algiers. It was therefore indispensable that he should take the orders of the grand seignior respecting it. Lord Exmouth was not deceived by this specimen of Algerine diplomacy. ly, by an act for striking off a new silver coinage. Among He knew that the pasha was a man of resolution as well as of address; that he was certain of the support of his furious and fanatical subjects; and that his sole object was to gain time in order to prepare for the conflict which, he foresaw, was impending. However, he affected to be for the present satisfied with the dey's answer, and withdrew to Gibraltar, ostensibly to wait for the decision of the Porte, but in reality for definitive orders from his own government. The latter had already decided on its course.

A powerful squadron was accordingly fitted out at Portsmouth, and dispatched to Gibraltar to reinforce the admiral, who, after its arrival, had under his orders five sail of the line, two of them three-deckers, five frigates of the largest and second class, five sloops of war, four bomb vessels, five gun-boats, furnished each with a sixty-eightpound carronade, and a dock-yard sloop converted into a fire-ship or explosion vessel; in all twenty-five ships and

¹ Speaking of this scheme, Colonel Juchereau de Saint Denys remarks, " C'était mettre le fanatisme Catholique à la place du fanatisme Mahométan ; c'était substituer à une classe oisive et improductive, une classe également ennemie du travail et également dépourvue d'industrie. C'était d'ailleurs un acte du pure demence et cruauté que de vouloir faire gouverner une population entièrement Mussulmane par des moines militaires qui n'avaient été crées que pour combattre perpetuellement et à outrance tous les enne-mis du nom Chrétien, et particulièrement les disciples de Mahomet. Cependant ce projet absurde avait pu trouver des échos parmi les diplomates du congrès de Vienne." Pp. 118, 119.

Regency. join the British fleet in the approaching attack, and probably had stations assigned them, although it does not appear in the very precise and masterly order of battle given out by Lord Exmouth. The fleet arrived before Algiers on the 27th of August 1816. The wind was favourable, and a light breeze enabled the ships to take the positions which had been assigned to them. Lord Exmouth then transmitted his ultimatum to the dey. It embodied in substance the propositions presented in May, and required an immediate answer. None whatever was returned. The decision of the question was left to the arbitrement of battle. The fleet instantly weighed, and, led by the flag ship, Queen Charlotte, of a hundred and twenty guns, came to anchor within pistol shot, or rather less, of the batteries on the Mole, and those situated towards the western part of the town. The Queen Charlotte anchored across the entrance of the port, so as to take in flank and reverse such of the batteries as were furthest advanced, and she was supported by the Superb and Impregnable, which were directed to anchor as close to her as possible, to be made fast to each other, and hove together in order to concentrate their fire. The Albion had orders to supply the place of either of the two last mentioned ships that might be thrown out; and, in case of both getting their places, to present her broadside against a flanking battery of three guns, and enfilade the northern part of the works by throwing part of her fire upon the upper tier of the light-house battery. The Dutch appear to have taken their station on the left, in order to produce a diversion by commanding the exterior batteries and forts of the eastern part of the place. All these movements were executed with that admirable order and precision which distinguish the operations of the British navy, and also without opposition. The dey, it is said, wished to avoid the reproach of being the first to commence hostilities; and it has been thought that this capital fault contributed to decide the fate of the action. But this is a mistake. Had the Algerines opened their fire on the ships as they approached, the casualties might have been more numerous, but the result would have been the same.

> When the British line of attack had been completely established, two shots were fired on the flag ship from the grand battery of the Mole. The instant he saw the flash of the guns, Lord Exmouth gave the word "Fire away my lads," and the cannonade immediately became general. The battle commenced at three o'clock in the afternoon, and continued without any intermission until nine in the evening, when a land breeze springing up, the ships weighed anchor, and gained an offing, to prepare, if necessary, for a renewal of the attack. While the combat was at the hottest, a detachment of English seamen and marines entered the harbour amidst a murderous fire of grape and musketry, and succeeded in setting fire to and destroying the whole of the Algerine fleet; an event which made a terrible impression on the population of Algiers, and in fact completed its demoralization. They then found what a formidable and daring enemy they had had the hardihood to contend withal; and horror soon gave way to despair. The dey durst not risk a renewal of the combat; but next day (the 28th of August) gave his unqualified assent to the propositions which, twenty hours before, he had scorned even to entertain. The terms which Lord Exmouth had the glory to dictate were, first, the total abolition of Christian slavery in future; secondly, the immediate liberation of all slaves within the territories and dependencies of Algiers, of whatever nation they might be; thirdly, the restitution into the hands of the English admiral of the various sums which had been paid since the commencement of the year by Christian powers for the ransom of their subjects

dragged into slavery; fourthly, an indemnification to the Regency. English consul for the losses he had sustained, and an apology by the dey in the presence of his ministers and officers for the indignities which the consul had suffered in being arrested and detained in prison during the battle. This was followed by the conclusion of a treaty of peace with the Netherlands, by which all arrears were discharged, and that country ceased to figure among the tributaries of Algiers. Such were the results of this memorable battle, which, to use the words of Sir Charles Ekins (Naval Battles, p. 304), "bore the character of a crusade in behalf of Europe, rather than on the part of Great Britain alone, which excited a prodigious sensation throughout all Christendom, and which was believed to have put a final stop to Barbary piracies and depredations."

A general want of work and reduction of wages continued during the year, subjecting the lower orders to great distress, and exposing them to the arts of designing demagogues. Large assemblages, particularly in Spafields, took place previous to the meeting of parliament; and on the day of its opening (the 28th of January) the regent was insulted on his way to the House of Lords. A secret committee of each house was soon afterwards appointed to examine papers in the possession of government, said to bear evidence of serious projects of insurrection; and each made a speedy report, declaring the existence of very dangerous societies. There was in these reports a strain of confident allegation, unaccompanied by specific proof or temperate reasoning, which brought to recollection the declamatory state papers of the French revolution, and gave the reports the appearance of documents framed to disseminate alarms, and justify extreme measures. They engaged, however, the serious attention of the house, and the result was a bill for the suspension of the habeas corpus act during the current session of parliament; a measure carried in the Lords by a hundred and fifty to thirtyfive, and in the Commons by two hundred and sixty-five to a hundred and three. Towards the close of the session a second report from the secret committees produced an act for continuing the suspension of the habeas corpus to the 1st of March 1818.

The continued want of work, and the distress of the lower orders, led to an act for authorizing the issue of exchequer bills to persons finding employment for the poor. The same causes inducing the public to call loudly for retrenchment, the opposition, on the 25th of February, took the sense of the House of Commons on a motion to reduce the number of the lords of the admiralty, and mustered a hundred and fifty-two votes against two hundred and As an offering on the part of government to the prevailing demand for retrenchment, an act was passed for abolishing the two sinecure offices of justice in Eyre.

Mr Abbot, who had filled the office of speaker of the house since 1802, finding himself incapable, from continued indisposition, of performing its arduous duties, sent in his resignation, and was succeeded by the Right Honourable Charles Manners Sutton. Mr Abbot was forthwith raised to the peerage by the title of Baron Colchester; and, on the 6th of June, a vote passed the Commons for settling on him a life annuity of L.4000.

Parliament was opened on the 27th of January under circumstances which indicated that the want of work and the distress of trade, though still considerable, were less serious than in the preceding year. A secret committee, appointed anew by each house, reported to that effect; and on their recommendation was brought in a bill to indemnify persons, chiefly magistrates, who had acted in apprehending and detaining individuals suspected of treasonable practices. This bill was not carried without considerable opposition.

Regency. 1819.

The death of the Princess Charlotte having caused a that of the neutral party. We allude to Mr Tierney's Regencyroyal dukes became a subject of consideration; but the provision for any increase of expenditure was exposed to difficulty, as well from the distress of the public, as from the near approach of the time when the members were to meet their constituents. A motion made by ministers to grant L.10,000 additional to the Duke of Clarence was not successful, an amendment for reducing it to L.6000 having been carried by a hundred and ninty-three to a hundred and eighty-four. Votes, equally restricted, were passed in the case of the Dukes of Kent and Cambridge; and an attempt to obtain a similar grant to the Duke of Cumberland, who had been several years married, was negatived but a provision of L.6000 a year was made for the duchess in case she should survive him.

Among the transactions of this year was a grant of L.400,000 to Spain, as a compensation for losses attendant on an early abolition of the slave-trade by that power. Certain acts were also passed for the humane treatment of negroes in our sugar colonies. The bank exemption act being about to expire, Mr Vansittart brought in a bill for continuing it another year, on the ground that the loans now contracting in England for France and Prussia carried capital out of the country, and prevented the bank, for a time at least, from diminishing its paper circulation.

Mr Brougham having, early in the session, brought in a bill for investigating the abuses of public charities, it was Commons, passed to the Lords. There it encountered opposition from Lords Eldon and Redesdale, and was returned to the Commons with material alterations; the commissioners charged with the inquiry being limited in their powers, and restricted to charities connected with education. The act, however, passed in this state, and the labours of the commissioners, like those of the committee on the education of the poor, have been productive of much public advantage. The session was closed on 10th June by a speech from the regent, containing a notice, not only of the prorogation, but of the dissolution of parliament; a measure which for many years had been announced by proclamation.

The new parliament met on the 14th of January 1819. and on the 21st proceeded to business. The demise of the queen having taken place during the recess (on the 17th November), one of the first measures was to vest the custody of the king's person in the Duke of York, who, very imprudently, under the circumstances of the country, demanded and received from parliament an annual allowance of L.10,000 for discharging an act of filial duty. This formed a striking contrast to the conduct of the Marquis of Camden, who, possessed of the lucrative sinecure of teller of the exchequer, relinquished L.9000 a year of it to the public; a sacrifice noticed in honourable terms in a vote passed in parliament on the occasion.

Such was the addition made to opposition, by an election under circumstances of general distress, that several measures were carried in this session against ministers; in particular, a motion on the 2d of March, by Sir James Mackintosh, for a revision of the criminal code, where the numbers were a hundred and forty-seven against a hundred and twenty-eight, and a motion for a committee on the state of the Scottish burghs, carried by a hundred and forty-nine to a hundred and forty-four. In the division on the grant of L.10,000 to the Duke of York, the opposition mustered a hundred and eighty-six votes against two hundred and eighty-one. But the impression excited by these successes was greatly enfeebled by a motion, which arrayed on one side all the strength of government and for a committee on the state of the country was negatived

blank in the succession to the crown, the marriage of the motion for an " inquiry into the state of the nation," which was negatived by three hundred and fifty-seven to a hundred and seventy-eight; a division evincing that, though disposed to co-operate with opposition occasionally and for specific objects, the neutral party had no wish for a change of ministry. Encouraged by this success, Mr Vansittart came forward with the bold proposition of new taxes, to the extent of L.3,000,000, on the ground of a sum of that amount being absolutely necessary to give efficiency to the sinking fund. Of this sum the chief part was expected from an increase of the duties on malt, spirits, and tobacco; but part also was to be derived from a tax on foreign wool (6d. per lb.); a most singular impost by a hundred and forty-three to a hundred and forty-six; in a country where the exportation of manufactured wool forms a main branch of the national industry. Ministers were conscious of its injurious tendency, but were obliged to bring it forward as an equivalent to the landed interest, for the fresh burden exacted from them in the malt-duty.

The further debates of the session related to the Catholic question and the resumption of cash payments. In the contest pending at this time between Spain and her American colonies, ministers took part with the mother country, so far at least as to discourage by act of parliament the enlistment of our officers and soldiers on the side of the insurgents. In the preceding session L.1,000,000 had been voted for building additional churches and chapels for the established religion in England; and this year referred to a committee, and, after some discussion in the L.100,000 was appropriated for a similar purpose to the established church of Scotland. The last act of the session was a grant made in July, of the limited sum of L.50,000, to be shared by government among persons settling on particular conditions at the Cape of Good Hope. This was the first pecuniary aid given by government towards emigration, which is accounted by some the only remedy for our overstock of labourers and manufacturers.

> The revival of commercial activity in 1818 proved unfortunately of short duration. Distress returned towards the end of that year, and assumed an aggravated aspect in the course of 1819. This produced popular assemblages, and led, on 16th August, to an unfortunate scene at Manchester, in which the interference of the yeomanry cavalry to disperse a very numerous meeting of the people was productive of loss of life to a number of persons, and of bodily injury to a great many. The irritation excited among the lower orders by this proceeding, and by the continued pressure of poverty, led to the dissemination of a spirit of discontent and insurrection which necessitated the assembling of parliament on the 23d November. The speech of the regent, as well as the discussions of both houses, were directed to this painful subject; and the alarm excited among the aristocracy, joined to other considerations, having finally detached the Grenville party from the opposition, the latter now mustered in less formidable array. On the division for an amendment upon the address to the regent, the numbers were a hundred and fifty against three hundred and eighty.

Several bills were afterwards introduced by ministers for the prevention of disturbances. These consisted in imposing a tax on the petty publications circulated among the lower orders; impeding the circulation of libels; authorizing the seizure of arms; and forbidding military training or seditious meetings. These bills produced long and animated debates; but the most considerable division on the side of opposition, namely, that for limiting the act against seditious measures to three years instead of five, consisted of only a hundred and fifty votes against three hundred and twenty-eight. A motion of a more comprehensive nature

Regency. in the Lords by a hundred and seventy-eight to fortyseven; in the Commons by three hundred and ninety-five to a hundred and fifty.

After transacting this and other business of an urgent nature, parliament adjourned; but was soon after brought together by an event which, however conformable to the course of nature, was not at that time expected, namely, the death of George III. The day after the demise, agreeably to established usage, both houses met, and took the oath of allegiance to the new sovereign. On the 2d February they adjourned till the 17th, the day after the interment of his majesty. On that day both houses voted an address of condolence to the present king, after which they proceeded to transact such business as was pressing, and might, according to law, have continued to sit during six months; but ministers judged fit to resort to a dissolution. Another election now took place under circumstances of general distress. The new parliament met on the 21st April, and was opened on the 27th by George IV., in a speech declaring his anxiety for strict economy, but regretting that the state of the country was such as to admit of no reduction of the military force.

The peace of Amiens at first gave hopes of the improvement of Ireland by the introduction of British industry and capital; but these hopes were soon clouded by the renewed contest of 1803. In that contest the public in England and Scotland joined with almost unexampled zeal; but Ireland was less cordial, although it would be altogether erroneous to connect with any political party, whether Catholic or Protestant, the miserable insurrection of the 23d of July 1803. A plot to seize Dublin, almost as extravagant as that of the Cato Street conspiracy in London, was framed by a few infatuated individuals; and in the tumult, which burst forth with great violence but with feeble means, Lord Kilwarden, the chief justice, unhappily lost his life. A party of military soon dispersed the rabble; and of their leaders, most of whom were afterwards apprehended and executed, the only one entitled to notice was Robert Emmett, a young man whose education and talents ought to have placed him above such desperate attempts. The alarm thus excited engaged some time after the attention of parliament, and led to the enactment of two bills, one for a renewed suspension of the habeas corpus act in Ireland, the other for trying rebels by martial law.

The encouragement so generally given to the volunteer system in England and Scotland was not extended to Ireland, from a dread of embodying indiscriminately a people of whom so great a proportion were disaffected. The yeomanry, however, or select volunteers of Ireland, were very numerous, being about eighty thousand; and they had been highly instrumental in putting down the unfortunate insurrection of 1798. In addition to these, Ireland required a body of our regulars and militia amounting to nearly fifty thousand men as a defence against invasion, a guarantee of public tranquillity, and a check on illicit distilla-tion and smuggling. The return yielded by Ireland in the shape of revenue was small, but her supply of recruits to our army and navy was very considerable.

The suspension of the habeas corpus act continued in 1805, a year remarkable as the first in which the Catholic question was submitted to parliament. It was brought forward in the Commons by Mr Fox, in the Peers by Lord Grenville; and curiosity was strongly excited in regard to Mr Pitt, who had lately accepted office without carrying his professed object, the grant of political privileges to the Catholics. The minister, however, extricated himself with address; declaring that if his vote could give the Ca-

claims; and this, in fact, was sufficiently shown by the Regency. division which ensued, and exhibited three hundred and thirty-six votes against them, with only a hundred and twenty-four in their favour. Next year the appointment to office of Lord Grenville and Mr Fox raised high the hopes of the Catholics; but the known repugnance of the sovereign to their claims induced these ministers to dissuade a direct discussion of the question in parliament, under an assurance that they would do whatever should be otherwise practicable for obtaining the removal of disabilities. Hence the bill of February 1807, which caused the dismissal of the Grenville ministry, and excited such a ferment in England against the Catholics, as to render it wholly unadvisable to bring forward the question for several years.

In 1809 the Catholic committee in Dublin held public meetings, but confined themselves to preparing a new petition to parliament. Next year they went much farther, and sought to assume an imposing attitude, proposing that ten persons should be deputed by each county to Dublin, and there form an assembly, charged not only with the duty of preparing petitions to parliament, but of taking measures for the redress of the general grievances of the Catholic body. The secretary for Ireland, Mr Wellesley Pole, alarmed at this design, addressed circular letters to the sheriffs of counties, requiring them to prevent the election of the proposed delegates, and even to arrest all persons taking part in such elections. But this order appeared too peremptory to the opposition, and a debate took place, in which Mr Wellesley Pole explained, that, so long as the Catholics confined their proceedings to petitioning, they had received no interruption; but that the delegates proposed to go much farther, and that a body, under the name of a Committee of Grievances, had assembled weekly in Dublin with all the forms of parliament. The house supported the measure adopted by Mr Wellesley Pole, and disapproved of the proceedings of the Catholics. Still the latter deemed this session not unfavourable to the discussion of their political claims, on account of the laurels lately won by our armies in Spain and Portugal, which counted many Catholics in their ranks. The question was brought forward by Mr Grattan, but lost by a large majority in both houses.

The same fate attended its discussion next spring. Another year elapsed; and in the session of 1813 it was brought forward with more combination and better prospects. Mr Grattan, supported by a part of the Cabinet, obtained the assent of the house to several preliminary resolutions; first, that the Catholic disabilities ought to be removed; secondly, that the Catholic clergy should bind themselves by oath to hold no correspondence with Rome except on ecclesiastical business; and, thirdly, that two commissioners should be appointed for examining into the loyalty of persons recommended as deans or bishops among the Catholics. The time occupied in these discussions was considerable, and gave occasion to the Catholic clergy in Ireland to testify their dissent from several of the provisions, particularly from that which restricted their correspondence with Rome. The knowledge of this dissatisfaction made a deep impression on parliament, and gave a turn to the question which induced the supporters of the bill to withdraw it for that session.

The ensuing year unfortunately gave further evidence of the want of temper and union among the Catholics. The court of Rome recommended their acquiescence with the propositions of Mr Grattan; but meetings of the Catholic board at Dublin disclaimed indignantly all foreign interference; and the clergy passed resolutions against the tholics what they desired, they should not long want it, but appointment of any Catholic bishop by the British governthat at present the prevailing sentiment was against their ment. The intemperate proceedings of the Catholic board Regency. now led government to dissolve that body, and declare its the development of our resources, and the expansion of Regency.

meetings contrary to law.

1820.

These dissensions prevented the question from being submitted to parliament in 1814. Next year it was brought forward by Sir Henry Parnell, not by Mr Grattan, who declared that an unconditional grant of the demands of the Catholics was not to be expected, and that, without cultivating a spirit of conciliation, they never would succeed. The motion was lost by a great majority. In 1816 it was again brought before parliament, but in two distinct petitions, of which the more temperate, introduced by Mr Grattan, received the support of a hundred and forty-one against a hundred and seventy-two.

In the year 1817 the question was proposed by Mr Grattan, with the same views as in 1813, and supported by two hundred and twenty-one votes against two hundred and forty-five. The disappointment caused by this failure was soothed not only by the large minority, but by a very substantial concession, obtained soon after, on the proposition of ministers, namely, an act to enable Catholic officers in the army and navy to attain rank nearly on the plan proposed by the Grenville ministry in 1807. In 1818 the Catholic question was not agitated; but in 1819 the tone of that body having become more conciliating, Mr Grattan's motion for taking it into consideration was supported by two hundred and forty-one votes against two hundred and forty-three. Further details of the progress of this great measure towards a successful conclusion will be given in the course of the narrative.1

There is another subject which deserves a particular notice in this place, more especially as it is connected with an event of deep and lasting interest. We allude to reform in the representation of the people. For several years anterior to 1816, the question had been but little agitated, and seemed to be abandoned to occasional declaimers and mere pot-house politicians. But the general distress which prevailed during that and the following years, with the discontent consequent on the privations to which the working classes were exposed, redirected their attention to a subject which they had too long lost sight of; and as it seemed obvious that the pressure of taxation, added to the evils occasioned by a transition from a state of war to a state of peace, formed the principal obstacle to

the productive powers of industry, an opinion began to gain ground among the people, that the evils under which they suffered would never be materially mitigated, much less effectually cured, until a reform had been effected in our system of representation. One of the first symptoms or manifestations of the revival of an interest in this question was afforded by the Spafields meeting, which took place on the 2d December 1816; and although the tumult and violence in which that assemblage issued produced considerable alarm, and brought no little discredit on the cause, yet the defeat of government in the state prosecutions which followed, the continued pressure of distress, and, above all, the invincible truth that the people were inadequately represented, and that they experienced many of the evils of the worst government under one held forth as the best, served to overcome every disadvantage, and to keep alive the interest which had previously been excited. The Spafields riots were soon forgotten; and although no overt manifestations of any consequence took place during the two following years, still the conviction of the necessity of parliamentary reform continued to gain ground, and the cause began to find advocates in quarters where it had previously been regarded with indifference, if not with aversion. Reformers, though agreed in principle, were indeed much divided in regard to detail, or rather as to the extent to which the principle ought to be carried; and extreme doctrines began to be openly and boldly promulgated by many persons, who about the year 1819 received the appellation of radical reformers, and were at this time regarded with affected contempt, but with real terror, by the partizans of the existing system. But neither this diversity of views, nor the dread which many persons entertained or pretended of radical theories, retarded the progress of the cause, or prevented it from daily gaining new converts. On the 12th of July 1819

Such were the final acts of 1819, and of the reign of

Birmingham ventured on the bold experiment of electing

a legislatorial attorney to represent that great town in the

House of Commons; and on the 16th of August follow-

ing took place that memorable meeting at Manchester,

already mentioned as accompanied with such disastrous

¹ The following table exhibits, in a synoptical form, the times and results of the parliamentary discussion of the Catholic Question from 1805 to 1819 inclusive.

	House of Lords-			House of Commons.		
	For.	Against.	Majority.	For.	Against.	Majority.
1805	49	178	129	124	336	212
1810	62 102 125 	154 121 174 126 	86 59 72 1 	109 83 215 235 264 186 187 245	213 146 300 106 224 119 235 203 247	104 63 85 129 40 67 48 42
1814	69 90	86 73 142 147	26 4 52 41	147 141 221 241	228 172 245 243	81 31 24 2

Reign of George III. The public conduct of this monarch, and the George IV. tendency of the political principles by which it was governed, the reader will judge of for himself, from the narrative of the events of his reign; as to his private and domestic character, it is admitted on all hands to have been highly respectable. He was distinguished for probity and a sense of religious obligation; in his habits and manners he displayed equal moderation and simplicity; his disposition, though unyielding, was benevolent; and both as a husband and a parent he was highly estimable. His intellectual faculties, originally of no high order, were permanently clouded by the constitutional malady which exhibited itself at an early period of his life; he adhered with invincible obstinacy to the maxims of government instilled into his mind by his early instructors; and he cherished an attachment to the church of which he was the head, that amounted to a species of bigotry, if not to fanaticism. Yet he loved and patronised the fine arts, particularly music and painting; he collected a noble library; he had a taste for agriculture and some of the mechanic arts: and he was at once plain and unpretending in his manners; all which circumstances go very far in the case of a king. Hunting and the penal laws against the Catholics formed the things which, next to his own family, he was most attached to; and his scruples of conscience long stood in the way of national justice.

## CHAP. XX.

## REIGN OF GEORGE IV.

Accession of George IV .- Assembling of Parliament .- Message from the King.—Debates.—Parliament dissolved.—Cato Street Conspiracy.—Thistlewood and his Accomplices seized, convict-Debates.—Parliament dissolved.—Cato Street ed, and executed.—Disc is tent.—Fomented by Government Spies.—Severe Measures.—The Queen.—Aversion of the King.
—She Lands at Dover.—Message from the King respecting
the Conduct of the Queen.—Bill of Pains and Penalties introduced .- Proceedings thereupon .- Bill of Pains and Penalties thrown out.-Scene in the House of Commons.-Character of the Proceedings against the Queen.—State of the Country.—General Distress.—Parliamentary Proceedings.—Grampound Disfranchisement Bill.—Droits of the Admiralty.—Brougham's Education Scheme.—Excitement connected with the Queen's Case.—Parliamentary Session of 1821.—Proceedings.—Circular Dispatch to our Missions Abroad.—Earl Grey's Motion.—Other Proceedings connected with it.—Motion relative to the Declaration issued by the Congress of Laybach.—Internal Affairs.—Mr Plunkett's Motion for a Committee on the Catholic Question carried.—Resolutions adopted.—Bills brought in. Consolidated into one.—Passed by the Commons.—Thrown out in the Lords.—Parliamentary Reform.—Mr Lambton's Scheme. Defeated by a manœuvre.—Resolutions proposed by Lord John Russell.—Other Projects.—Grampound disfranchised.— Mr Hume's efforts in favour of Retrenchment .- Attempts to humanize the Criminal Code defeated.—Constitutional Association.—Distress of the Agricultural and Manufacturing Population.—Consequent Proceedings in Parliament.—Coronation.—Death of Queen Caroline.—State of Affairs at the commencement of 1822.—Session of Parliament.—Ireland.—Insurrection Act, and Suspension of Habeas Corpus .- Other Measures of Severity.—Insurrectionary Spirit unsubdued.—Unpopularity of the Lord-Lieutenant.—Reform.—Lord John Russell's Motion.—Mr Brougham's proposed Resolution respecting the Influence of the Crown.—Burgh Reform.—Mr Canning's Bill for the Admission of Catholic Peers passed by the Com-mons but thrown out in the Lords.—Finance.—Retrenchment. Reduction of the Navy Five per Cents.—Scheme concerning the Naval and Military Pensions carried, but rendered abortive. Measures for the Relief of the existing Distress.—Commercial Affairs—Repeal of the Navigation Laws.—Death of Lord Londonderry—Changes in the Administration.—New Government.

Reform.—Continental Relations.—Congress of Verona.—Affairs—Service Provided Administration.—Congress of Verona.—Congress of Verona.—Affairs—Congress of Verona.—Congress of Ver fairs of Spain.—French Invasion and Overthrow of the Constitution.-Appointment of Commercial Agents to the New South

American States .- Financial Operations .- Reduction of Taxes. Reign of —Sir James Mackintosh's Resolutions.—Acts for the Amend-George IV ment of the Criminal Law.—Ireland.—Catholic Claims.—Colonial Affairs.—Resolutions in regard to the Treatment of Slaves.— Government Circular.—Character of Mr Canning's Policy.—Independence of the South American States recognised.—Measures for unfettering Commercial Intercourse....Combination Laws repealed...Other Measures of a similar kind...Reciprocity System.—Legal Reform.—Finanical Arrangements.—Ireland.—The Catholic Association.—The Catholic Rent.—Conduct of the West India Planters.—Proceedings in Canada and at the Cape of Good Hope. Domestic Affairs. Meeting of Parliament.—Catholic Association.—Bill for suppressing it.— Debates on this subject.—Association reconstituted.—Bill for the Relief of the Catholics introduced.—Two subordinate Bills.

—Declaration of the Duke of York.—The Bill passed by the Commons, but thrown out in the Lords.—State of Ireland.— Report of the Committee of the Lords.—Other Proceedings. Bill for the Protection of Masters and Workmen against Combinations.—Modification of the Colonial System carried by Mr Huskisson.—Details.—Reduction of Taxation.—Consequences of Excessive Speculation of 1825.—General Panic and Distress. —Affairs of 1826.—Meeting of Parliament.—State of the Country.—Measures for alleviating the general Distress.—Small Note Circulation.—Opposition of Scotland to the Destruction of its Small Note Currency.—Successful.—Branch Banks estations. blished .- Advances on Deposits of Goods and other Securities. Discussions as to the Cause of the late Panic.—Emigration Committee .- Petitions from the Silk Manufacturers and Shipowners.—Mr Huskisson's triumphant Reply.—System of Free Trade.—Budget.—Discussion thereon.—Termination of the Burmese War.—Origin and Progress of this Contest.—Dissolution of Parliament.—General Election.—Effects produced in Ireland by the Catholic Association.—Deficient Crop.—Scarcity.-Order in Council for relieving the Distress.-Meeting of Parliament.-Lord Liverpool struck with Apoplexy.-Canning's Interviews with the King.—He receives the Royal Commands to reconstruct a Cabinet.—Consequent Negociations.—Combination against Mr Canning.—Cabinet formed.—Mr Canning joined by the Whigs.—His Ministry irresistible.—Mr Canning's Death.—His Character as an Orator and Statesman. Succeeded by Lord Goderich Dissolution of his Government.—Parliamentary Session of 1826-27.—Corn Laws. Resolutions.—New Bill passed by the Commons.—Abandoned in consequence of the Duke of Wellington's Amendment in the Lords.—A temporary Bill passed.—Other Questions:—Interference in behalf of Portugal.—Catholic Emancipation.—Lost by a Majority of four.—Duke of Wellington's Administration. Dismission of Mr Huskisson.—Foreign Policy of Britain.—State of our Relations with other Powers.—Portugal—Greece.
—Turkey.—Treaty of London.—Consequent Interference in the Contest between the Ottoman Porte and the Greeks.—Battle of Navarino.—Results of this Action.—Expressions applied to it by the New Cabinet.—Finance Committee.—Government Annuities.—Error in regard to them.—Settlement of the Corn Laws by Compromise.—State of the Common Law Courts.— Efforts of Mr Brougham.—Repeal of the Corporation and Test Acts.—Sir F. Burdett's Motion on the Catholic Claims carried by a Majority of six.-Motion in the Lords to concur in the Resolution of the Commons negatived .- Proceedings of the Catholics.—Mr Fitzgerald defeated in Clare.—Mr O'Connell returned for Clare.—Re-assembling of the Catholic Association in its original form.—Proceedings.—Pledges to be proposed to Candidates.—Party Feuds among the Peasantry hushed.—Clubs.—General Organization.—Mr Dawson's Speech at Derry.—Protestant Ascendency.—Measures.—Orange Lodges.—Brunswick Clubs.—Divisions in the Cabinet on the Catholic Question.—Opposition of the King.—Duke of Wellington's Letter to Dr Curtis.—Recall of the Marquis of Anglesey.— Meeting of Parliament.—Catholic Question recommended in the Speech from the Throne.—Catholic Association denounced. Bill introduced for putting it down.—Association dissolves itself.—Bill passed.—Committee on the Civil Disabilities affecting Catholics.—Mr Peel's Speech in proposing it.—Nature of the Measure proposed for the relief of the Catholics.—Character of the Debates.—Large Majority in the Committee.—Discussion in the Lords.—Relative Division in 1828 and 1829.— Royal Assent given to the Relief Bill.—Disfranchisement of the Irish Forty-shilling Freeholders.—Injustice of this Measure.—Parliament prorogued.—State of the Country.—Character of the Administration.—Parliamentary Reform.—Assembling of Parliament in 1830.—Sir James Graham's Resolution.—Va-

1820.

Reign of George IV. 1820.

rious Motions and Proceedings.-Cry for Reform daily in- violence of their language had added to the ministerial Reign of creasing.—Death and Character of George the Fourth.

George III. closed his career on the 29th of January 1820. He had been so long withdrawn from the eyes of the world, that the event could scarcely be called the termination of a reign. The prince who succeeded him on the throne had virtually discharged all the offices of king for nearly eight years. The same line of policy continued to be persevered in, as nearly as events permitted; the same ministers continued to manage the affairs of state; the prosperity of the country received no sudden shock nor increase; and public opinion went on to form itself, without experiencing any sudden impulse. The customary bell, which announced by its monotonous clang that a king had been gathered to his fathers; the sorrow, real or affected, of personal friends; a slight alteration in the tenor of writs; and some unimportant changes in the arrangements of office, were the only indications that a new reign had commenced.

The ministers, as a matter of form, resigned their places the day after the death of the old king, but were all of them immediately reinstated. It is the law and custom of the country, that if no parliament be in existence at the death of the king, the last immediately revives, and continues to sit for six months, unless dissolved at an earlier period by the new monarch. If a parliament, however, be in existence but not sitting at the time, it assembles with the least possible delay. The House of Commons met, on the present occasion, about noon of the 31st of January, and the Lords a little later in the same day. At this meeting no business was transacted beyond the simple ceremony of taking the oaths of allegiance. Some additional members were sworn next day, when the house adjourned till the 17th of February. This was done in conformity with the uniform practice of parliament on the demise of a king to suspend its operations until after the

On the day appointed both houses again met; and by this time ministers had fully resolved upon the course they were to pursue. Messages from the king were presented by Lord Liverpool to the Peers, and by Lord Castlereagh to the Commons. The tenor of both was the same. king felt persuaded that the House of Lords, and his faithful Commons, sympathized with the late loss which he and the nation had sustained. He reminded them that the melancholy event imposed upon him the necessity of summoning a new parliament within a limited period; intimated his opinion, that in the present state of public sentiment it was expedient to take this step without delay; and recommended to the Commons to adopt, and to the Lords to concur in, such measures as might be found necessary to provide for the public exigencies during the interval which must elapse between the dissolution of the old and the opening of a new parliament.

The reasons assigned by ministers for thus precipitating the assembling of a new parliament were in themselves quite satisfactory. The quantity of business before the legislative bodies was so great, that it could not possibly be completed within the prescribed period. The assizes would take place during its continuance, and render the absence of many members necessary; while the cares and bustle of an approaching election would distract the attention of all. Notwithstanding the weight of these arguments, the opposition discovered, or affected to discover, another reason for the resolution which had been taken of dissolving parliament immediately. The unpardonable assault upon the people at Manchester during the preceding year, and the subsequent policy of ministers, had deeply exasperated a large body of the lower orders; and the Having by the license they held out, attracted a sufficient

party, already numerous among the wealthier portion of George IV. the community, all the timid and wavering adherents of opposition. That party saw, therefore, in the attempt to precipitate a general election, the desire of ministry to obtain a parliament returned at a moment when the influence of fear had materially swelled their majority, and secured, by the prospect of a long career, against that popular influence which uniformly exercises greater control over the members in proportion as an appeal to their

constituents approaches.

In the desultory opposition, however, which was offered to the course recommended in the king's message, Mr Brougham was the only speaker who ventured to take this ground. The rest of his party, both in the Lords and the Commons, discussed the question as one of form and privilege. Lords Lansdown, Grosvenor, and Carnarvon, in the upper house, and Mr Tierney in the lower, while they admitted the dissolution of parliament to be regular and constitutional, objected to the recommendation to provide for it, as savouring of dictation, and infringing the liberty of the legislature. The ministerial party, however, strengthened as it had been by its accession of numbers, was too strong to be resisted. Bills were introduced, continuing the mutiny act and the marine mutiny act until the 24th of June. Certain sums of money were voted towards defraying the expenses of the army and the extraordinary civil charges. And in addition to these, two hundred thousand pounds were granted "towards satisfying such annuities, pensions, or other payments, as would have been payable out of the consolidated fund of Great Britain, or out of the civil list, in case the demise of his late majesty had not taken place before the 5th of April 1820." This grant is in no other way remarkable than as having afforded the first opportunity of introducing a discussion which was destined to engross almost the whole attention of parliament during that year. The opposition, understanding that in this sum of two hundred thousand the queen's allowance was included, made a stand to have an express provision made for her. The resolutions were, however, agreed to without any alteration in their form. When carried to the House of Lords, they experienced some further opposition from Lord Lauderdale, on the plea that the power which had been assumed by the House of Commons, of appropriating the supplies and authorizing the payment of pensions otherwise than by the constitutional method of passing the appropriation bill, was an infringement on their lordships' privileges. This diffi-culty was met by Lord Liverpool, who moved an amendment, "that this house, from the state of public business, acquiesce in the resolutions of the Commons, although no act may be passed to give them effect." These necessary arrangements having been completed, parliament was dissolved in the usual form on the 29th of February, and a new one summoned to meet on the 23d of April.

In the mean time government was beginning to learn by experience the effects of attempting to repress by arbitrary enactments the public expression of popular feeling, in the growth of those dark and sanguinary plots which are ever the consequence of violent attempts to Arthur Thistlewood, a man of respecstifle complaint. table connections, and originally of some property, but who, by his own profligate habits, had been reduced to a state of abject poverty, entered into a conspiracy, with a few others of like desperate fortunes, to overturn the government. Thistlewood's plan was to seize the opportunity of the late king's funeral, when it was expected that all the military would be engaged at Windsor, to make themselves masters of London, and plunder the shops.

Reign of force of the needy and discontented to rally round them, whether with or without the encouragement of ministers, Reign of George IV. he proposed to establish a provisional government, and send to the sea-ports, to prevent all gentlemen from leaving England without passports. The more sanguinary brutality of his uneducated companions in part overruled him. It was resolved to assassinate the ministers, when assembled at a cabinet dinner at Lord Harrowby's. While one party effected the massacre, others were to seize the two pieces of cannon in Gray's-inn Lane, and the six pieces in the artillery ground. Emissaries at Hyde Park were to intercept any messenger dispatched to Windsor. A body of conspirators were to cross the Thames and take the telegraph, to prevent any communication with Woolwich. The Mansion House was fixed upon as the seat of the provisional government. A few disbanded soldiers had been induced to join in the plot; a motley assortment of arms had been provided; and proclamations were written out in the name of the provisional government, for the purpose of being stuck up on the walls.

The conspirators were as deficient in caution as their plot was in any reasonable likelihood of success. They were surprised in the garret or hay-loft in Cato Street where their meetings were held, on the evening of the 23d of February, the same on which the massacre of the ministers was to have been perpetrated. After a desperate resistance, in which one police-officer was killed, and several severely wounded, the greater part of the band were apprehended. Thistlewood and some others were not secured till next day. A few of the more cowardly turned king's evidence, and the guilt of the conspirators originator of the plot, Brunt his lieutenant, Ings, who was to have been secretary to the provisional government, Tidd, and Davidson, a man of colour, were ordered for execution, and suffered the penalty annexed to treason

on the 29th of April.

The most diligent inquiries of government could not discover any ramifications of the plot. Every thing that has since transpired strengthens the belief that these desperadoes stood alone. Thistlewood had, a short time before his arrestment, made a tour through the manufacturing districts of England and Scotland. There can be no doubt that he had endeavoured to engage the radical party in some undertaking equally violent with that for which he suffered, but more extensive. About the close of 1819, or early in 1820, a messenger was dispatched to for no assistance from the country in his attempt. The opinion of his want of success in the attempt to stir up the working classes to co-operate with him, is further corroborated by the coarse manner in which he affirmed to one of his associates, that " no one who was worth ten pounds was worth any thing for the good of this country.

Still, although even the discontented portion of the community turned with disgust from projects of assassination, there was much in the disposition of the lower orders to afford grounds for apprehension to the ministers under whose auspices Castlereagh's acts had been introduced and passed into a law. Throughout the manufacturing districts the working classes were associated in unions. The writer of this sketch remembers in the autumn of the preceding year to have accidentally overheard a discussion held by a pretty numerous body of weavers in the neighbourhood of Glasgow. The prevailing sentiment seemed to be, that the interests of the rich were diametrically opposed to those of the poor; and the conviction was pretty generally expressed, that a time was near at hand when the relative positions of the parties would be inverted. In this state of affairs spies were liberally dispersed through the disaffected districts; and these men,

endeavoured to break the force of public discontent by George IV. encouraging partial explosions. In the course of the month of March, inconsiderable bodies of the people rose in arms in Lanarkshire and Yorkshire. These demonstrations, by alarming the holders of property, attached them more firmly to government. The punishment of the insurgents cast a damp over the spirits of the disaffected; and, to strengthen the impression, the most severe measure authorized by the late laws was likewise awarded to every man who expressed in strong language his disappro-

bation of the policy of ministers.

The events to which we have hitherto adverted served either to indicate the strength of the ministry or to increase it. The elections to the new parliament left them much in the same position in which they were at the dissolution of the old. But a discussion was impending over them, which threatened to task their powers to the utmost. The dispute between the Prince and Princess of Wales was a matter of very secondary importance compared with that between the king and queen of England. The hatred which George IV. entertained for his consort was invincible. He had relinquished his early principles and most intimate friends, rather than struggle with a party which he found firmly established in power; he had conformed to the system of policy they had adopted, without suggesting one modification; he was contented that the course of national exertions should be controlled and guided by other minds; but his passive disposition left him the moment the question was urged of conceding even the external was clearly established. Five of them, Thistlewood the resemblance of respect to the queen. Her name was omitted in the liturgy; the utmost anxiety was displayed to avoid, if possible, making any parliamentary provision for her as queen; the common civility of announcing to her the death of her father-in-law, who was moreover her blood relation, was not observed; and she was given to understand, that if she attempted to return to England, she would be instantly visited with a bill of pains and penalties. But her majesty stood upon her rights; and after several ineffectual negociations on the part of those friends of the royal disputants, who feared the consequences of a public agitation of the question at issue between them, she landed at Dover in the month of June. Her journey to London was a triumphant progress; and her reception there by the populace most enthusiastic.

On the 6th of June, the Earl of Liverpool in the Peers, Thistlewood from Leeds, to assure him that he need look and Lord Castlereagh in the Commons, presented a message from the king, recommending to the immediate attention of these bodies "certain papers respecting the conduct of her majesty since her departure from the country." The Lords, after slight discussion, referred the communication to a secret committee. The same course was adopted by the Commons, but after a more violent debate. Her majesty's friends had in that house touched upon the subject even before the dissolution of the old parliament. Lord Archibald Hamilton had complained of the unconstitutional dictation to the church of Scotland on the point of praying for the queen. The resolutions by which a temporary supply was voted to the king had not been allowed to pass without the question being asked, in what manner the interests of the queen were to be secured. Now the storm burst in its full strength on the heads of ministers. Not a few members declared, that without examining witnesses, they were convinced of her majesty's innocence by the line of conduct which the government had pursued.

The guilt or innocence of Queen Caroline is a question of very subordinate importance in an outline like the present. It deserves attention merely because of the influence it exerted upon the public mind, and its effects upon the subsequent course of events. Now that the excitement of

Reign of the contest has subsided, few, we believe, would assert her The usher summoned the house to attend the lords com- Reign of indulgence of a private pique, at the hazard of national tranquillity, was clearly discernible; whilst the ministers, who endeavoured to gratify the royal antipathy, sunk in the estimation of the country. And that this was the feeling of the wealthy, as it was of the poorer classes, is eviof their bill against the queen.

the 5th of July Lord Liverpool presented a bill of pains by counsel was presented the same evening, and refused. least allow her counsel to state at their bar the nature of her claims. This request was in so far complied with, that Messrs Brougham and Denman were heard relative to the mode and manner of the proceedings to be had upon the place. Their arguments were ineffectual. A list of witnesses was refused. The bill was ordered to be read a reading. The proceedings commenced on the 17th of August, and were continued, with scarcely any intermission, till the 4th of November. On that day the Lords committee, but finally retained by a majority of sixtyseven in a house of a hundred and ninety-one. When their Lordships came to divide upon the question of the third reading, it was still carried in the affirmative, a hundred and eight voting for, and ninety-nine against it. Lord Liverpool immediately announced, that, looking to the narrow majority and the temper of the country, he had come to the determination not to proceed further with the measure. He accordingly moved that the bill do pass that day six months.

During the trial repeated attempts had been made by the House of Commons to put a stop to the proceedings. Ministers, unable to parry the reiterated and vehement attacks directed against them, had recourse to repeated adthe House of Lords adjourned to the 23d of November, to which day the House of Commons at that time also stood and Mr Brougham having communicated to the speaker that a message would be sent down from the queen, suggested at the same time his taking the chair at one o'clock, in order that there might be an opportunity of receiving the about a hundred members, chiefly of the opposition party, were present, but the speaker did not appear. He was understood to be closeted with Lord Castlereagh. At length he entered the house, and exactly at two the reading of prayers concluded. Mr Denman immediately rose and announced that he held in his hand a message which the queen had commanded him to present to the house. Before he could proceed the deputy usher of the black rod entered. His appearance was the signal for uproar. "Mr Den-

George IV. innocence; but if ever suspicious conduct was susceptible missioners in the House of Peers. Amid the surrounding George IV of an apology, it was in her case. Viewed as a private in- clamour he was inaudible; nevertheless the speaker rose, dividual, the king had no right to complain of her behaviour. and, accompanied by Lord Castlereagh and the chancellor The allegation that the honour of the country was at stake, of the exchequer, followed, amid cries of "Shame!" both was a transparent disguise, through which his obstinate from the opposition and ministerial members. The speaker on his return declared the house adjourned to the 23d of January.

Respecting the rank injustice of the proceedings against the queen there cannot now be two opinions. She was attacked by an anomalous procedure, which was neither dent from the narrow majorities which an administration trial nor bill of divorce. The pains and penalties inflicted so strong on every other question commanded in behalf by the bill were such as could not have been extended to any other English subject. The law of England guarded A brief sketch of the proceedings in the House of Lords every other woman in the kingdom against such a meawill suffice to show the character of the prosecution. On sure. Again, by adopting the mode of procedure by bill, her prosecutors escaped the necessity of furnishing her with a and penalties against the queen. Her petition to be heard list of witnesses, and thus crippled her defence. Lastly, by allowing the measure to drop after the third reading On the 6th her majesty again petitioned the house, re- had been carried, the ministers clearly established that the questing, that if their Lordships were resolved to refuse personal degradation of the queen was all they sought for, her a hearing at that stage, and likewise to refuse a list and that the vindication of the national honour was a mere of the witnesses to be adduced against her, they would at pretext. In what other instance was that iron administration known to pause out of respect to public opinion? The effect of the proceedings upon the power of the ministry was twofold. It distracted the attention of the country for a time, and men ceased to brood so incessantly over bill, and the time when these proceedings should take their distress; but, on the other hand, it swelled the ranks of opposition, and embittered its tone of feeling.

Amid these stormy discussions, in which the remotest second time, and evidence to be led during its second districts keenly participated, the more vital interests of the country were comparatively neglected. Still the universal stagnation of business, and the consequent suffering of all classes, did not admit of their being entirely neglectresolved that the bill should be read a second time, by a ed. A petition from the merchants of London, presented majority of twenty-eight, in a house of two hundred and by Mr Baring, elicited an animated and instructive diseighteen. The divorce clause was warmly attacked in the cussion of the causes and remedies of mercantile distress, but without leading to any result. The subject was resumed on the 11th, when a petition was presented from Birmingham, but with as little effect. On the 16th Lord Stanhope called the attention of the Lords to the distress of the working classes, and moved for a committee " to inquire into the best means of giving employment to the poor, especially in the manufacturing districts." Lord Liverpool exposed in the most lucid manner the visionary nature of the schemes suggested by Lord Stanhope, and the motion was negatived without a division. The Marquis of Lansdown's motion on the 26th, for a committee to inquire into the means of extending the foreign commerce of the country, which was agreed to, drew from Lord Liverpool an exposition of his views of commercial journments. No sooner had the bill been thrown out than policy. He insisted upon the necessity of adopting a comprehensive system, and adhering to it; remarked that the fewer laws there were, the better; disapproved of the views adjourned. There was a call of the house for that day, adopted by those who represented the interests of the farmer and the manufacturer as adverse; and, after propounding many excellent principles, and protesting against their practical application, came to the conclusion that there was no harm in inquiry, but great danger in action. On message before the meeting of the Lords. At one o'clock the motion of Mr Baring, a similar committee was appointed by the Commons on the 5th of June. The first report of Lord Lansdown's committee was presented on the 3d of July. It was confined to an inquiry into the state of the timber trade, and an investigation of the means of its improvement. A motion made by Lord Milton the same evening in the House of Commons, for repealing the duty on the importation of foreign wool, was negatived without a division.

The distress was not confined to the manufacturers; for man!" "Withdraw!" were vociferated from fifty throats. the table of the House of Commons groaned beneath a

George IV. on the 30th of May, that they be referred to a select comthe country gentlemen were at stake, and, notwithstanding the earnest opposition of ministers, a majority of twenty-nine determined in favour of a committee. Mr Baring moved an adjournment of the house, in order that the committee might be appointed at a time when there was a full attendance. Mr Robinson (president of the board of trade) proposed next evening, with a view to neutralize the effect of Mr Sumner's motion, that the labours of the committee should be restricted to devising means for the prevention of frauds in striking the averages under the corn laws of 1815. This motion was carried by a majority of a hundred and twenty-three. When Mr H. Sumner presented the report of the committee on the 8th of July, he complained of the narrow limits within which the inquiries of the committee had been restricted, and expressed his conviction, that unless much more was done for the agricultural interest, the difficulties under which it laboured must ultimately prove overwhelming. Mr Western added, that the committee had recommended a new mode of taking the averages, but that it was one which would rather facilitate than retard the opening of the ports.

> The only other important discussions in parliament during this agitated year regarded parliamentary and financial reform, and the education of the poor. To the firstmentioned head belongs the fate of a bill passed by the Commons for suspending the issue of writs to four boroughs convicted of corrupt practices, and which was allowed to fall to the ground in the Lords, not having reached a second reading at the time when parliament was dissolved. Lord John Russell's bill for the disfranchisement of Grampound was read the first and second time on the 9th and 17th of May. Lord Castlereagh and Mr Canning attacked with much inveteracy the clause which proposed to transfer the franchise to the town of Leeds, on the ground that this would be "to admit all that had been urged on the question of parliamentary reform." On the 25th of May Lord Archibald Hamilton called the attention of the house to the absurd and unjust system by which, in Scotland, the right of voting had been detached from the possession of the soil. He intimated an intention of submitting a measure to restore the franchise to the real landowners, continuing their votes to all such as now possessed them. Under the head of finance we may class the attack made by Mr Brougham on the droits of admiralty. In an eloquent speech he demonstrated that the property claimed in that fund by the crown was unwarranted by the constitution; dangerous to the liberties of the subject, since parliament had no control over it; an inducement to the piratical commencement of hostilities, without a declaration of war; and burdensome in the highest degree. Mr Canning spoke at great length, but adduced only one argument. "The system of the civil list was more adapted to a monarchical constitution than that of the American government could be; and he would not be induced by any pecuniary temptation to the sovereign, to strip off trappings which were neither costly to the people nor dangerous to the constitution." Sir James Mackintosh and other eminent members of the opposition argued on Mr Brougham's side of the question at great length; but the only other speaker of the ministerial party was the chancellor of the exchequer, who contented himself with pointing out some discrepancies of opinion among his antagonists. Mr Brougham's motion was lost by a majority of a hundred and eighteen.

We have now arrived at the last topic which we indicated as having in the course of the year 1820 occupied the attention of the House of Commons. On the 28th

Reign of load of agricultural petitions. Mr Holme Sumner moved, of June Mr Brougham moved for leave to bring in a bill Reign of for the better education of the poor in England and Wales. George IV mittee to examine and report on them. The interests of He stated that there were, in the endowed and unendowed schools of England, means of educating six hundred and fifty-five thousand children; and that taking the whole children of the kingdom as one ninth or one tenth of the population, this provision would suffice for no more than one fourteenth or one fifteenth of their number. But from this six hundred and fifty-five thousand were to be deducted thirty-three thousand who were at dames' schools, where they learnt next to nothing; a deduction which would reduce the number educated to one sixteenth. Previous to the establishment of schools under the Bell and Lancaster system, it was only one twentieth. There were three thousand five hundred parishes in England without schools. The proportion educated varied in the different counties from one forty-sixth to one eighth. It was found that crime kept pace with the want of education. Mr Brougham's bill embraced four objects;—the foundation of schools; the appointment and removal of masters; the admission of scholars; and the improvement of the old education endowments. According to the ratio of schools in the county of Devon, the total outfit would be eight hundred and fifty thousand pounds; according to that of Cumberland, only four hundred thousand pounds. The annual expense might average a hundred thousand pounds. The motion having been agreed to, Mr Brougham brought in his bill on the 8th of July.

1821.

During the closing months of the year the queen continued the great object of attention, and the press laboured incessantly to keep up the excitement. The Whigs and reformers, encouraged by the popular feeling which was thus excited against ministers, again put themselves in motion. Meetings were held in different parts of the country, at which strong resolutions were adopted respecting the necessity of a reform in parliament. In this temper of the country the legislative session of 1821 commenced on the 23d of January.

The opening speech from the throne was eminently vague and unsatisfactory. The only allusion to the revolutions in Spain, Portugal, and Naples, consisted of an assurance that the country continued at peace with foreign powers, and an expressed determination, should the events in Italy lead to hostilities, to preserve this country from participation in them. The truth was, that Lord Castlereagh had committed himself with the allied sovereigns more than the spirit of the country could tolerate; and the only course left open for ministers was, to profess a strict neutrality, even between opposing principles. About the opening of the session a circular dispatch to his majesty's ministers at different courts, disavowing, on the part of Great Britain, any participation in the plans of the allies, dated the 19th of January 1821, was communicated to both houses. This document was by no means satisfactory to the opposition. Lord Grey moved, on the 19th of February, for the production of all the communications between the British government and that of Naples relative to the late occurrences in that kingdom. The noble earl maintained that " England, by assuming the tone of neutrality at the moment she did, gave her tacit approbation to the conduct of Austria." The ministers asserted the right of an independent nation to regulate its own government, but admitted the case of Naples to be an exception. The Earl of Liverpool affirmed, that the document already submitted to the house afforded sufficient evidence of the good faith of government towards Naples; and the motion was ultimately negatived without a division. Lord Grey's motion was followed up by one on the part of Lord Lansdown on the 2d of March. His lordship proposed to thank the king for laying before the house copies of the dispatch to

Reign of his majesty's ministers at foreign courts; to express the sa-George IV. tisfaction felt by the house at his majesty's refusing to participate in the designs of the allied sovereigns; and to intimate its earnest hope that his majesty would exert his influence with the allied powers to prevent or repair the consequences of measures which might eventually disturb the tranquillity of Europe, and which threatened the independence of sovereigns and the security of nations. Lord Liverpool condemned the principles of the allies; but maintained that England had no right to prescribe a rule of conduct to Austria, and that it was unwise to remonstrate when we were not prepared to enforce our suggestions by arms. The result of the debate was a majority of forty-seven in favour of ministers. A like series of hostile attacks were made almost simultaneously upon ministers in the House of Commons. The motion of Sir James Mackintosh for the papers called for by Lord Grey was made and negatived on the 21st of February. The only novelty in the ministerial defence was Lord Castlereagh's assertion, that the declaration emitted by the allied sovereigns assembled at Troppau did not contain their final determination. The event has not borne his lordship out in this assertion. The motion was negatived by a considerable majority. The pretext laid hold of for resuming the discussion in the Commons differed from that of Lord Lansdown. Sir Robert Wilson moved, on the 20th of March, for the production of a letter from the English ambassador Sir William A'Court to the Neapolitan minister for foreign affairs, in which it was declared that England intended to remain neutral, unless interference "should be rendered indispensable by any personal insults or danger to which the royal family may be exposed." Sir Robert maintained that the right claimed to interfere if the royal family of Naples were exposed to personal insult or danger, was incompatible with the rights of independent nations. Ministers contended that the interpretation of Sir William A'Court's letter was strained and unjust. The motion was subsequently withdrawn. Here the matter rested till after the breaking up of the congress of Laybach. The final declaration of its members, that "useful or necessary changes in legislation, and in the administration of states, ought only to emanate from the free will, the intelligent and well-weighed conviction of those whom God hath rendered responsible for power,"—and that they regarded " as legally null, and as disavowed by the principles which constitute the public right of Europe, all pretended reforms operated by revolt and open hostility,"was regarded by the whole English nation as directly condemnatory of its constitution, and subversive of the independence of all nations. Mr Hutchinson attacked ministers on the 20th of June for their tame acquiescence in the monstrous doctrines promulgated by the despots of the Continent, and proposed an address to the throne, calling upon the king to assume an attitude of more determined opposition to the introduction of new principles into the laws of nations, which, if acted upon," would not only prevent the establishment of all rational liberty, but tend to render perpetual despotisms of the worst kind." The motion was negatived by a large majority, on the ground that the circular of the 19th of January sufficiently expressed the views entertained on these points by the English nation. A yet stronger indication of the feeling of of the Roman Catholics, ought to be repealed; that the the country on this point was given to ministers next day, word "spiritual," which occurred in the oaths of supre-when one of their most influential and strenuous support- macy, should be declared to import merely "that the ers, Mr Stuart Wortley, in moving for copies of the declaration issued by the courts of Russia, Prussia, and Austria, and of the circular dispatch published at Laybach on the 12th of May 1821, called upon the house to express strong- the stubborn and evil doer;" that the act of repeal and ly and markedly its disapprobation of the principles ad- explanation should be accompanied with such exceptions

Castlereagh had by this time succeeded, on the death of Reign of his father, to the paternal title) opposed to this motion George IV his never-failing answer, that it was unnecessary. "The declaration of the 19th of January had announced to the world our dissent from the principles acted upon at Troppau and Laybach, and no good could result from engag-ing in a war of state papers." Mr Wortley's motion was accordingly negatived. The only other discussions respecting the foreign policy of Britain which occurred during the year 1821 were, an address from both houses of parliament to the throne on the state of the slave-trade, agreed to without the sanction of ministers, but likewise without any active opposition on their part; and Mr Hume's motion for inquiry into the conduct of Sir Thomas Maitland, the lord high commissioner of the Ionian Islands, which was negatived.

The speech glanced at the internal affairs of the nation in a manner quite as unsatisfactory as that in which it treated foreign relations. Several branches of manufactures and commerce were said to have improved, and the amount of revenue to have increased, avowedly from new taxes. The speech concluded with an expression of confidence in the popular attachment to the king's person and government, and an exhortation to preserve respect for established institutions. The opposition, still much inferior in numbers to the ministerial adherents, but strong in its reliance upon the popular feeling, and encouraged by the wavering allegiance of the country gentlemen, whose sufferings had led them to doubt the infallibility of the party to which they had hitherto adhered, made no hostile demonstrations upon the moving of the address, which, as usual, was a mere echo of the speech. It scarcely allowed, however, a day to elapse before it commenced a series of attacks upon the whole system of ministerial policy. The session of 1821 was one of unintermitting hostilities directed against ministers in every department, the administration preserving in almost every instance the attitude of defence.

The first question started by the members of opposition was one of constitutional reform. With considerable tact they selected one, upon the merits of which the ministerial phalanx, nay the cabinet itself, was known to be divided in opinion, namely, that of Catholic emancipation. By this arrangement they secured a prospect of disturbing, in some measure, the harmony of their adversaries, and at the same time exposed themselves to less unanimous hostility in the opening of their campaign. Mr Plunkett moved, on the 28th of February, that the state of the laws affecting Roman Catholics be taken into consideration by a committee of the whole house. Mr Peel stood forward as the champion of the party opposed to concession, and the members of that party mustered in strength; but the motion was carried by a majority of six. On the 2d of March the house accordingly resolved itself into a committee for the purpose of taking into consideration the Catholic claims. Mr Plunkett was prepared to prosecute his advantage, and submitted six resolutions for the adoption of the house. Their purport was, that such parts of the oaths required to be taken by persons qualifying for the enjoyment of offices, franchises, and civil rights, as merely disclaimed a belief in the speculative religious opinions kings of this realm should govern all estates and degrees committed to their charge by God, whether they be ecclesiastical or temporal, and restrain, with the civil sword, vanced in these documents. Lord Londonderry (Lord and regulations as might be found necessary for preserv-

Reign of ing the Protestant succession to the crown, and maintain-George IV. ing inviolate the Protestant episcopal church of Ireland and the church of Scotland. The resolutions were agreed to pro forma, and leave given to bring in a bill founded on them. Mr Peel declared his determination to oppose the measure in all its stages. Mr Plunkett digested his scheme into two bills, the one containing the civil, the other the spiritual arrangements, which it was proposed to pass into a law. They were read a first time, without discussion, on the 7th of March. An attempt was made on the part of the opponents to concession, aided by some discontented members of the Catholic church, to represent the measure as odious to the class of the community whose enfranchisement it contemplated, but without success. Various amendments, calculated to defeat the object in view, were proposed by Messrs Bankes, Peel, and Goulburn, but successfully combated. Sir John Newport, when moving the commitment of the bills on the 26th of March, gave notice of his intention to move their consolidation; and on the 28th his motion was submitted and agreed to. The consolidated bill, notwithstanding the strenuous opposition which it encountered from the high church party within the house, and latterly from the Catholic clergy without, passed the Commons on the 2d of April by a majority of nineteen. It was accordingly carried to the House of Lords and read a first time without any debate, but ultimately thrown out on the 16th of April, upon the motion that it be read a second time, by a majority of thirty-nine.

The support given by the house to this effort for the relief of the Catholics, and the loud cry of the country for parliamentary reform, encouraged opposition to moot that question, upon which every rational hope of amelioration in church and state depended. Mr Lambton was first in the field. He submitted a plan of reform to the consideration of the House, the very evening that the Catholic relief bill was rejected by the Lords. The principal features of the measure which he contemplated were, the limitation of the duration of parliament to three years; the extension of the elective franchise to all persons possessing property, however small in value, which contributed to taxation; and the abolition of rotten boroughs. The attendance was thin and the debate languid, although adjourned on the first evening. It was resumed on the 17th, but abruptly terminated by a manœuvre of the ministerial party. Mr Lambton and his friends were rather late of appearing, and their antagonists taking advantage of their absence, instead of prosecuting the discussion, called for the vote, and thus defeated the wish of the reformers to go into committee. Such a stratagem was more worthy of a knot of mischievous school-boys than of men deliberating upon the interests of the empire; yet the skilful employment of the result by the ministerial press succeeded for a considerable time in alienating the public confidence from MrLambton, and neutralising his utility in parliament. The opposition were disappointed by this result, but not defeated. Lord John Russell re-introduced the subject on the 9th of May, in a more indefinite shape; several members having declared, on the occasion of Mr Lambton's motion, that they were ready to entertain the general question of reform, although they objected to the specific measure proposed. Lord John proposed for the adoption of the house four resolutions, declaratory of the corrupt state of the elective system; the necessity of extending the elective franchise to wealthy and populous places hitherto unrepresented; the propriety of appointing a select committee to consider the best measure of effecting this innovation; and the expediency of referring to the same committee the consideration of the best mode of proceeding against such boroughs as should in future be convicted of bribery

and corruption. The first resolution was lost by a majori- Reign of ty of thirty-one, in a house consisting of two hundred and George IV seventy-nine members: the others were negatived without a division. The last attempt made during the session for the attainment of a general reform, was Mr H. G. Bennet's motion for leave to bring in a bill for the better securing of the independence of parliament. His plan was to continue to the great officers of government their seats in the house, but to exclude clerks and underlings. Of fifty-one persons holding seats in the house at the pleasure of government he proposed to exclude twenty-nine. This motion was negatived like the rest. On the 10th of May, Lord Archibald Hamilton made an attempt to induce the house to pledge itself that it would next session take into consideration the state of representation in the counties of Scotland, but without success. The only instance in which the cause of reform was at all successful during the lapse of this session, was the passing of the bill for the disfranchisement of Grampound. Even this slender victory was incomplete in itself. The bill, as agreed to by the Commons, transferred the franchise which Grampound was declared to have forfeited to Leeds, vesting the electoral qualification in all the inhabitants renting houses at L.20 yearly. Lord Liverpool moved in the House of Lords, that, instead of giving two representatives to Leeds, the whole county of York should in future be allowed the privilege of returning four. The amendment was agreed to; and the House of Commons decided that the measure, even in its mutilated state, was not to be rejected.

While these two great constitutional questions were thus keenly contested, Mr Hume kept up a continual fire upon the ministerial system of finance. He opened his battery with the first introduction of the estimates. When the army estimates were introduced, he directed the attention of the house to the enormous augmentation of the numbers of the army on the peace establishment which had taken place since 1792, and the corresponding increase of expenditure; and proposed that the resolution recommended by the finance committee of 1817 of approximating the military establishment as near as possible to that of 1792, should be adopted. The motion was negatived. Nothing daunted by defeat, Mr Hume returned to the attack on the production of the navy estimates. His motion was similar to that which he had brought forward in regard to the army; and, resting upon the same principles, it was not pressed to a division. A motion by the same gentleman, on the production of the ordnance estimates, in which he urged, in addition to a statement similar to those made on the former occasions, a transgression by this department of the orders of the house, was equally unfortunate. In his resolutions respecting a possible saving in the collection of the land and assessed taxes, he was more successful. The ministers did not dare to meet him, as they had the year before, with a direct negative; but suggested a reference to a committee, in which Mr Hume acquiesced. The chancellor of the exchequer brought forward the budget on the 1st of June. The amount of supply he estimated at L.20,018,200; of ways and means at L.20,031,569. He sought to make it appear that a reduction of ten millions had been effected on the national expenditure since 1820. Mr Hume was again at his post, and recapitulated, with new illustrations and calculations, the arguments he had already adduced in opposition to each particular estimate. He concluded by moving an address to the king, requesting that his majesty would be pleased to direct a minute investigation into the expense of the management and collection of the revenue; a careful revision and adjustment of all salaries and allowances; and the exercise of a vigilant superintendence over the expenditure of the country,

Reign of especially in everything connected with the military esta- isting system. Their general object was clearly to calcu- Reign of George IV. blishment. The ministry, in order to avoid the disagreeable necessity of adopting a suggestion from Mr Hume, moved an amendment, differing from the original motion in nothing but its more courtly tone, and its vagueness of expression. A resolution similar to Mr Hume's was submitted to the Peers by Lord Darnley on the 2d of July, and evaded in the same manner. During the time that this extended plan of financial reform continued to be pressed upon a reluctant ministry, the country gentlemen were busy striving to shift as large a proportion of the national burdens off their own shoulders as possible. Mr Western attempted to introduce a bill for repealing the additional duties imposed on malt in 1819; and Mr Curwen succeeded in obtaining a repeal of the tax imposed on horses employed in agriculture.

All attempts to shake the attachment of the majorities in both houses to the ministry, or give such a voice to the nation as might deprive its supporters of their seats, having failed, the ameliorations in our legal institutions so warmly desired by all friends of humanity and justice made but slow Their bigoted adversaries still maintained an ascendency in the cabinet. Sir James Mackintosh brought forward three bills;—for abrogating capital punishment in certain cases of forgery, and in cases of stealing in dwelling-houses, and on navigable rivers. The first, after having been thrice read in the Commons, was thrown out, in consequence of a manœuvre of Lord Londonderry on the question that it do pass. The second and third were carried through the lower house, but thrown out in the Lords. Another attempt to humanize the criminal code was made by Mr Martin of Galway, who introduced a bill for allowing the benefit of counsel to persons accused of felony; but on the second reading it was negatived without a division. Mr Kennedy directed the attention of the house to the faulty mode of constituting juries in Scotland; but the hostility of government and the Scottish law officers to any improvement was so marked, that he forbore to press his measure for remedying the defect. Sir John Newport submitted a series of resolutions to the House of Commons, complaining of the dilatory proceedings of the commission appointed in 1815 to inquire into the state of the English courts of justice. The resolutions were negatived, the ministers taking upon themselves the defence of their nominees. Although the party in power thus strenuously opposed in parliament every modification of the laws, their adherents out of doors hesitated not to appoint officers not recognised by the constitution, to watch ever the strenuous enforcement of the law of libel. An association was formed in London on the 12th of December 1820 for the purpose of suppressing seditious publications; and bills of indictment were preferred by the law agent of this body against several booksellers. Mr Brougham took an opportunity of directing the attention of the house to its proceedings; insisting strongly on the dangerous character of men associated to prosecute individuals selected at the discretion of political prejudice. He contended, likewise, that such a union had a tendency to destroy the impartiality of juries. The subject was again brought before the house by Mr S. Whitbread. No conclusion was come to; but the society, after being thus held up to public reprobation, languished and died.

The attention of the house was this year again directed to the continued distress both of the agricultural and manufacturing population. The committee appointed in 1820 to investigate the mode of striking the corn averages, reported immediately upon the sitting of parliament. In consequence of the recommendation contained in the rewhich considerable changes were effected in the then ex- matters were still worse. The distress there was even more

late the averages so as to diminish them in apparent George IV. amount; in other words, to raise the importation price. Not contented with this arrangement, the country gentlemen made another and successful attempt on the 7th of March, to obtain the appointment of a committee to take into consideration the petitions relative to the distress of the agricultural interest. The committee reported, on the 18th of June, that the agricultural suffering was mainly owing to the change in the currency; that it would decrease as contracts, and prices, and wages of labour, assimilated themselves to the new value of money; and that considerable progress had already been made towards this desirable consummation. All interference on the part of the legislature was deprecated. Mr Curwen suggested the imposition of a duty on the transfer of stock, and Mr Baring adverted to the expediency of allowing the bank to pay either in gold or silver; but neither of these gentlemen pressed the adoption of any measure. With a view to alleviate the depressed state of commerce and manufactures, committees were appointed by both houses to inquire into the regulations affecting our foreign trade, and how far benefit might accrue from modifying them. Lords' committee reported on the 11th of April, confining its attention to the advantages likely to be derived from an extension of the Asiatic trade. All the suggestions of the report were consequently in a great measure at the mercy of the East India Company. The report submitted to the Commons by their committee related to the intercourse with the Baltic, and was followed up by a resolution declaring the expediency of diminishing the preferences given to the colonial timber trade over that from the north of Europe, allowing that of Russia and Prussia superior advantages over the timber of Norway. This paltry advance in liberality was with difficulty carried into a law. A more important step, suggested by the committee, was the leave granted by the house to introduce bills for the amendment of the navigation laws; a measure which was allowed to stand over till next session.

While these important debates were agitating the legislature and the country, the monarch was engrossed with the gorgeous pageantry of his coronation, and pleasure excursions to Ireland and to Hanover. All three entailed a great expense upon the country, and not one of them was rendered conducive to any useful purpose. Devolving upon other shoulders the cares of state, George IV. would have led a life of unalloyed ease, but for that thorn in his side, the queen. Her safety once assured, and an allowance settled upon her by parliament, she naturally ceased to have any interest for the public, which had been led to espouse her cause from a conviction of the injustice with which she had been treated, not from any personal attachment, which her character was but ill qualified to inspire. She made one last desperate effort to regain her notoriety, which was rapidly subsiding at the time of the coronation; but failing in her attempt, she was seized with such chagrin that she soon afterwards died. Her death in some measure re-awakened the national sympathy; and an attempt on the part of the ministers to interfere with an expression of respect to her remains increased the unpopularity of the sovereign.

The aspect of affairs at the commencement of 1822 was stormy in the extreme. The distresses of the agriculturists continued unmitigated; and meetings of farmers and landholders, clamorous for assistance, were held in every county. One called for corn laws, another for the abolition of tithes, and another for a reduction of the national debt. Each thought his own remedy sufficient, and port, a bill was introduced on the 26th of February, by refused to listen to the suggestions of others. In Ireland

1822.

George IV.

Reign of overwhelming than in England, owing to a redundant population, and the absence of any variety of employments. The pressure of tithes, ever odious to the Irish peasant, as a tax levied for the support of a heretical church, and of an unjustly apportioned local taxation, bore down the population, and embittered their spirit. Men's minds were, moreover, even in times of prosperity, alienated by bitter theological feuds. The increasing strictness of the precautions taken by government against smuggling had driven many lawless men into the mountainous district in the northern baronies of the county of Cork, and in Kerry; and there, accordingly, the most extensive and seemingly organised devastations were perpetrated. The flame, it is true, broke out at intervals over the whole of Ireland, but in that district was its head-quarters.

Under these inauspicious circumstances parliament assembled on the 5th of February. In the House of Commons, the ministerial party, which had never quite recovered the secession of Mr Canning from office at the time of the queen's trial, was strengthened by the appointment of Mr Peel to be home secretary. In both houses its Grenville party, some of whom accepted of office.

The theme most emphatically dwelt upon in the speech from the throne, and first submitted to the attention of parliament by ministers, was the state of Ireland. Lord Castlereagh and his coadjutors had only one remedy for the disturbances of that country—coercion. Two bills were immediately introduced into the Commons, and with the most indecent haste hurried both through that house and the Peers, receiving the royal assent on the 11th of February. The first contained a re-enactment of the insurrection act, empowering any two justices to cause an extraordinary session of the peace to be held, and the justices, when assembled in such session, to the number of seven in a county and three in a city, to signify to the lord-lieutenant their opinion that the county was in a state of disturbance, assigning at the same time their reasons, and praying him to proclaim it. The proclamation which the lord-lieutenant was empowered to issue warned the inhabitants of the disturbed district after a certain day to remain within their houses between sunset and sunrise. After that day any justice of peace, or any person authorized by his warrant, might enter into any house in the proclaimed district between one hour after sunset and sunrise, and give orders for the apprehension of such of hours, all persons having in their possession offensive arms, all persons not travellers or inmates found assembled after nine at night and before six in the morning, in any house where malt and spirituous liquors were sold, and a mulcourt of special sessions, to be held within seven days from the date of the proclamation, and prolonged by adjournments as long as the district continued proclaimed. Dispersing seditious papers was declared punishable by twelve months' imprisonment, and all other offences specified in the act, by transportation for seven years. This strong measure was enforced by the second bill, which suspended the habeas corpus act. The operation of both acts was limited to the first of August following opposition arrayed against these enactments was vehement, but not numerous. The more timid Whigs palliated their acquiescence by their confidence in the character of Lord Wellesley, who was then lord-ligutenant. Two other measures were shortly after introduced, and carried through parliament by the 11th of March. The first was an act to indemnify all persons who, since the first of November preceding, had, with a view to the preservation of omission of some of the most obnoxious details.

peace, but without legal authority, seized arms or gun- Reign of powder; the second imposed severe restrictions on the George IV. importation of arms and ammunition into Ireland, on the manufacturing of these articles in the country; and also on the removal of them from one place to another. The bills passed through both houses without observation.

The additional powers conferred by these acts were vigorously exercised by the Irish government. Every district in which an act of violence occurred was immediately proclaimed. The whole country was patrolled by large bodies of military and police. Special sessions were held for the purpose of putting the laws into immediate execution. At Cork alone there was a calendar of three hundred and sixty-six offenders, of whom thirty-five received sentence of death. The regular assizes soon followed, at which similar scenes were repeated. The most worthless testimony was lightly credited by terrified jurors. But all this vigilance, although it succeeded in rendering resistance to the constituted authorities less daring and systematic, failed to give peace to Ireland. The country continued in a state of feverish insecurity, and violence extended numbers had been increased by an amalgamation with the its sphere of action. As the spring advanced, however, and the nights shortened, outrages diminished in number; and a famine which ensued, accompanied in many places by a virulent typhus fever, the result of bad and insufficient diet, effectually tamed the spirit of insubordination. The humanity of England was awakened, and great exertions were made to relieve the sufferers, but not until their misery had almost exceeded what human nature, if untried, could be conceived capable of enduring.

On the 8th of July a bill was introduced by Mr Goulburn, prolonging the duration of the insurrection act, and the suspension of the habeas corpus, till the 1st of August 1823. A feeble opposition was offered to it. Only seventeen voted against the principle of the measure in the Commons, whilst in the House of Lords it was suffered to pass almost without remark. A more permanent measure of coercion was introduced at the same time. By the constabulary act, the lord-lieutenant was empowered to appoint, by warrant under his own hand, a chief constable for every barony, or division of a barony; and to require by his proclamation the county magistrates to appoint constables and sub-constables at the rate of sixteen to a barony. If the magistrates did not obey the proclamation within fourteen days, the lord-lieutenant was to appoint the constables himself. The chief constable was to have the inhabitants as were found absent. These, along with a house provided for him, and a salary not exceeding all persons found out of their abodes between the same L.100 per annum; the salaries of the others were not to exceed L.35 a year. The lord-lieutenant was likewise authorized to nominate superintendents or inspectors of the chief constables and constables, with salaries of L.500 a year. By a clause of this act, his lordship was authotitude of others, were to be tried without a jury, by a rized, upon application from seven or more justices, to appoint a resident magistrate for any district, possessing all the powers of a justice of the peace, bound not to leave his district except in the prosecution of his official duty, and obliged to make monthly returns of the state of the country within his jurisdiction. This official was to enjoy an annual salary not exceeding L.500, and a house and furniture not exceeding L.200. A keen opposition was offered to this enactment. It was alleged that it entailed an enormous expense on the country; that it was unconstitutional, and would prove ineffective. These arguments received additional weight from the quarter whence they came. Mr Charles Grant, a strenuous partizan of ministers, and who had governed Ireland for three years with great prudence and popularity, was the person who urged them with most energy. The utmost concession, however, that could be wrung from ministers was the 1823.

and the clamour of Orange partizanship effectually drowngun, and almost completed during Mr Grant's secretaryship. The task was one of infinite labour, and its completion required both time and caution. The new list was completed by the end of 1820, and the commissions issued. The change proved great. In seven counties alone no fewer than two hundred noblemen and gentlemen had these parties was directed against Lord Wellesley. On jected by the Lords. the 4th of November his lordship yet further offended the zealots of the Protestant ascendency, by his prevention of the annual insult offered to their Catholic countrymen. The press teemed with libels against his person on the 14th of December, he was received with every expression of dislike, and some manifestations of violence.

and their remedies, which engrossed the legislature, the important question of a general reform of the representative system continued to be forced upon its attention. Petiin the Commons, " that the present state of the represenand, referring to his approaching departure for India, con-That the noble lord will carry his motion this evening, I have no fear; but with the talents he has shown himpresume not to expect that he will give any weight to obthe question of parliamentary reform, while I conjure the himself to pause before he again presses it upon the country. If, however, he shall persevere, and if his perseverance shall be successful, and if the results of that success shall be such as I cannot help apprehending, his be the triumph to have precipitated these results, be mine the consolation, that to the utmost and latest of my power I have opposed them." Mr Canning seems to have had a prophetic consciousness of the approaching dissolution of ness justified by the division. Only a hundred and sixtyfour voted for Lord John's motion, and two hundred and sixty-nine against it; but the ranks of the minority were swelled by the heirs of the noblest families in Britain, whose talents and energy promised an immense accession of force on every future occasion. This attack was followed up on the 24th of June by another, in the form of a resolution, proposed by Mr Brougham, "that the inof its due prerogatives, destructive of the independence of reform. A languid debate ensued, which terminated in a tractors a fixed annuity for forty-five years; in return for

Notwithstanding all these rigorous enactments, the in- negative being put upon the motion by a large majority. George IV. surrectionary spirit began to show itself again as the win- The party attached to parliamentary reform in Scotland George IV. ter came on. It was, however, kept within narrow limits, received this year an accession in consequence of the contemptuous indifference with which Lord Archibald Hamiled its noise. A revision of the magistracy had been be- ton's measure for removing the abuses which had crept into the administration of royal burghs was refused a hearing.

The only attempt made this year in favour of the Catholics was Mr Canning's bill for the admission of Catholic peers to the right of sitting and voting in the House of Lords. The idea of this measure had originated with Mr Canning, and was not unsuited to the character of his writs of supersedeas directed to them. The whole fury of mind. The bill passed the Commons, but was of course re-

The most serious opposition against which ministers were this year called to contend, was in the matter of finance. Mr Hume renewed his detailed attacks upon every item of the estimates and budget, and, although he and government; and when he appeared in the theatre failed in effecting any immediate change, kept alive the public attention, and rendered government more cautious and attentive. In other efforts Mr Hume and his coad-Amid the anxious discussions on these local disturbances jutors were yet more successful. Ministers announced, as the whole amount of their projected alleviation of national burdens, the repeal of the malt tax, which produced nearly a million and a half per annum. With a view to tions on that subject were presented from most of the force them to do what they refused to undertake sponlarge towns and important counties of the empire. On taneously, Mr Calcraft on the 28th of February brought the 29th of April, accordingly, Lord John Russell moved forward a motion for the progressive repeal of the salt tax, by taking off one third of the duty in each of the tation of the people in parliament required the most se-rious consideration of the house." His lordship did not jority of only four in favour of ministers. Next day they propose any specific plan, but indicated one or two which received a still more effectual lesson. In a discussion of might be worthy the attention of the house. Mr Can-the expenses of the admiralty office, Sir M. W. Ridley ning took upon himself the burden of opposing the motion, moved a reduction of two thousand pounds in the vote, the amount of the salaries enjoyed by the two junior lords cluded in these words a tissue of splendid declamation. of the admiralty. These two useless offices were consequently abolished by the votes both of Lords and Commons, although ministers continued to defend them veheself to possess, and with, I sincerely lope, a long and mently to the last. A similar defeat was sustained by brilliant career of parliamentary distinction before him, government on the 2d of May, when, in despite of every he will no doubt renew his efforts hereafter. Although I exertion, an address to the king was carried, praying him to abolish the office of one of the postmasters-general. servations or warnings of mine, yet on this, probably the In its other attempts to enforce retrenchment the opposilast opportunity which I shall have of raising my voice on tion was unsuccessful; yet so well had its partial success worked upon the apprehension of ministers, that the house to pause before it consents to adopt the proposition amount of taxes repealed during the course of the session, of the noble lord, I cannot help conjuring the noble lord notwithstanding their original declaration, may be estimated thus:-

Annual malt duty	£1,500,000
Salt tax	
Leather tax	300,000
Tonnage duty	150,000
Irish window and hearth taxes	250,000

£3,500,000

that system to which he had yoked himself; a conscious- But the severest wound received by the financial reputation of ministers was inflicted by the hands of the chancellor of the exchequer. Mr Vansittart undertook two great financial operations; the one with a view to diminish permanently the charge of the public debt, the other to diminish part of the annual expense of government. The first was the reduction of the navy five per cents. to four per cent. Some objections were stated to the manner in which this object was proposed to be attained; but the fluence of the crown is unnecessary to the maintenance advantage was too apparent, and Mr Vansittart's plan obtained the assent of parliament. His other scheme, how-ever, proved a singular failure. The amount of naval and parliament, and inconsistent with the good government of ever, proved a singular failure. The amount of naval and the state." The mover intimated, on the conclusion of his military pensions was about five millions annually. The speech, that he considered his resolution, if adopted by chancellor of the exchequer proposed to provide for this the house, as nothing less than a pledge to parliamentary branch of public expenditure by granting to certain con-

Reign of 1823.

Reign of George IV. 1823.

sum in each of the forty-five years as should upon calculation be sufficient to pay the pensions that should then be in existence. The scheme was, in other words, to contract now for annual loans to be advanced to government in each of the next fifteen years, and to be repaid by a gradually increasing annuity, to commence at the end of fifteen years, and continue for thirty years from that time. This new mode of loan was improvident and grossly unjust, as tending to throw the whole load of the burden on posterity. It was attacked by Mr Ricardo and Mr Brougham with the most biting sarcasm, but nevertheless most pertinaciously forced, with the whole strength of the ministerial phalanx, through both houses. A fate awaited it, however, compared with which Mr Brougham's withering sneer was gross flattery: not one capitalist could be found to engage in the contract. The prudence of the monied men saved the minister from the effects of his own imbecility. He again submitted his scheme to the House of Commons in a form so modified, that the only objection to which it was liable was its intricacy and confusion. This, however, was as much the fault of the school to which he belonged, as of the individual financier.

The continued distress of the agricultural interest occupied the attention of parliament to a yet greater extent than in the preceding year. At the commencement of the session Mr Brougham submitted a resolution to the House of Commons, declaratory of the necessity of affording relief to the agriculturists by the removal of taxes. The motion was negatived, upon the declaration of Lord Londonderry that ministers had a plan of their own to propose. This plan his lordship developed on the 15th of February, when moving for the production of some financial documents. The remedies which it contemplated were the repeal of the malt-tax, already noticed, and a loan to the agricultural interest by means of exchequer bills. In order to clear the way for an exposition of this measure, the marquis moved, on the 18th of February, for the renewal of the agricultural committee. This body laid its report before the house on the 1st of April, and the same day three different schemes were submitted for the relief and protection of farmers and landlords. Lord Londonderry proposed a loan of a million to the agriculturists by means of exchequer bills, under certain circumstances; the opening of the ports to the importation of foreign grain whenever the average price of British corn exceeded a specified sum; and the subjection of the foreign grain thus admitted to certain duties. Mr Ricardo proposed no loan, but the opening of the ports, when British corn reached a specified price, to foreign grain, subjected to certain duties, and a bounty or drawback on the exportation of corn to foreign countries. Mr Huskisson's resolutions contained a narrative of the state of the British agriculturist, from which the proper method of coming to his assistance was logically deduced. His plan was a gradual repeal of the prohibitory corn laws, and the establishment of a permanently free trade in foreign grain, subject to the imposition of moderate duties. Lord Londonderry subsequently withdrew his proposal to extend a loan to the agriculturists. Mr Ricardo withdrew his resolutions, two of them, having reference to the scale of duties upon imexported, having been adopted by Mr Huskisson. The final discussion in the Commons took place on the 7th of May. Sir Thomas Lethbridge proposed a series of protecting duties, including almost every species of agricultural produce, down to apples and pears, which re-

which they were to pay into the public treasury such a tions were agreed to; and a bill founded upon them pass- Reign of ed into a law, against which Lords Lauderdale and Ers-George IV. kine entered a protest. 1823.

The commercial interest likewise attracted a considerable portion of the attention of the legislature, although, as there was on this point less difference of opinion, the debates were less noisy. The mania for speculating in foreign funds, which had begun to show itself so early as 1817, reached its height, and experienced its first check, this year. The Colombian bonds received the first shock. The depression of Spanish stock followed. A series of panics convulsed every money market in Europe. The price of all foreign stocks fell rapidly, and thousands were ruined or impoverished by the change. Nevertheless it appeared, by returns from the manufacturing districts, procured by the secretary for the home department, and laid upon the table of the House of Commons, that the rate of profits, although low, was sufficient to induce persons to enter into trade; and that in most places the operatives were fully employed. The plans announced by Mr Wallace in the preceding session of parliament, for benefiting the commerce of the country, were this year carried into effect by means of five acts. The first repealed all the acts affecting navigation and commerce passed by British parliaments previous to the enactment of the navigation laws under Charles II. The second repealed the third clause of the navigation law, which enacted, that no goods of the growth, product, or manufacture of Asia, Africa, or America, shall be imported into England, but in such ships as do truly belong to English people, and are navigated by a master and three parts English mariners; the fourth, which enacts that no goods or commodities of foreign growth, production, or manufacture, which shall be brought into England otherwise than in ships built and navigated as above, shall be shipped from any other place but the place of their growth, production, or manufacture, or from those parts where they can only be or usually have been brought; the eighth, which relates to the importation of goods from Turkey and from Russia; the twelfth and fourteenth, which relate to the importation of goods from the Levant, from Spain, and Portugal, and their dependencies; and all acts from the time of Charles II. downwards, which stood in the way of the provisions contained in the third act. This statute established the principle of the old navigation laws, but with important modifications. Foreign ships were allowed to bring enumerated goods from any port in Europe, provided the ship belonged to the port in question. The ships of Holland, so long the objects of a pitiful jealousy, were allowed the same privileges with those of the rest of Europe. Goods of any country or place in South America or the West Indies, belonging to, or which had belonged to Spain, might be imported direct from the place of growth, in ships of the country. No importation was permitted from any port where British ships were not admitted. The fourth act regulated the trade between the British possessions in America and the West Indies, and other places in America and the West Indies; and the fifth between the same colonies and the rest of the world. The object of the two last-mentioned laws was to benefit the West India planter. An attempt was also made by goported grain, and the drawback upon such as should be vernment to induce the East India Company to permit ships measuring less than three hundred and fifty tons to participate in the private trade to India. But the Company stood upon its charter, and refused to comply unless the full rights of British registry were extended to India built ships, and East India sugars for home consumption ceived a very feeble support from a small minority. The admitted on equal terms with those from the West India conjoined resolutions of Mr Huskisson and Mr Ricardo colonies. Mr Hume drew the attention of the Commons were likewise negatived. Lord Londonderry's resolu- on several occasions to the exorbitant consular fees, which

a law to alleviate this evil.

The death of Lord Londonderry, which happened shortly after the prorogation of parliament, whilst the king was absent in Scotland, was eventually the cause of an essential change in the system pursued by the British government. Lord Liverpool entertained very liberal opinions in matters of commercial and international policy. His sentiments were in general shared by such members of the Grenville party and of Mr Canning's friends as were in office. Mr Peel was a minister of comprehensive mind, extensive acquirements, and a disposition that could adapt ton, with their retainers Bathurst, Westmoreland, Maryand relentless pertinacity of purpose, was the animating In opposition to its wishes, and in opposition to the king's reigns with the internal arrangements of Spain. personal dislike, Lord Liverpool installed Mr Canning into the office left vacant by the death of the Marquis of Londonderry. The new foreign secretary was further strengthened in the commencement of 1823, by the resignation of Mr Vansittart, to whose financial reputation the last session of parliament had given the finishing stroke, upon receiving a peerage and the sinecure chancellorship of the duchy of Lancaster. He was succeeded as chancellor of the exchequer by Mr Frederick Robinson. Mr Huskisson was at the same time appointed president of the board of trade; his seat in the cabinet he did not receive till a later period. A government of shifts and expedients had failed, and one of a different description was now to be tried.

The line of policy observed by government during the continuance of Mr Canning, Mr Robinson, and Mr Huskisson in office, was such as to conciliate the confidence of a large body of the people. It was indeed a material improvement upon that persisted in by Lord Londonderry and Mr Vansittart; and the nation, long unaccustomed to such a parade of liberality on the part of ministers, conceived an exaggerated idea of its excellence. To this circumstance, and to the more determined and better organized efforts of the Catholics of Ireland, which for some years shared, with questions of commercial arrangements and foreign policy, almost the exclusive attention of the public, we are to attribute the fact that, subsequent to the year 1823, the very name of parliamentary reform seemed for a time to have been forgotten. During the early part of the session of parliament in this year, the table of the House of Commons was loaded with petitions for reform. On the 24th of April Lord John Russell moved that the state of parliamentary representation required the most serious consideration of the house. The motion, however, was negatived. Lord Archibald Hamilton submitted a series of resolutions to the house on the 2d of June, descriptive of the state of county representation in Scotland, and containing a pledge of early redress. But these were no more in parliament for several years of reform, except in some futile attempts to obtain an amendment in the representation of Edinburgh.

The topic on which the discussions in parliament for the most part turned during the session of 1823 were the relations of continental Europe. Mr Canning's system was to record a protest against the doctrines of the allied sovereigns, and to endeavour to prevent any attack upon however, frankly admitted the justice of the procedure on

Reign of operated as a heavy tax upon merchandise; and govern-Spain on their part, but if possible to avoid war. A few Reign of George IV ment at last declared that the board of trade was framing days after Mr Canning's acceptance of office, the Duke of George IV days after Mr Canning's acceptance of office, the Duke of George IV Wellington left London for Vienna. The topic of deliberation at the congress appointed to be held in that city was the existing state of affairs between Russia and the Porte. That question having been disposed of, the members of the congress, with the exception of the British minister, were to have adjourned to Verona, there to sit in judgment on the Italian peninsula. It was the wish of Mr Canning that the absence of the English minister from Verona should mark England's refusal to interfere with the independence of the Italian states. The Duke of Wellington, however, being detained by indisposition, did itself to associates of any principles. The liberal incli- not reach Vienna until a few days before the proposed nations of these men were completely neutralized by the adjournment, and the urgency of affairs rendered it advisdecided ultra-toryism of Eldon, Londonderry, and Welling- able that he should follow the sovereigns to Verona. He had learned from a conversation with M. de Villèle at borough, Sidmouth, and Vansittart. Of this clique, Lon- Paris, that it was the intention of the French ministers to donderry, by his plausible manners, ready flow of language, call upon the congress to come to some decision on the relative positions of France and Spain. By Mr Canning's spirit. After his death it offered to its more enlightened instructions the Duke of Wellington opposed most vigoassociates no resistance beyond that of mere vis inertiæ. rously any interference on the part of the allied soveunexpected opposition checked them in their arbitrary projects; and the result was, that they abstained from a combined demonstration, resolving to assist France, in case of any aggression upon the part of Spain, of any outrage on the person of the king, or of any attempt to change the dynasty of that kingdom. With this resolution the congress separated, and Mr Canning's negociations for preserving the peace of Europe and the principle of national independence were adjourned to Paris.

The British envoys in that capital were amused by different pretences, from the termination of the congress in November 1822 till the 7th of April 1823, when the Duke d'Angouleme crossed the Bidassoa. According as timid or rash counsels prevailed, the French ministers expressed pacific or warlike intentions; but whatever their expressions might be, French gold and French intrigue were incessantly employed in stirring up factions in Spain. The reasons for declaring war, ultimately published by France, however frivolous, rested the justification of the matter upon a national quarrel alone, and thus precluded the interference of Britain. The popular feeling in England ran very high in favour of Spain; but the indifference manifested by the body of that nation towards the constitutional cause reconciled the country to the pacific policy of ministers.

The most embarrassing circumstance which attended these negociations was the necessity of a serious remonstrance with the Spanish ministry respecting certain aggressions perpetrated on British subjects in consequence of the disputes between Spain and her colonies. constitutional government was as averse to the recognition of colonial independence as the old despotism. Britain had, however, acquired, during the Peninsular war, a right of commerce with the Spanish South American possessions, and this she was not inclined to relinquish; while British vessels had been captured by cruizers carrying Spanish colours, under the pretext that they had infringed a nominal blockade of the provinces in a state of insurrecnegatived by a narrow majority. Nevertheless we hear tion. After various ineffectual representations, the British ministry assumed the right of redressing themselves, and sent notification of the fact to the Spanish court. It was a matter of great delicacy to press for the recognition of rights which that government could not fail to grant with reluctance, at a moment when England was the only barrier to which it could look against the encroachments of the holy alliance. The Spanish ministry,

1823.

Reign of the part of England, and the intercourse between that nery with which former sinking funds had been encum- Reign of George IV. country and Spanish America was allowed to remain upon the footing that had been established for years without any complaints on the part of the mother country. The success of the French army rendered it expedient to adopt yet more decided steps. In the month of July a number of respectable merchants connected with South America applied to the foreign office, requesting the appointment of commercial agents to protect British interests in that quarter of the world. Their prayer was granted, and consuls and consuls-general appointed to the principal stations in Mexico, Colombia, Peru, Chili, and Buenos Ayres.

The system adopted or intended to be adhered to by government in these questions of foreign policy was explicitly declared in the speech from the throne. The only complaint urged against the declaration was its coldness. Mr Canning was not at that time in parliament. Lord Liverpool's explanation of the views of ministry, and Mr Brougham's indignant denunciations of the despotic projects of the continental sovereigns, rendered his absence less felt. The Spanish question was not immediately urged by opposition, it being understood that negociations were still in progress. The diplomatic papers relative to these transactions were submitted to both houses on the 14th of April; Lord Liverpool and Mr Canning seizing the opportunity of addressing to their respective houses explanatory statements of their conduct. The opposition leaders intimated their opinion that the explanation given by ministers was by no means satisfactory; but more minute discussion was reserved for a future occasion, when members should have had time to examine the correspondence. Before that discussion occurred, Lord Althorpe moved for leave to bring in a bill for the repeal of the act prohibiting British subjects from engaging in foreign military service, or fitting out in his majesty's dominions, without the royal license, vessels for warlike purposes. It was argued in opposition, that, under existing circumstances, such an alteration of the law would operate exclusively in favour of Spain; and by means of this argument a majority of the house was influenced to negative the motion. The main question of the correctness of the ministerial measures was resumed both by the Lords and Commons a few evenings later. In both houses an address to the king was moved, expressive of regret that his majesty's ministers had not adopted a more dignified tone, and supported with more energy the cause of Spain. The universal sentiment was so apparently in favour of ministers, that the opposition endeavoured to avoid coming to a division in the House of Commons. The ministerial members, however, succeeded in forcing the house to divide, by which means they gave to the lately re-constructed ministry the sanction of an overwhelming majority.

The financial operations of the government increased the popularity which its avowed secession from the interests of the holy alliance had gained for it. The increase of the revenue enabled the new chancellor of the exchequer to commence his career with a spontaneous alleviation of national burdens. In addition to this circumstance, Mr Robinson's lucid statement of accounts, and explanation of the measures contemplated by government, contrasted most favourably with the complicated and imbecile attempts of his predecessor. Mr Robinson's calculations showed a surplus of seven millions, five of which he proposed to appropriate to the reduction of the debt, and two to the remission of taxes. The latter object was accomplished by the introduction of the necessary bills. In order to secure the former, Mr Robinson laid before parliament a bill, the purport of which was to apply an annual sum of five millions as a sinking fund, and at the same time materially to simplify the superfluous machi-

bered. Mr Maberly proposed to substitute for a sinking George IV fund, which he disapproved of as illusory, an extinction of four millions of three per cent. stock in the course of seven years, by the redemption of the land tax. It was objected that this project, as involving a necessary diminution of revenue, was totally nugatory; and it was accordingly rejected. Mr Hume fought hard for further reductions of the national burdens; but such was the popularity of ministers, that he met with less support than he had experienced on former occasions. His motion of censure against the ministry for appointing a lieutenant-general of the ordnance after that office had been declared unnecessary by the report of commissioners, was pressed to a division by Mr Canning, and negatived by a great majority. The ministers no doubt deemed it politic to meet such a

proposition by a full display of their power.

Intent upon winning golden opinions from all sorts of men, ministers exerted themselves to secure the rejection of Sir James Mackintosh's resolutions for the improvement of the criminal code, only to introduce bills of their own tending professedly to the same end. The resolutions introduced by Sir James were nine in number, and their purport was to declare the expediency of abrogating the punishment of death in the cases of most flagrant hardship; of substituting in these cases transportation for life or a term of years, or imprisonment with or without hard labour at the discretion of the judge; of making provision that sentence of death should not be pronounced in cases where there was no expectation of its being carried into effect; and of doing away with the forfeiture of goods and chattels in cases of suicide, and putting an end to the indignities offered to the remains of the dead in cases of suicide and high treason. The acts introduced in the course of the same session under the auspices of government, and passed, contained provisions to the same effect, with certain concessions to popular prejudice in the treatment of the remains of suicides. In the department of civil law some amendments were introduced into the law regulating the relations of agent and principal; a commission was appointed to inquire into the forms of process in the courts of Scotland, and into the course of appeals from the court of session; a resolution was adopted by the House of Lords to devote five days of the week instead of three to hearing appeals; and some modifications of the law for preventing clandestine marriages were wrested from its reluctant propounders. Every attempt to obtain an amendment of the court of chancery proved unavailing. The strong repugnance of Lord Eldon, and the unwillingness of the ministry to admit the existence of abuse in one of their own offices, proved insuperable obstructions.

The conduct of ministers towards Ireland was far from being marked by the same eagerness to conciliate popular affection. The violent conduct of the Orangemen necessarily embittered the spirits of the opposite faction, and acts of violence occurred even more frequently than before. Under these circumstances Lord Wellesley found himself called upon to apply for a continuation of the insurrection act, which was conceded by parliament. This anxious moment was selected by Mr Canning to hang coldly back for the first time when the question of the Catholic claims was stirred. He expressed himself averse to their discussion at that time. Mr Plunkett, however, insisted upon bringing them before the house on the 17th of April. On that day Sir Francis Burdett and several other friends to Catholic concession declared that the annual discussion of the question was a mere farce, from which the honest advocates of emancipation ought henceforth to withdraw. Mr Brougham indulged in a strain of indig-

George IV. of maintaining a parliamentary appearance of equanimity, or disguising the feelings which it excited. Mr Plunkett insisting upon bringing forward his motion, Sir Francis and many other opposition members rose and left the house. The debate was soon adjourned, and not renewed during the course of the session. In the House of Lords the Duke of Devonshire endeavoured to excite attention to the condition of Ireland, but in vain. In the House of Commons Mr Brougham called for investigation into the gross inequality of the Irish law wherever Catholic and Protestant were opposed, and to the yet more oppressive mode of its administration; but the house refused to entertain the question. Mr Hume exposed the more prominent defects of the church establishment, but could scarcely obtain a hearing from an audience unwilling to be convinced. Ireland perceived that reason was no match for injustice armed with power; and a conviction began to prevail that the use of other means had become necessary. In the course of a few years, this sentiment animating an immense organized body, impelled by the unwearied activity of an agitator of high talents, wrung from a reluctant government the boon which had so long been humbly prayed for, but in vain.

The affairs of the colonies and other dependencies excited this year more than the usual share of attention. An act was passed, establishing courts, and making other regulations for the administration of justice in New South Wales and Van Diemen's Land. A bill for remedying abuses in the administration of justice in Newfoundland was announced by ministers as in preparation. A strenuous effort was made on the part of the East India merchants to obtain an equalization of the duties imposed on the sugars imported from Hindustan, and those which were the growth of the West Indian colonies; but it was defeated by the exertions of the planters. But the measure most important, both in regard to the test it afforded of the progress of liberal opinions, to the consequences it has already produced, and the still greater results it must ultimately lead to, was the ministerial circular of the 24th of May, relating to the treatment of slaves in the British colonies. This document followed up the resolutions adopted by the House of Commons on the 15th of the same month at Mr Canning's suggestion. The resolutions declared the anxiety of the house that immediate measures should the slave's character as might render safe his ultimate admission to participation in the civil rights and privileges of other classes of his majesty's subjects. The circular the case of females, and forbade the carrying of whips on nation in the sugar colonies was violent and unanimous, again with applause. Jamaica spoke of asserting its independence. In Barbadoes, the chapel of a missionary suspected of having transmitted unfavourable accounts of the treatment which the slaves experienced at the hands of the planters was demolished, and the clergyman himself obliged to abscond. In Demerara the promulgation of the order in council was deferred, and all knowledge of it attempted to be withspread among them, the mysterious silence of their mas-

Reign of nant invective that stung Mr Canning beyond the power clearest exculpatory evidence. They did not dare to in- Reign of flict their unjust sentence, but the unhappy martyr died George IV. in prison before the news arrived that the king had rescind-1824. ed his condemnation.

The policy of government, liberal in the highest degree when compared with what the nation had been accustomed to, blinded men to its defects. The brilliant and somewhat gaudy eloquence of Canning strengthened the charm. His speech delivered at Plymouth in October completed his achievement. The splendid diction and imagery with which he adorned his development of the system adopted by himself and his colleagues carried away all who heard and all who read that magnificent oration. A palpable object to be attained, one of the most winning appearance, seemed to be placed within their view, nay within their reach. They soothed themselves with the idea that the honour to be gained would be shared by themselves. They forgot that nothing beyond fair words had been afforded to the falling constitutional governments of the Continent; that the reduction of national burdens so ostentatiously paraded had left them much as they were; that the sister island remained convulsed by faction, and robbed of her rights. All these they forgot and forgave for the sake of a few fair promises. Castlereagh had endeavoured for years to tame the spirit of the country by whips and dungeons, but in vain. Canning sung its stern resolves to peace in the course of twelve months. At the expense of some slight concessions to popular opinion, the governing party had renewed its lease of power for an indefinite term.

During the year 1824 ministers continued, by perseverance in their new sprung liberality, to grow in the good graces of the nation. The opposition found it extremely difficult to muster a respectable minority. Attempts to attach to government the stigma of having played a double game with the Spanish constitutionalists, and given underhand encouragement to the French, were successfully repelled. Calls for an acknowledgment of the independence of the South American states were answered by the declarations of Lord Liverpool and Mr Canning, that to all useful intents they had been declared independent. They were allowed the privileges of free states under the new navigation act, and consuls had been appointed at their most important maritime towns. A formal acknowledgment of independence could be made only by the power which claimed dominion over another. Ministers therebe adopted for securing such a gradual improvement of fore contended that one thing only remained to be done, namely, the opening a diplomatic intercourse with these countries; but the power of deciding at what period this step ought to be taken, they maintained, was unquestioncommanded the abolition of the punishment of flogging in ably the prerogative of the crown. Parliament declared itself satisfied with these reasons; and a further declarathe field in the crown colonies. Enactments to the same tion by Mr Canning, that government had refused a seeffect were recommended for the adoption of the legisla- cond and urgent application to become a party to a new tive bodies of the chartered colonies. The burst of indig- congress, made the walls of the House of Commons ring

Notwithstanding the caution with which ministers avoided any express pledge to recognise the independence of the rising states in the new world, active preparations were making for paving the way to such a step. So early as the end of August 1823 the diplomatic agent of the United States in England had been sounded as to whether " the moment had not arrived when the governheld from the negroes. Some vague surmises having ments of Great Britain and the United States might come to some understanding with each other on the subject of ters excited the most unreasonable expectations, and hope the Spanish American colonies; and whether, if they could deferred precipitated them into insurrection. The planters arrive at such understanding, it would not be expedient in their blind fury accused the missionaries of exciting a for themselves, and beneficial for the world, that the prinrevolt which had been caused solely by their own illegal ciples of it should be clearly settled and plainly avowand unwise proceedings. A court-martial convicted Mr ed." The American envoy did not feel himself autho-Smith, one of the Independent clergymen, ip the face of the rized to enter, on the part of his government, into any ex-

Reign of press understanding on the subject. Mr Canning next George IV. turned to the French ambassador, with whom he opened a conference in October of the same year. The reply of this diplomatist was evasive and unsatisfactory, and seems to have fixed the British ministers in the resolution to wait no longer for the co-operation of any other power. In fulfilment of the promise made to the South American traders, consuls were dispatched to all the principal seaports within the Spanish provinces on that continent and Mexico. Commissioners were at the same time dispatched to Colombia and Mexico, with directions to report on the political state of these countries. The measures of the British government were precipitated by the urgency of opposition, by the reluctance manifested on the part of France to withdraw her troops from Spain, and by the intelligence which arrived early in 1824 of the preparatory steps taken by the president and congress of the United States towards recognising the independence of South America. Towards the end of July Mr Parish was dispatched to Buenos Ayres, intrusted with powers to negociate a commercial treaty with that state, in the contingency of the government continuing to afford a reasonable prospect of being able to maintain its authority. On the 14th of December it was determined to recognise forthwith the independence of Colombia and Mexico; and by the first day of the year 1825 instructions and full powers had left the coasts of England, and the ambassadors of the allied courts received intimation that measures for recognising the independence of the three most powerful of the new states of Spanish America had been taken, past recall, by the British government.

Great Britain might in the year 1824 be regarded as emancipated from the false position in which, as a free and commercial nation, she had long found herself entangled. The good work was carried on by the adoption of several important measures both in and out of parliament. The first was the removal of certain stoppages and impediments to a free internal circulation. An act passed in the former session for repealing some, and providing for the progressive discontinuance of other duties to which the manufacturers of Great Britain and Ireland respectively were subject, on their importation from either country into the other, had been found so beneficial, that all the duties left in existence were repealed. Next in importance was the measure introduced by Mr Huskisson for placing the home silk manufacture on a more natural basis, by lowering the duty on raw silk, repealing the bounty on the exportation of silk goods, and substituting a duty of thirty per cent. on the importation of foreign silk manufactures. The interests of the operatives received also a share of legislative attention. The old laws against combinations of workmen for the purpose of regulating the price of labour and the hours and manner of working, were abolished by an act which denounced severe punishments against those who should attempt to influence or overawe by violence or intimidation. The laws against the emigration of artizans were likewise repealed. An act was passed of the greatest consequence to commercial dealings, establishing a uniformity of weights and measures, to commence from the 1st of May 1825. A bill for the repeal of the usury laws, a measure even more vitally important than any we have now enumerated, was thrown out by a manœuvre; its opponents having moved that it be read that day six months, at a late hour, when many of the supporters, expecting no further division, had left the house. While the legislature was thus employed, the executive was busy giving a wider extension to the system of reciprocity in commerce. Commercial treaties with Portugal and the United States of America, including this reciprocity arrange-

ed since 1810 in the case of the former nation, and 1815 Reign of in that of the latter. A similar convention was concluded George IV. with Prussia in the April of the year the occurrences of which we are now narrating. The next arrangement was with Sweden. It was at first effected without treaty, and matters remained in this unauthenticated condition till 1826. A convention for reciprocal equality, to endure for ten years, was concluded with Denmark in June. In May the kingdom of Hanover, and in October the duchy of Oldenburg, were admitted to the footing of reciprocity by an order in council. France and the Netherlands adhering to their impositions upon British vessels, were subjected to retaliation.

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Government continued to advance with a hesitating and timorous step along the path of legal reform, into which it had reluctantly been forced. The reversal of attainders of several noble Scottish families may be viewed as falling under this head, but was a measure of little general importance. The different bankrupt laws were consolidated into one act, which, however, never received effect, a new enactment having been found necessary before the time arrived at which it was to have come in force. An attempt to procure for persons accused of felony the benefit of counsel was again defeated by the address of the lawyers and the prejudices of the country gentlemen. The utmost attempts of the friends of law reform could this year procure nothing more than the appointment of commissioners to inquire into the proceedings of the court of chancery. The commission consisted of the chancellor, master of the rolls, and vice-chancellor, together with some masters in chancery, barristers, and members of parliament. This, however, was at least something gained.

The financial arrangements of ministers encountered little opposition. The revenue of the preceding year had exceeded the expenditure by L.6,718,985. From this it was necessary to deduct L.5,000,000, the sum set aside for the gradual diminution of the national debt. The surplus immediately available was L.1,718,985. Ministers anticipated an additional surplus of L.1,052,076 during the current year. This excess of income over expenditure was accounted for partly by retrenchment and partly by savings in management. Various items of charge which intercepted a part of the revenue in its progress to the exchequer were reduced. A saving of one half per cent. on the interest of the debt was effected. The bounties on the whale and other fisheries were allowed to expire. Under these favourable circumstances, and with a prospect of their continuance, ministers felt themselves authorized to commence a system of alterations in the commercial and fiscal regulations of the country. They proposed to begin by putting rum, in regard to the duty with which it was chargeable, on a level with spirits produced by British distillation. The duty on coals and wool was diminished. The alteration on the laws regulating the silk trade, which has already been adverted to, was the last measure proposed for immediate adoption. The total reduction thus effected upon the national burdens was:-

Rum.....L.150,000 Coals...... 100,000 Wool...... 350,000 

L.1,062,000

The relief was kept within the limits of the fund which afforded the means of granting it.

Ireland continued to experience but a small share of this conciliatory policy. Although disturbances had in a great measure ceased, the insurrection act was again renewed. The claims of the Catholics continued to be urged ment (not however extending to the colonies), had exist- with increasing feebleness, and operated with additional

Reign of inveteracy. Committees were demanded both in the inquire into the loss occasioned by the late revolt, and to Reign of George IV. Lords and Commons for investigating into the state of report on the best mode of obtaining compensation from George IV Ireland. Ministers, however, evaded the inquiry by li- England. An attempt was likewise made to repeal the

miting it to the nature and extent of the disturbances that had prevailed in the districts of Ireland subject to the operation of the insurrection act. At a subsequent period of the session, Mr Hume moved "that it is expedient to inquire whether the present church establishment of Ireland be not more than commensurate to the services to be performed, both as regards the number of persons employed, and the incomes they receive." In a house of two hundred and thinks they receive. dred and thirty-two, only seventy-nine members supported the motion. This repulse, however, operated as an incentive rather than as a discouragement. The Catholic Association now began to assume a bolder tone, to extend its local connections, and to adopt the most decided measures. Its members held regular sessions in Dublin, constituted themselves the medium of communication between Ireland and parliament, ordered a census of the population to be taken, and appointed collectors in every district for the receipt of the "Catholic Rent." Mr O'Connell may be regarded as the effective founder and organizer of this body. The violent and theatrical character of many of its proceedings cannot be denied; but it had the effect of giving concentration, and a rational aim, to the angry efforts of the oppressed Irish. It at once added a fresh energy to their demands for redress of grievances, and withdrew from them the temptation to illegal and atrocious acts of vengeance. Beneath its influence, and the restraining force of the new constabulary, outrage subsided to such a degree, that shortly after the close of the session the operation of the insurrection act was suspended in several of the disturbed districts. The clamours of Protestant and Catholic zealots were loud and bitter, but they abstained from personal violence. Increased tranquillity, the loosening of the restrictions upon commercial exertions, and a limited but certain increase of the means of education, shone through the troubles of Ireland like the first dull beams of a tempestuous day-break.

The West India colonies still continued in an unsettled state. A numerous military establishment maintained quiet in Demerara. Such, however, was the malignant spirit of the planters, that a missionary who had been heard to speak favourably of Mr Smith was obliged to quit the colony. In Trinidad the regulations of the order in council were submitted to under protest. In Barbadoes a bill for admitting the evidence of slaves in certain cases miscarried, and Mr Canning's plans were contemptuously neglected. In Dominica the governor recommended to the legislature the incorporation of the whole of the slave-laws into one act, comprising the substance of the order in council, and repealing such statutes as were at variance with its spirit. The House of Assembly refused, and expressly declined, to contribute any pecuniary aid towards the instruction of the slaves. In Jamaica the temper of the planters had been ruffled by a partial insurrection of the slaves; which, however, had been suppressed without loss either of lives or property. A fresh alarm was given during the month of June. On both occasions a number of negroes were executed. The revolt was supposed to have originated in some vague expectations on the part of the slaves of aid from England. The House of Assembly, which met in November, was informed that the general government had appointed a bishop for the island, and appropriated a fund for the support of the Episcopal clergy. One important office confided to the bishop was the superintendence of the religious instruction of the slaves; and the return required for this benefit was the adoption of the order in council. The angry planters, instead of complying, appointed a committee to

registry act, and much violent and foolish language was uttered. All the other colonies were tranquil, except Lower Canada and the Cape of Good Hope. In the former province, constitutional questions of an essential and grave nature were urged. The House of Assembly on the one hand, and the governor, supported by the legislative council, on the other, were at issue respecting the claim of the former to the right of disposing of the whole revenue. The governor and council would not admit the claim to its full extent; the Assembly refused the supplies; a dissolution ensued, and the different branches of the legislative body parted in very bad humour with each other. The disquiets of the Cape were caused by the petty tyranny of the governor Lord Charles Somerset. Sixty of the most respectable individuals of Cape Town were desirous of establishing a literary society, a museum, and a library. A fundamental article of the constitution of this body, was the exclusion from their discussions of controversial theology, the question of slavery, and all purely professional subjects; but the governor condemned the scheme as illegal, and induced the chief justice and some other members to withdraw their names. The reasons which he assigned for calling the society illegal were, first, because they had presumed to form themselves into a society " without

any previous reference to his excellency," which he de-

signated as a complete disregard of the existing authorities at the Cape; secondly, because it was improper to permit the establishment of an association which might

have a tendency to produce "political discussion." Ano-

ther instance of the governor's proceedings was his conduct

towards Mr Greig, the editor of a newspaper, who had pub-

lished an article which Lord Charles conceived to be disrespectful to his administration. The offender was order-

ed to quit the colony within a month. He abandoned his

employment, and advertised his effects for sale; but by

this time the governor had changed his mind, and Mr Greig received intimation that he was at liberty to remain

in the colony.

England was this year involved in two wars by her foreign possessions. The Burmese war will fall to be noticed when we come to narrate the events of 1826, when it was terminated. The petty skirmishes with the barbarians of Ashantee were the cause of much private grief, and materially enhanced the expenses attendant upon the maintenance of an unhealthy and useless establishment; but were too trifling to affect the majestic interests of Britain. The shock which had been communicated both to the agricultural and manufacturing interests, by the transition from a state of commerce in which, although exposed to hostile depredation, they were encountered by no competition, to the rivalry of every nation, and increased in vehemence by the measures taken to restore the currency to a sound state, had begun to pass away. The prospect of a government acting upon a rational system cheered men's spirits; and under such auspices national industry, although still trammelled and burdened by an unnecessarily complicated, wasteful, and extravagant executive system, was beginning to regain a healthy tone. There was a regular demand for labour, and wages were rising. Manufactures of every kind were prospering. The abundance of capital led to many new devices for its employment. The lately opened trade to South America was prosecuted, with all the sanguine hope of ignorance, to an absurd extent. Joint-stock companies were formed for working the mines and conducting its pearl fisheries. The rage for such associations spread through every department of domestic industry. The wildest anticipations

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Reign of of profit were indulged. The nation, drunken with the ciously to his line of argument. Mr Canning alone at- Reign of George IV sudden increase of its mercantile transactions, was preparing for itself a sudden and tremendous reflux of its spring-tide of prosperity.

Parliament met in 1825 on the 3d of February. The question most urgently pressed upon its consideration was the necessity of suppressing the Catholic Association. The coldness of lukewarm friends, and the open enmity of avowed enemies, had rallied the whole of the Catholics and a great number of the Protestants of Ireland around this body. A contempt for the rights of citizens had called it into existence and invested it with power; and now the oppressors were the first to discover the might with which they had invested it, but without feeling inclined to betake themselves to the only effectual method of destroying it, namely, removing the grievances which gave it birth.

The expressions in the king's speech applicable to the Catholic Association were these:—"It is to be regretted that associations should exist in Ireland, which have adopted proceedings irreconcilable with the spirit of the constitution, and calculated, by exciting alarm, and by exasperating animosities, to endanger the peace of society, and retard the course of national improvement. His majesty relies upon your wisdom to consider without delay the means of applying a remedy to this evil." dress in answer to the speech from the throne was agreed to without a division. Several of the opposition members, however, protested against the line of policy indicated in the passage which we have quoted. In the Lords, the Marquis of Lansdown cautioned ministers not to be hasty in repressing open complaint, and not to beguile themselves with the idea of curing a malady merely by removing a few of the outward symptoms. Mr Brougham, in the Commons, maintained that the delay of redress had driven the Irish to seek it at their own hands. He exposed the insincerity that lurked under the plural "associations." It was a juggling attempt to assume the appearance of dealing equal justice to the Orangemen and

the members of the Association.

Ministers were not slack in following up their denunciation. On the second day of the session Mr Goulburn gave notice that he would, on the 10th of February, move for leave to bring in a bill to amend certain acts relating to unlawful societies in Ireland. The acts referred to were two in number. The oldest, enacted by the Irish parliament in 1793, prohibited all assemblies for the appointment of deputies, or which assumed in any manner the right of representing the people of that country. The other, passed in 1823, with the view of conciliating party feuds, was directed against Orange societies and Orange processions. Neither touched the Catholic Association. Mr Goulburn, when propounding his measure, dwelt at great length on the members of the Association. According to him, it was composed mainly of priests, men of disappointed ambition, and the familiar friends of Tone and Emmett. The Roman Catholic gentry who belonged to it were acting, he averred, under intimidation. The objects of the institution he described as being the levying of an unauthorized tax by the agency of the priests; instituting prosecutions against individuals accused of perpetrating outrages, or acting as incendiaries; and assuming the right to call upon the illegal societies to disband. With regard to the last charge, Mr Goulburn expatiated at considerable length on one part in the Association's "Address to the People of Ireland," in which they adjured them to refrain from secret and illegal societies, "by the hate you bear the Orangemen, who are your natural enemies." The members who, in the course of the debate, supported Mr Goulburn's motion, adhered most pertina-

tempted to awe the house by insinuating that its vote George IV against the motion would be tantamount to a declaration that it had satisfied itself "that his majesty had been deceived by false information; and that the description applied in his majesty's speech to the associations in Ireland was altogether incorrect." On the part of the opposition, Sir Henry Parnell showed that Mr Goulburn had misrepresented the mode of collecting the Catholic rent, and the share taken by the priests in the operation; and Mr Tierney affirmed that he had exaggerated its amount. Mr Denman contended that the analogy which had been attempted to be established between the case of the constitutional association and that before the house, did not hold. The former sullied the fountain of justice, because men who accused a man because he entertained certain opinions, might sit upon his trial as jurors. The latter was at the most but on a footing with associations for the prosecution of thieves and swindlers. The members only bound themselves to contribute to the prosecution of men guilty of offences which were allowed by the whole world to be such. Each might bring to the consideration of the individual case a mind free from prejudice. Mr Plunkett, although in favour of the motion, admitted that it was quite legal to associate for the purposes professed by the Association. Mr Goulburn's motion was, however, agreed to, after a debate which lasted four nights. The Catholic Association made application to be heard at the bar of the Commons; and being denied that privilege, they repeated the request to the Lords with the same want of success. The bill passed both houses, and received the royal assent on the 9th of March. But the Association, strong in the national affection, was not so easily discomfited. It submitted without a struggle; but no sooner was the session closed than an aggregate meeting of the Catholics re-established it with a constitution which did not come under the law. Like Milton's spirits, it re-united, seemingly incapable of " mortal wound" in its " liquid texture.

1825.

The friends of the Catholics laid hold of the occasion, when the pretended advocates of emancipation were protesting the more violently their continued attachment to the cause that they were busy binding those who petitioned for it, and when some of its opponents were shaken in their firmness by the determination of the people, to renew the question. Sir Francis Burdett, after some preliminary discussion in committee, introduced a bill for the relief of the Catholics on the 23d of March. Two subordinate bills were introduced at the same time for the purpose of conciliating the most determined enemies of concession. By the one the qualification of a voter was raised to a freehold of L.10 per annum, while the object of the other was to make a provision for the Catholic clergy. The friends of the principal measure were by no means agreed as to the auxiliaries; but their variance was rendered of less consequence by the fate of the bill. While it was yet before the committee of the House of Commons, the Duke of York rose in his place in the Upper House, and in a long and confused speech declared his resolution to oppose every concession "up to the latest moment of his existence, whatever might be his situation in life, so help him God." This uncalled for and illiberal declaration of the heir-apparent exasperated the Catholics and grieved their friends. The bill passed the Commons notwithstanding; but was, as every one anticipated, thrown out in the Lords.

While parliament was thus refusing their just rights to the Catholics in one breath, and in the next forbidding, under heavy penalties, every attempt to vindicate them, the committee appointed by the Lords during the previous session to collect information respecting the state Reign of of Ireland, were proceeding with the investigation. The George IV evidence led established the existence of the most extensive and pervading misery. The peasantry were described as in the colonial ports were abolished. Two further alterations in the colonial ports were abolished.

being constantly on the verge of starvation, the victims of disease produced by the state of their squalid habitations. They were servilely dependent on their landlords, the tithe-agents. The law which was devised to protect them had been perverted into an engine of oppression. The report of the committee was presented at too late a period of the session to admit of its being made the basis of any enactment. Various attempts were, however, made in the House of Commons to procure redress of specific grievances. Sir John Newport, founding upon the report of the commissioners on education, moved an address to the king, praying his majesty to give orders for instituting prosecutions against different individuals connected with the charter-schools of Ireland, who had been accused of gross acts of cruelty; which was agreed to unanimously. Mr Hume renewed his attack upon the established church in Ireland, but with a diminished number of supporters. And after wasting the best part of five months in vehement declamation, and passing a number of unimportant laws, parliament abandoned Ireland to the rage of party spirit, with scarcely any thing to preserve that country from anarchy but the vigilance and influence of the Catholic Association.

Meanwhile discussions leading to a more satisfactory result had been agitated in parliament. On the 29th of March Mr Huskisson called the attention of the House of Commons to the effects of Mr Hume's bill of the previous session, repealing both the common and statute law against combinations among workmen. It was to be expected that men new to liberty should in some measure abuse it. Every unaccustomed pleasure is apt to be indulged in to excess. Accordingly it was found, that in west of Scotland and the sea-ports, the operatives had immediately availed themselves of the privilege of com-bination to an extent that endangered the just rights of

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tions of a local nature were contemplated. The sugar of the Mauritius was admitted at the same rate as that of the West Indies; and the corn of Canada was admitted and harassed incessantly by the unprincipled extortions of into Great Britain on payment of a moderate duty. This last provision, however, was limited in its operation to the space of two years. This measure was accompanied by a second, which had for its object the promotion of commerce by the diminution of duties imposed for protection, and not for revenue. A third was added, tending to relieve the navigation of the country. Quarantine duties were abolished. All fees on commerce with the colonies were done away. The duty imposed upon the transfer of ships was removed. And, lastly, the system of consular establishments was reformed by the substitution of fixed salaries, payable out of the public purse, for the burdensome and unequal fees which had previously been levied. These measures, although viewed with apprehension by some members of the legislature, were approved of without a dissenting voice. The surrender of its charter by the Levant Company at the same time conferred an additional benefit on the mercantile interest. The repeal of the usury laws was again attempted, but without success. A further reduction of taxation was effected by the chancellor of the exchequer, but not to any great

The excessive speculation occasioned by the increasing commercial prosperity of the country led, in the autumn of 1825, to such a reverse as might have been anticipated. Lord Liverpool and Mr Huskisson had raised their warning voices against the excess of speculation. Mr Tooke and Mr McCulloch distinctly foretold the convulsion which was about to happen. The process of the change was this:—" The depressed state of trade in 1821 and 1822 several parts of the country, and more particularly in the had led to a diminished production and importation of goods, and to an advance of prices in 1823; and the very high prices of 1824 and 1825 were the result, first, of this diminished production and importation; secondly, of an their employers, and threatened to place themselves at the improvement in the state of agricultural produce; thirdly, mercy of the more artful and unprincipled of their own of the acknowledgment of the independence of the South The treasurer of the navy concluded his exposi- American republics, which opened new markets to Brition of the state of combinations by moving for a commit-tee to report their opinion how far it might be necessary for these republics, and transmitted in manufactured to repeal or amend the act 5th George IV. cap. 95. The goods." The consequences of a want of due foresight motion was agreed to; and in consequence of the report under these circumstances were, production on the part of of the committee, a bill was introduced having for its ob- the manufacturer beyond what could find vent, and imporject to afford protection to masters, and to such workmen tation on the part of the merchant beyond what could find as declined entering into associations. A summary juris- a market. The delusion was kept up longer than it otherdiction was established, with power to convict for offences wise would have been, through the facilities afforded by against the act on the oath of one credible witness, and large issues of paper. The first symptom of something to inflict an arbitrary punishment to the extent of six being wrong was the turning of the exchange against months imprisonment with hard labour. Some protection England. The bank immediately, in conformity with its to the capitalist was undoubtedly necessary; but it must established policy, diminished its issues and discounts. at the same time be admitted, that the vague manner in Merchants were now pressed for funds to supply the place which the act was worded left open a wide field for op- of those which had been vested in a mode unavailable for pression; and that the removal of the constitutional pro- immediate demand. The bankers, induced by the low tection of a jury was an infringement upon the rights of rate of interest, had discounted bills at unusually long the subject. The other measures introduced by Mr Huskisson were less exceptionable. The first was an importnot be quickly realized. Several important commercial ant modification of the colonial system. The commerce failures took place, and the country became alarmed. A of the colonies was thrown open to a certain extent to all run upon the banks ensued, and several of them gave way. friendly powers. They were entitled to trade thither On the 12th of December it was announced that a London with goods of their own produce in their own ships. The house, upon which no less than forty-seven country banks bonding system was likewise introduced into the colodies, and five warehousing ports appointed; Kingstown another equally important house was announced. Mr

Reign of Baring thus described the scene which ensued:- "A pa-George IV. nic seized the public. Men would not part with their money on any terms, nor for any security, and the consequence was general distress. Persons of undoubted wealth and real capital were seen walking about the streets of London, not knowing whether they should be able to meet their engagements for next day." On the Wednesday the bank began to increase its discounts; it purchased exchequer bills, and discounted on stock. Before the end of the week it had issued in gold and notes not less than eight millions. In the mean time meetings were held in London, and in most of the trading towns, in which resolutions were adopted for the support of commercial credit. The public mind gradually became re-assured, but in the interval banks had broken down in every district of England. Between October 1825 and February 1826 fifty-nine commissions of bankruptcy were issued against English country banks; and at such a time the number of private compositions are estimated to be to the number of commissions in the proportion of four to one. In a mercantile nation such a suspension of the circulation paralyses every effort. The ship-owners suffered from their inability to procure freights; while the artizans were thrown out of employment, and exposed to famine. Scotland the momentary distress was equally great, but the more solid system of banking materially alleviated the after-pressure. Mistrust and apprehension darkened the close of 1825, and threw their shade over the prospects of the opening year.

Parliament was opened on the 2d of February 1826 by commission. Almost the only topic touched upon in the speech was the distress which pervaded the nation. "The embarrassment," it said, "did not arise from any political events either at home or abroad. It was not produced by any unexpected demand upon the public resources, nor by the apprehension of any interruption to the general tranquillity. Some of the causes to which this evil must be attributed lie without the direct reach of parliamentary interposition, nor can security against the recurrence of them be found, unless in the experience of the sufferings which they have occasioned. But to a certain portion of this evil, correctives, at least, if not effectual remedies, may be applied, and his majesty relies upon your wisdom to devise such measures as may tend to protect both private and public interests against the like sudden and violent fluctuations, by placing on a more firm foundation the currency and circulating credit of the country.'

The answer proposed by the ministerial party to be returned to this recommendation was agreed to in both houses without opposition; but many members embraced the opportunity of stating their opinions of the state of the country, and the measures that ought to be adopted. Lord King attacked the corn laws, and proposed that the Lords should pledge themselves to their revisal during the session. Mr Brougham thought the causes of the distress more complicated than those adverted to in the speech, and dwelt upon its universality as a sufficient proof that its origin was not to be sought in the adoption of more liberal commercial principles. Mr Hume maintained that the true cause of the distress was the heavy pressure of taxation, and the wasteful expenditure of government. The members connected with the country bankers defended the characters of these gentlemen; and Mr Baring and others eulogised the conduct of the Bank of England. Ministers announced that the palliatives they meant to apply were, first, to prohibit the circulation, after a certain period, of notes under two pounds, whether issued by the Bank of England or any private banker; secondly, to increase the stability of private banks, by enabling them to augment their capital, and with that view to repeal

the clause in the charter of the Bank of England which Reign of made it unlawful for any private banking establishment to George IV. consist of more than six partners. 1826.

The first of these projects carried into execution was that which contemplated the destruction of the small notes. Government entertained apprehensions that during the interval which must necessarily elapse between the announcement of their plan and its receiving the sanction of law, an infinite number of small notes might be stamped, and immediately gave orders to put an end to the stamping of such notes. The step was animadverted on in both houses as a most dangerous assumption of power, but defended as necessary to insure the success of the measures in contemplation. On the 10th of February the chancellor of the exchequer, in a committee of the whole house, fully developed that part of the plan which related to the small-note circulation. He proposed that no new notes under the value of five pounds should be stamped; and that all promissory notes payable to the bearer on demand, issued by license, and under the value of five pounds, and stamped previous to the 5th of February 1826, should be allowed to circulate until the 5th of February 1829, and no longer. Ministers at a later period consented to allow the Bank of England the power to issue one and two pound notes, stamped at any time prior to the 10th of October, but not to continue them in circulation after the lapse of three years, the limited date of the existence of such a circulation. This measure met with vehement opposition in the Commons, but from a very small minority. In the Lords it was less pertinaciously opposed. Ministers had from the beginning limited the immediate operation of their bill to England, but declared that they could not see on what principle different systems of currency should prevail on the opposite sides of the Tweed. Scotland took the alarm; a smallnote currency was there identified with every step in the march of national improvement. The tables of both houses of parliament were instantly loaded with petitions from that country against any restrictions on its paper currency. It was necessary to pay attention to representations in which men of all political parties and every rank in life concurred. Select committees were appointed to investigate the matter; and the result of their inquiries was, that the small-note currency of Scotland remained untouched. Ireland was also left in possession of her small notes.

In order to give effect to the other measure contemplated by ministers, it was necessary to interfere to a certain extent with the chartered privileges of the Bank of England, and the consent of that body was therefore requisite even to its introduction. A communication was accordingly made by the first lord of the treasury and the chancellor of the exchequer, to the governor of the bank, on the 13th of January, containing a detailed and luminous exposition of the views of ministry, and expressing their hopes "that the bank will make no difficulty in giving up their exclusive privileges, in respect to the number of partners engaged in banking, as to any district fifty miles from the metropolis." The directors, in their answer of the 20th, declined the task of recommending to the proprietors the abandonment of their exclusive privileges. Several papers were interchanged, and finally, a general court, held on the 3d of February, consented to waive their privilege, except within a district of fifty miles round the city of London. In the course of this correspondence the propriety of the bank establishing branches was suggested by government. The measure founded upon this arrangement was first introduced into the House of Lords; but no discussion took place upon it, until on the 17th of March Lord Liverpool moved the second reading. The debate even then wanGeorge IV 1826.

Reign of dered entirely from the subject, and lost itself in vague dis- The advantages likely to result from the gradual emanci- Reign of quisitions on the history and fluctuations of the currency. a clause authorizing the Bank of England to establish of the thought of a retrograde movement. branch banks throughout the country. The adoption of the notes issued by the branch banks payable at the place where they were issued. The bill experienced a warmer opposition in the House of Commons, but was ultimately, with some slight alterations, agreed to.

Public confidence was not however yet quite restored, and ministers were pressed to take some step for the alleviation of the immediate pressure. After some hesitation, an arrangement was made with the bank, in virtue of which it agreed to make advances to private individuals upon the deposit of goods, merchandise, and other securities. The whole sum advanced was not to exceed three millions. The adoption of this measure rendered it necessary, for the security of the bank, to introduce a new bill regarding the law of principal and agent. This act enabled all persons in the possession of goods, possessed likewise of documents conferring the property of them, although such persons should be merely factors or agents, to pledge with the bank as effectually as if they had been the actual owners. Its operation was confined to deposits made with the bank. Commissioners were immediately appointed by the bank in the principal provincial towns. They were almost uniformly merchants resident in the district. The applications for advances were much fewer than had been anticipated: either men were unwilling to disclose their necessities to local competitors, or the knowledge that a fund was provided restored confidence.

During these transactions the cause of the late panic continued to be keenly canvassed both in parliament and beyond its walls. Emigration was suggested as a source of relief for the labouring classes, and a committee appointed to collect information on the subject. The corn laws were most vehemently exclaimed against, and even forced upon the notice of parliament. Ministers acknowledged the necessity that existed for thoroughly revising them, but deprecated the introduction of so extensive a topic during a session which, as the last of that parliament, must necessarily prove a brief one. The general question was evaded; yet before the end of the session, it was found necessary to introduce two bills to modify the strict operation of these laws. The first allowed wheat in bond to come into the market on payment of a duty of ten shillings second gave ministers a discretionary power of admitting foreign grain during the recess to the limited quantity of five hundred thousand quarters. These very slight concesthe land-owners. The silk trade, a branch which had not been long enough exposed to our rigorous climate to be able to bear its severity, was as usual the first to complain. Petitions flowed in upon parliament from every district where this manufacture had struck root. An attempt was made to have them referred to a select committee, as a preliminary step towards checking the advance which had been made by government in liberal commercial policy; but without success. The ship-owners, a body who are sufficiently alive to their own interests, and active in pursuing them, were the next to make their voice heard. Mr Huskisson met their allegations by a prompt appeal to facts, moving for "returns of ships built in the British dominions between 1814 and 1825 both inclusive, distinguishing the number in each year, and the amount of their tonnage."

pation of the country from ill-judged trammels upon its in-George IV In the committee Lord Liverpool moved the addition of dustry were too apparent to allow, in any enlightened mind,

1826.

In the discussions of this session to which we have this clause rendered another proviso necessary, declaring hitherto alluded, the ministers had found themselves uniformly in triumphant majorities, swelled indeed more frequently by their habitual opponents than by some of their avowed supporters. The restriction of the small-note currency was a step of very questionable expediency, but one, however, which admitted of a plausible defence. The curtailment of the bank privileges could only be disapproved of by a member of that powerful incorporation, which had so long controlled at its pleasure all the money transactions and contracts of the kingdom. But the relaxation of the corn laws, and the removal of commercial restrictions, were measures based alike upon justice and expediency, and consequently sanctioned by all the rules of sound policy. Every honest and enlightened man lent a willing support to the projectors of such a system of policy. The state of the finances, however, opposed a serious obstacle to any change of system. Huskisson and Robinson entertained clear business notions, and were willing to adopt a better system. Canning saw that their views were popular, and he coveted the glory of enforcing them. But they and their friends knew perfectly that their places in the cabinet were held by the sufferance of that party which, in virtue of its ascendency in the House of Commons, had the reins of power in their hands. They were kept in office to transact business, whilst the real holders of power reaped the profits. They might make what parade of liberal sentiments they pleased in order to conciliate the nation, as long as they did not trench upon the emoluments of their patrons. The distribution of offices ostensibly provided for discharging the executive functions of the government, was ill assorted and ineffective, but the structure, though in itself frail, was sustained by a power capable of supporting a still weaker fabric.

The chancellor of the exchequer, on opening the budget on the 13th of March, took a large review of the whole financial system of the country from the conclusion of peace. It will be sufficient if we confine ourselves at present to what related more immediately to the period during which he himself had held office. Considerable retrenchment had been effected between 1815 and 1819. During the lastmentioned year an increase of taxation had been made to the amount of three millions. In 1820 there had been no change, and little in 1821. In 1822 Mr Vansittart was reper quarter, and other kinds of grain at inferior rates. The luctantly forced to remit rather more than three millions of taxes. Matters were thus placed upon the same footing as in 1819. Mr Robinson claimed to have remitted during his administration L.8,073,000. The annual charge on sions to sound economical principles were wrung with the whole debt on the 5th of January 1823 he stated utmost difficulty from the landed interest. But, on the at L.29,286,000; and on the 5th of January 1826 at other hand, a portion of the manufacturing and mercantile L.27,946,000; being a reduction of L.1,339,000 in three community showed themselves as unreasonable and selfish as years. But he omitted to remind the house that during each of these three years he had been professedly setting apart an annual sum of five millions as a sinking fund. In his estimate of the amount of the debt he omitted the bargain commenced by Mr Vansittart, and completed by himself, for the payment of military and naval pensions,—an annuity of L.2,800,000, which had forty-one and a half years to run, paid by government to trustees who had undertaken to discharge that burden. Mr Robinson was likewise reminded by Mr Hume that the decrease on taxation was more apparent than real. The taxes in 1818 had produced a sum of L.52,000,000; and in 1825 their amount was L.52,540,000. In 1818 the taxes were payable in paper not convertible into gold, on an average of three years, at a lower rate than L.5 per ounce. In 1825 they were payable in gold, or in paper money convertible into gold.

Reign of at the rate of seventy-seven shillings and tenpence half-George IV penny per ounce. In reality there had been an increase of taxation instead of a reduction. The chancellor of the exchequer evaded Mr Hume's statements and arguments, under the pretext that they were too complicated to be discussed at once. There was nothing in the argument he advanced, that the amount of revenue being derived chiefly from the excise and customs, indicated increased consumption. If the officials of government were adequately remunerated in the depreciated currency, they were extravagantly paid after its value had been raised. Undue burdens were imposed upon the country; but these were never adverted to. The majorities were the only answer relied upon by ministers; and they were applied with great success to meet motions for reduction of the naval, military, and diplomatic expenditure.

The discussions which arose during this session on the state of Ireland were as vain and fruitless as might be expected from a legislature indifferent to or ignorant of the

merits of either question.

In the speech by which the session was prorogued, allusion was made to the termination of hostilities with the Burmese empire. The origin, progress, and termination of this war were briefly these :- For many years the Burmese officers had been in the practice of committing acts of encroachment and aggression on the East India Company's territories. Towards the close of the year 1823 they had crossed the frontiers, and entrenched themselves within the limits belonging to the British. During January and February 1824 they were driven from several of their stockades; but on the 21st of February they succeeded in repulsing a British force, which inspired them with fresh audacity. The governor-general, by the advice of his council, issued a declaration of war on the 5th of March. A considerable naval and military armament, drawn partly from Madras and partly from Calcutta, was assembled at Port Cornwallis in the beginning of May, under the command of Sir Archibald Campbell and Commodore Grant. It attacked Rangoon, the principal sea-port of Ava, on the 10th of May, and took it after a feeble resistance, without the loss of a single man, capturing on the occasion a considerable quantity of artillery and ammunition. A detachment sent against the island of Cheduba, on the Arracan coast, and another against Negrais Isle, at the mouth of the Nerbudda, were equally successful. On the 10th of June General Campbell moved upon the enemy's camp at Kemmendine, which he attacked in concert with the flotilla. The position was evacuated by the Burmese troops, after sustaining a cannonade of a few hours. The British maintained their advantage in several engagements, and the enemy withdrew to a greater distance; but the inundations, and the necessity of collecting a large supply of provisions, induced General Campbell to continue his head-quarters at Rangoon up to the end of the year. Expeditions were, however, detached against the most important maritime stations; and by the end of October the whole of the Burmese coast from Rangoon to the eastward was subjected to the British arms. On the 1st of December Maha Bundoolah, who had been lately appointed to the command of the Burmese army, appeared in front of General Campbell's position with from fifty to sixty thousand men. He was allowed to extend his line round the British flanks, and to the rear, and even to entrench himself in that position. On the 5th General Campbell attacked and entirely routed his left wing. Bundoolah reinforced his centre and right with the scattered remnant during the night, and presented himself next day in front, having pushed his entrenchments close up to the British lines. General Campbell attacked them at noon, and drove them from all their entrenchments.

Bundoolah having received some reinforcements, took Reign of up a strong position with twenty-five thousand men, George IV "with a judgment," says Sir Archibald Campbell, "which would do credit to the best instructed engineers of the most civilized and warlike nations." On the 15th a body of thirteen hundred of General Campbell's infantry stormed the works, and the enemy fled, leaving their camp standing, with all their baggage and a large proportion of their arms and ammunition. Whilst these operations were carrying on, demonstrations had been made by the Burmese on the Chittagong frontier. Their arms were at first attended by success, and they continued to hover around Ramao till the end of July. Colonel Innes having taken the command of the Sylhet frontier, they gradually fell back; and the end of October saw Cachar completely evacuated, and the enemy in full retreat for Munnipoor. About the middle of February 1825 Sir Archibald Campbell moved from Rangoon upon Prome. The inhabitants of the country through which he passed saw with pleasure the expulsion of the Burmese. Having reached Sorrawah, fifty miles in advance of Rangoon, the commander-in-chief halted in the hope of hearing of the fall of Donabew, which was to be attacked by the column advancing under General Cotton by the Irawuddy. But the attack was foiled. On the 11th of March General Campbell commenced a retrograde movement on Donabew, before which he arrived on the 25th, and established a communication with the water column on the 27th. The batteries were opened on the 1st of April; and Maha Bundoolah having been accidentally killed, the Burmese garrison abandoned the fort. Sir Archibald immediately resumed his march upon Prome, which he entered on the 25th of April without firing a shot. By the 1st of February the Burmese were expelled from Assam. A series of brilliant operations on the 26th, 27th, 28th, and 29th of March gave General Morrison possession of Arracan. In Cachar General Shuldham was advancing upon Munnipoor, which lies two hundred miles north-west of Ammerapoora, the capital of the Burmese empire. The main body of the army was arrested at Prome by the rainy season, and felt somewhat straitened for provisions, the country through which their route lay having been entirely depopulated. The mortality among the troops was also considerable. The Burmese had twenty thousand men at Mecadore, fifty miles from Prome, and the same number at Patana-go. An equally numerous body was interposed between the British force in Arracan and the troops under the com-mander-in-chief. In September negociations for the restoration of peace were set on foot. A cessation of hostilities was agreed to on the 17th, to continue till the 17th of October. Commissioners from the king of Ava met the British general at Neounben-ziek on the 2d of October. They endeavoured to elude his demands for territorial cessions and indemnification; but finding him immovable, requested a prolongation of the armistice, that they might consult their court. It was accordingly extended till the 2d of November. Preparations were in the meanwhile made to prosecute the war with activity in case the armistice did not lead to a definite treaty. On receiving the proposed terms of peace, his majesty of the golden foot burst into a violent passion, and gave orders to renew of-fensive operations. Before the termination of the armistice it was haughtily announced to the British leader-"If you wish for peace you may go away; but if you wish either money or territory, no friendship can exist between us. This is Burman custom." The whole army of Ava, nearly sixty thousand strong, advanced against Prome, occupied by six thousand British and native troops. The left division of fifteen thousand, commanded by Ma-

ha Nemiow, approached close to Prome, keeping the east-

Reign of ern bank of the river. By the end of November the cen- ment. The forty-shilling freeholders, a body of men who Reign of Napadee, on the same side of the river, five miles above Prome. The right, consisting of fifteen thousand men under Sudda Woon, were posted on the opposite side of the river. All these bodies were, according to the military system of the Burmese, strongly entrenched. Sir Archibald Campbell, after expecting an attack for some days in vain, marched on the 1st of December to dislodge the corps of Maha Nemiow; and in this he succeeded after a desperate resistance. The leader fell, and the dispersion of his followers was so complete that they did not even attempt to form a junction with their centre. Sir Archibald, after allowing his troops only two hours repose, returned to Zeouke, having marched twenty-nine miles and fought a battle in the course of a day. Next day the British stormed the heights of Napadee under a heavy cannonade, entirely dispersed the centre, and captured the whole of its artillery, ammunition, and military stores. The position of the right wing was attacked on the 5th; the Burmese were driven from their defences, which were set on fire; and a considerable amount of military stores was captured. The road to the capital was now open, and Sir Archibald, after allowing his men one day's repose, advanced upon it in two columns. The Burmese once more indicated a desire to make peace; but as their shuffling and equivocation rendered it impossible to repose confidence in their professions, the commander-in-chief continued to advance; nor was it till the army had arrived within four days' march of the capital that the king agreed to accept of the terms which were offered to him. He renounced all claims to Assam, Cachar, and Jyntia, and recognised Gumbheer Singh as rajah of Munnipoor. He ceded to the Company the four great divisions of Arracan, and the provinces Yeh, Tavoy, Mergui, and Tenasserim. And to indemnify the British government he agreed to pay the sum of one crore of rupees. Twenty-five lacs of rupees were to be paid before the British retired upon Rangoon; the same sum before they evacuated the king's dominions; and the remaining half by equal annual instalments within two years from the date of the treaty. The handful of troops which had achieved this triumph commenced its return on the 5th of March. The India Company obtained by this conquest the removal of a troublesome neighbour, an increase of territory, and a consequent increased perplexity in its affairs. Britain gained nothing but an augmentation of its military and naval establishments.

Parliament was prorogued on the 31st of May 1826, and dissolved on the 2d of June; and writs were ordered to be issued for a new election, returnable on the 25th of July. The elections afforded a test of the success which had attended the new system of ministers. They showed how far the confidence of the people had been won by the concessions made to the spirit of the age and the popular eloquence of Mr Canning. In Scotland, as was to be expected from its miserable system of mock representation, there was a dull silent adherence to the old routine, from which nothing could be gathered. In Ireland the Catholic Association prosecuted with success its sacred task of forcing from an unwilling government the nation's rights. The bond of union, in defiance of the law, was kept up among its members; "the rent" continued to be levied; and the priests had been won to lend it their confidence. In every district of Ireland the new allies struggled with unwearied assiduity to turn the angry energies of the peasantry into a legal channel, and to teach them to direct their efforts to the attainment of some real good. The elections offered them an opportunity of strengthening the phalanx of their friends in parliament, and of testifying the national senti-

George IV. tre, between twenty-five and thirty thousand strong, un-lage der the Kee Wonghee, showed itself on the heights of to increase and multiply beyond what the land seemed able to support, and more neglected by their suzerains than the beasts of the field, except when the time arrived that they were to be driven to the poll, were converted into an engine to overthrow the power of their creators. The tenantry were besieged by the exhortations of clerical and lay emancipators to remember that they had rights as well as their landlords, and that they owed duties to themselves as well as to others. The great landholders now found the automata upon whom they had hitherto relied asserting wills of their own. The most splendid victory of the Catholics was gained in Waterford, where a member of the Beresford family was compelled to withdraw from the contest. The Catholic Association might point with pride to the change it had worked in the character of the Irish peasant; for, amidst all the heat of contested elections, bloodshed and lawless violence were on the decline, even while the hungry artizans of England were driven by want to violate the law. In England the ministers were almost everywhere triumphant. Mr Brougham experienced a more marked defeat in Westmoreland than on any former occasion. Lord Howick and Mr Beaumont, the Whig candidates for Northumberland, both failed. Mr Huskisson was again returned for Liverpool. The metro-polis alone adhered to its old principles. The usual topics were advanced by the candidates for popular favour. Only one is worthy of being recorded. In proportion as the Catholic cause advanced in Ireland it seemed to grow weaker in England. The same ignorance, prejudice, and sectarian spirit of which the Catholics stood accused was appealed to by their adversaries, and the almost absolute

watchword "no popery" was revived.

The bustle of the elections was succeeded by grave apprehensions of famine. Wheat had proved an average crop through England; but a long drought threatened a dearth in every other sort of grain. Barley was deficient; there was every appearance of a scarcity of pulse; oats, in many districts the most important article of food to the lower classes, and the potato crop, the sole stay of Ireland, threatened to fail altogether. The farmers, too, were suffering; for the violent and continued heats had dried up the richest meadow-land in England, till it became necessary to feed cattle with dry fodder, as if it were the depth of winter. A seasonable change of weather averted a great portion of the impending calamity; but in the month of September prospects were most alarming, and the rise in the price of grain pressed with unwonted severity upon the working classes, who were still suffering from the effects of the late panic. The price of oats in reality exceeded the importation price; but the crafty devices of the landlords' committee respecting the taking of averages precluded the opening of the ports before the 15th of November, although in the interim a famine might have depopulated the country. Ministers generously resolved to risk a violation of the law rather than incur the deeper moral responsibility of allowing the people to perish by famine. On the first of September they issued an order in council, authorizing the immediate importation of oats, oatmeal, &c. upon the persons importing becoming bound to pay a conditional duty. The necessity of obtaining an act of indemnity for this step occasioned the assembling of parliament at an earlier season than usual.

The first session of the eighth parliament of the united kingdom of Great Britain and Ireland commenced on the 14th of November 1826, and terminated on the 2d of July 1827. It adjourned twice; from the 13th of Decem ber to the 8th of February, and from the 12th of April to the 1st of May. It will be necessary, in order to pre-

Reign of serve the current of our narrative free from perplexity, to arrangement which Mr Peel conceived likely to solve all Reign of George IV detail briefly the changes in administration, and the intrigues by which they were effected, before narrating the

legislative proceedings of this session.

Lord Liverpool was struck with apoplexy on the morning of the 17th of February 1827. As it was possible that he might recover sufficiently to resume his share in public business, a feeling of delicacy kept both the king and ministers from taking any immediate steps to re-organize the government. The disunion between the two incompatible parties which composed the cabinet continued to increase after the removal of their connecting link; and a sense of this, aided by the urgency of opposition, forbade longer delay. The first practical discussions respecting a new arrangement took place between the king and Mr Canning, at the royal lodge, on the 28th of March. His majesty's first idea was, to retain the services of Mr Canning and his friends, and to place at the head of administration a peer holding Lord Liverpool's opinions on the Catholic question. Mr Canning explicitly stated, that if those whose sentiments were favourable to the Catholics were to be excluded, solely on account of these sentiments, from the highest offices of state, he could " not consent to be the individual in whose person such a principle should be established." He therefore felt himself bound honestly to state, that "the substantive power of first minister he must have, and, what was more, must be known to have," or he must beg leave to retire from a situation which he could " no longer fill with satisfaction to himself or with benefit to the king's service." Mr Canning felt, in short, that in any administration of which he should form a part, whoever might be the ostensible, he must be the real prime minister, and he was naturally and justly indignant at the demand that he should yield up his laurels to grace the brow of titled imbecility.

With the exception of an interview, during which nothing of moment occurred, Mr Canning had no more communication with the king till the 10th of April, when he received the royal commands to prepare, "with as little delay as possible, a plan for the reconstruction of the administration." There were, however, frequent conferences in the interim between Mr Canning, the Duke of Wellington, and Mr Peel. The last-mentioned gentleman frankly declared that he had made up his mind to resign if an individual favourable to the Catholics were placed at the head of government. The duke urged strongly the necessity of having a prime minister opposed to concession. Mr Peel's professions " of respect and regard" for Mr Canning were unbounded; so much so that Mr Canning expressed himself as feeling "it quite impossible to do sufficient justice to his frankness and straightforwardness, and to feelings for which he owned he had not before given Mr Peel credit." The subsequent conduct of that minister has proved that Mr Canning's first impressions were correct. The haughty character of the Duke of Wellington prevented him from wearing the mask to so much purpose. The language of the Duke of Newcastle, and other adherents of the Duke of Wellington, not disapproved of if not sanctioned by his Grace, had naturally irritated Mr Canning. By the intervention of muduke and Mr Canning, but without producing any effect beyond a re-establishment of the outward show of cordiality, and a conviction in the mind of Mr Canning that the duke coveted the post of prime minister for himself. The justice of this conclusion is established by the eagerness with which that eminent soldier on two subsequent occasions grasped at the office, and by Mr Peel's waiting upon Mr Canning at the king's command, on the 9th of April, to suggest the appointment of the duke as premier, an

George IV. difficulties.

1827.

Mr Canning left the king late in the afternoon of the 10th of April; and as parliament was to adjourn for the Easter recess on the 12th, there was not a moment to be lost. He found Lord Grenville, Mr Huskisson, and Mr Planta at the foreign office. Lord Grenville was requested to bear to his brother-in-law, Lord Harrowby, a verbal announcement of Mr Canning's having been ordered to construct an administration; Mr Huskisson was charged with a similar mission to Lord Melville and Mr Wynn; and Mr Planta to Mr Robinson. The same communication was made by Mr Canning in writing to the Duke of Wellington, Lord Bathurst, Lord Westmoreland, and Lord Bexley. The lord chancellor and Mr Peel were waited upon by Mr Canning in person. The projected cabinet, it was intimated, was to "adhere to the principles on which Lord Liverpool's government had so long acted. Lord Eldon "had long felt anxious to resign; but wished to procrastinate the time, not for his own sake, but on account of the business of his court. In about four months he would wind up its affairs and retire." Finding, however, his colleagues determined to secede from Mr Canning, his lordship at last vacated the woolsack, which he had for so many years occupied. The Duke of Wellington inquired who was the individual intended to be put at the head of the government. To Mr Canning's reply that the king "usually intrusted the formation of an administration to the individual whom it was his majesty's gracious intention to put at the head of it," his Grace rejoined by requesting Mr Canning to desire his majesty "to excuse him from belonging to his councils." Lord Westmoreland hesitated to pledge himself, and ultimately declined office on the ground that "the chief office was in the hands of a person of different principles from Lord Liverpool's." Mr Canning replied to this insinuation; but only received a brief and haughty note, intimating that Lord Westmoreland "declined to enter into a literary conflict upon principles." Lord Bexley first accepted office, and afterwards drew back. Lord Bathurst wished to see Mr Canning, but sent in his demission before an interview took place. The reason afterwards assigned was the resignation of so many of his colleagues. Mr Peel adhered to his first determination. Lastly, Lord Melville made up his mind to resign, because, as he expressed himself in the House of Lords, he doubted the stability" of Mr Canning's administration.

It was impossible for Mr Canning not to see that these answers were the result of combination. The king took the same view of the transaction; and, already moved by the dictatorial tone of the Dukes of Wellington and Newcastle, was roused, by this pertinacious opposition to the minister of his choice, to long unwonted decision. He immediately confirmed Mr Canning's appointment by giving him his hand to kiss. The new premier lost not a moment in gathering the friends who had stood true to him,-Lord Harrowby, Mr Robinson, Mr Wynn, and Mr Huskisson,—and preparing to fill up vacancies. Lord Melville was the last to resign, and his office was the first filled up. Before twenty-four hours had elapsed, his royal hightual friends several interviews took place between the ness the Duke of Clarence, the heir-presumptive to the throne, was placed at the head of the admiralty. Lords Anglesey and Lyndhurst accepted the offices vacated by the Duke of Wellington and Lord Eldon; the Duke of Portland, Lord Dudley, and Mr Sturges Bourne, joined the administration. A negociation was opened with the Whigs through the medium of Lord Lansdowne. Some difficulties occurred to prevent the immediate accession of the party to the number of Mr Canning's avowed supporters. In general, however, they cordially co-operated with him;

Reign of and it was settled, that at the close of the session Lords opposition undermined his strength, and hurried him to a Reign of George IV. Lansdown and Carlisle, and Mr Tierney, should have seats , in the cabinet.

The ministry seemed irresistible. Supported by triumphant majorities in both houses-opposed by the virulent but powerless hatred of a talentless faction of discontented place-hunters—suspected only by Lord Grey in the House of Lords, and Mr Hume and his small band of sturdy reformers in the Commons-it swayed the legislature to its will. The great body of the nation saw, in the junction of the Whigs with Mr Canning's friends, a further guarantee of administrative reform. The question of parliamentary reform had been postponed by universal consent, and the concession of it by the Whigs was less noticed than perhaps it ought to have been. Ireland, relieved from a portion of her fears by the death of the Duke of York, was waiting in breathless expectation of the change which the new arrangements were to work in her favour. The calculations of all were, however, rendered nugatory by the death of Mr Canning on the 8th of August 1827.

George Canning was a great orator, and specious organ of a party, rather than a great statesman. It has been said of him that he had no fixed political principles, no certain rules of public conduct. In his youth he defended despotic opinions, and the policy of restriction; towards the close of his career he patronized popular rights, and advocated a liberal commercial system; and the weapons which he employed, splendid declamation and ready wit, were equally available on either side. It would be in vain to seek in his numerous orations for any clear and distinct delineation of a system, or any accurate definitions of great principles; they are mostly brilliant superstructures, reared upon the ordinary basis of party assumptions. His favourite maxim, "to hold the balance between contending principles," is perhaps the severest censure that could have been pronounced against him; inasmuch as it involves an explicit admission that his system was adapted to the exigencies of his position, without reference to any higher or purer standard. Even his eloquence partook of this incidental and ephemeral character. Some of its finest passages are rather dexterous abstractions and ornate common-places, than those burning expressions of sentiment which strike home conviction, and excite new ideas in the mind. His chief power consisted in an open, generous disposition, which hankered after the love and admiration of all that he came in contact with; in a degree of vehemence, which compensated for his deficiency in reasoning and sentiment; and in a fine feeling of rhetorical beauty, which, from its subdued tone, kept him within the range of the comprehension of those he was addressing. In a popular government Canning would have sunk before men of business talent and ready elocution; in a despotic government his warm temperament would have incapacitated him for competition with cool and calculating courtiers. Even in the House of Commons, his ardent disposition, alike incapable of enduring opposition or of bearing triumph with moderation, if it sometimes enabled him to chastise petulance, occasionally prompted him to indulge in a strain of declamation which in his cooler moments his own generous and candid nature would have led him to condemn. But, on the whole, in a government such as that of England, where a despotic oligarchy sought to amuse the nation with the show of free discussion, he was an invaluable auxiliary in a cause, with which he never could have had any real or cordial sympathy. When it was too late, he awakened to a sense of his true dignity and character. The cold-hearted faction for whom he had exerted his youthful vigour turned the whole energy of their concentrated malice upon him the moment he asserted the natural supremacy of his genius. But although their insolence preyed upon his spirits, and their implacable

premature grave, a halo of glory brightened round the close George 1V. of his career, and he died an object of admiration to many, and of wonder to all.

The cabinet he had collected did not long survive him. His personality was the only cement that kept it together. Had he survived, time might have given it consistency; but both he and his immediate friends must have purchased it at the price of large concession to popular demands. He had thrown himself into the arms of the Whigs, and both parties must have thrown themselves, as the latter have since done, into the arms of the people, to enable them to make a stand against the aristocracy. His cabinet at the moment of his death consisted of three incompatible parties; -some adherents of the old far niente system; Mr Huskisson and others, who wished to govern in accordance with popular principles, but without conceding any direct influence to the people; and the Whigs, whose professions had ever been a desire to afford the people a more direct voice in public councils. At the head of this discordant mass was placed Lord Goderich, an intelligent and wellmeaning man, but totally destitute of promptitude and decision. Mr Herries, whose personal attachments bound him to the Duke of Wellington and Mr Peel, was placed in an important office. This ill-assorted shadow of a government was huddled up after the prorogation in 1827, and did not survive to meet the session of 1828. Lord Goderich resigned on the 8th of January. Some violent recrimination ensued between the parties, worthy only of ephemeral notice. One or other, or both parties, might have behaved, in fact did behave unhandsomely; but the real cause of the dissolution of Lord Goderich's government lay deeper, viz. in the very nature of its constitution.

Before proceeding to the history of his successors in office, and the fortunes of the nation under their sway, it will be necessary to revert to the proceedings of the session 1826-27; a session interrupted by two long recesses, and frittered away by vehement personal disputes.

The subject of the corn laws was almost the only one that met with serious and continued attention. The king's speech was studiously silent upon the general question, but this very silence was made a pretext for introducing it. Lord King in the House of Lords moved an amendment to the address, condemning the corn laws. Mr Western in the Commons moved an amendment to the address, calling for investigation into the state of the agricultural interest, and pointing at additional restrictions in its favour. Ministers objected to the discussion, on the ground that parliament had been summoned to meet before Christmas, not for purposes of general legislation, but to pass an act of indemnity in favour of ministers, in consequence of their having opened the ports before the averages indicated that the price of grain warranted such a step. Lord Liverpool and Mr Canning assured parliament that ministers were prepared to propose a general measure regarding the corn laws, and that they would produce it immediately after the holidays. In consequeuce of these representations, the only step taken before the close of 1826 was the passing of the indemnity act. Mr Whitmore took occasion to remark that the measure was a new proof of the absurdity of a law which they had been obliged to break thrice in the course of three years. It was intended to introduce the subject of the proposed alterations to the notice of both houses on the same evening, namely, the 17th of February.

The illness of Lord Liverpool prevented the propositions being submitted to a committee of the upper house, and Mr Canning's indisposition caused a postponement of the committee of the lower till the 1st of March. On that day the foreign secretary proposed a series of resolutions

Reign of respecting the future regulation of the corn trade, to be opposition. The Duke of Wellington asserted that his Reign of George IV adopted by the committee as the foundation of a bill. The amendment met with the concurrence of his majesty's George IV. object of the proposed measure he stated to be to afford ministers, and produced a letter from Mr Huskisson in as much protection to the land-owner as was necessary, at the expense of as little pressure upon the commercial interest as was possible. The mode in which this was to be accomplished was by imposing a scale of regulated duties upon foreign grain, rising and falling inversely with the fall and rise of prices. The medium price of wheat assumed was sixty shillings, and the corresponding duty was one pound per quarter. For every shilling wheat rose above the medium price there was to be a reduction of life, replied that he had only approved of the general printwo shillings of duty until the price reached seventy shillings, at or above which it was liable to a duty of one shilling per quarter. For every shilling wheat fell below the medium price, there was imposed an additional two shillings of duty. The duty upon other kinds of grain was in proportion, and varied upon the same principle. A duty equal in amount to the duty payable on five bushels of wheat was imposed upon every barrel of wheat-meal and flour, being a hundred and ninety-six pounds. A duty equal in amount to the duty payable on a quarter of oats was imposed upon every quantity of two hundred and fifty-two pounds of oatmeal. The averages regulating the amount of duty were to be taken weekly. Mr Canning having submitted his measure to the house, postponed its consideration for a week, in order that every appearance of precipitation should be avoided. The debate, when liament which witnessed the termination of Mr Canning's resumed, turned chiefly upon the question of too much or too little. It was waged, however, with all that pertinacity and violence which characterize the disputes of men who differ little from each other in opinion. Some concessions were made by ministers, but they were all in favour of the land-owners. Mr Hume took no part in the discussion in committee, but when the report was brought up he entered his protest against the measure. He manfully argued for a free trade in corn as in every thing else. He maintained, that if there was truth in the allegation of the land-owners, that they bore a heavier burden of taxation than the rest of the community, the proper way to afford them relief was by a countervailing duty, or the repeal of taxes. The country needed foreign grain; it could not one year with another grow enough for its own support. When the ports were sometimes open and sometimes shut, no foreign nation could rationally venture on the speculation of raising grain for the English market; the demand was too uncertain. Mr Hume suggested the imposition of a duty of fifteen shillings on foreign wheat, to decrease annually one shilling until it was reduced to ten shillings, which was to remain the permanent duty. Only fifteen members voted for this amendment. The House of Commons having approved of Mr Canning's resolutions, a bill enacting them into a law was introduced, which reached its third reading on the 12th of April, was passed, and sent to the Lords.

A strong opposition to the provisions of the bill had been mustering and threatening before it made its appearance in the upper house. Various unimportant amendments were made in committee; but one brought forward by the Duke of Wellington sealed the fate of the bill. His Grace moved, that "no foreign corn in bond should be taken out of bond until the average price of corn should have reached sixty-six shillings." This amendment, which completely altered the nature of the bill, was carried by considerable majorities, both in committee and when the report was brought up. Ministry in consequence abandoned the mutilated measure. A temporary bill was introduced by Mr Canning, lest a year should be allowed to elapse without any legal provision on the subject; and this passed through both houses without any serious

corroboration of his assertion. One expression in the letter was certainly liable to misapprehension, and might have contained the original hint of the duke's amendment; but Mr Huskisson expressly said, even of his own suggestion, that it would hazard the safety of the measure, and therefore he could not approve of it. The duke, also, when charged with having sought to defeat a measure to which he had given his assent during Lord Liverpool's ciple of it. But his measure was subversive of the principle of the bill. No wonder then that Mr Canning saw in the duke's amendment, and the hearty support it found, a personal attack. His only mistake lay in calling him an instrument in the hands of others. His previous intriguing, and his subsequent political career, show him to have been an instrument possessed of a perfect consciousness of the purposes to which he was applied. Mr Canning was thus far in the right. He was the object of the most intense animosity to the high Tories. They hated with all a woman's hatred one of the democracy who aspired to an equality with them, who they felt surpassed them in intellectual power, and who they were conscious knew that he surpassed them.

1827.

The other questions brought before the session of parcareer, were discussed with a considerable degree of listlessness and impatience. Mr Canning's vindication of the prompt interference of Britain, when Spain threatened to disturb by violence the internal arrangements of Portugal, was splendid and convincing. The establishment of a constitutional form of government in Portugal had given rise to much faction and intrigue; and there had been numerous desertions from the army. The disaffected had been well received, and allowed to organize themselves behind the Spanish frontier, and had even dared to violate the Portuguese territory. A large force of Spanish troops was mustering upon the frontier. Under these circumstances the regency, after losing some time in fruit-less negociations at Madrid, claimed the aid of England, which was frankly and promptly granted. Five thousand British troops were immediately embarked, the first division of which arrived in the Tagus on the 25th of December 1826. The course of events rendered it unnecessary for them to encounter the rebels in the field. Home affairs were discussed with the same want of keenness. On the 5th of March the House of Commons refused to entertain the question of Catholic emancipation, by a majority of four. Notices of one motion on the subject, and another for the repeal of the test act, were withdrawn immediately after the instalment of Mr Canning in the premiership, lest there should be brought about a premature collision between him and his new allies. Mr Hume's motion for the repeal of Lord Castlereagh's act against cheap publications was lost in consequence of the absence of the Whigs, and the opposition of Sir James Scarlett and others. Such was the aspect of affairs when the government of the nation was placed in the hands of the Duke of Wellington and his friends.

Lord Goderich had no sooner resigned than the king sent for the Duke of Wellington, and commissioned him to form an administration with himself at its head. His Grace immediately entered into communication with Mr Peel and others of Lord Liverpool's ministry who had seceded on the elevation of Mr Canning. The new government was speedily constructed. The Whigs were dismissed, the friends of Mr Canning remained in office, and the leading members of Lord Liverpool's cabinet return-

Reign of ed. The public were not satisfied at seeing the pertina- ably shaken. No decided steps of the minister justified Reign of George IV city with which Mr Huskisson and his friends clung to solely for the purpose of disgracing them in the eyes of the country; for, after forcing upon the House of Commons measures which obliged them, out of a regard to common decency, to declare they supported with reluctance, and merely for the sake of preserving unity in the cabinet, he took the opportunity afforded him by Mr Huskisson, when he voted for transferring the franchise of Penryn, convicted of corruption, to Birmingham or Manchester, to get quit of him, and with him of his retainers. Their places were immediately filled by creatures of the duke. The only other change made by the premier was his superseding the Duke of Clarence in the admiralty.

The Duke of Wellington found the country at peace, and looked up to as the head of constitutional Europe. The state of peace seemed to run little risk of being interrupted. The British troops dispatched to Portugal were still stationed there, but almost one of the first steps taken by the new minister was to withdraw them. The relation in which England stood to the Ottoman Porte was more delicate. From the commencement of the Greek struggle for independence till the year 1827 Britain had observed a strict neutrality between the Turks and their former vassals. The prolongation of the contest between the infuriated nations, however, promoted the growth of piracy to such a degree that the countries principally interested in the commerce of the Levant felt themselves bound to put an end if possible to the state of things in which it originated. These resolves were confirmed by their feelings of humanity, revolted by the Turkish cruelties. On the 6th of July a treaty was signed at London by the ministers of Britain, France, and Russia, declaratory of the necessity of putting an end to this sanguinary contest. The intervention of France and Britain was justified on the ground that their mediation had been requested by the Greeks. The object of the treaty was declared to be the effecting of a reconciliation between the Porte and its Grecian subjects. An armistice was to be insisted on from both parties as an indispensable preliminary to the opening of any negociation. Before the Porte could be brought to declare its sentiments with regard to this interference, Ibrahim Pacha, with the Egyptian fleet of ninety-two sail, arrived in the Morea. The British squadron under Admiral Codrington was cruizing off Navarino when this armament approached. The Porte not having yet refused to accede to the armistice, the English admiral gave the Egyptian his choice of returning to Alexandria or entering Navarino, to which in that case he must confine himself. The latter branch of the alternative was accepted. Ibrahim took advantage of the absence of the British and French squadrons to put to sea on the 30th of September, but returned to Navarino on the approach of Admiral Codrington. Chafed by these obstructions, he attacked the Greeks by land, and ravaged the surrounding districts with fire and sword. It was immediately resolved by the British, Russian, and French admirals, to enter the harbour, in the hope that their imposing attitude would induce Ibrahim to desist from his savage devastation. This movement produced an attack from several of the Turkish ships; and after a vain attempt at explanation the action became general. The Egyptian fleet was completely dismantled. It was feared that the sullen silence with which the intelligence of this disaster was received at Constantinople might eventually break out into war. If it happened that there was little reason to dread a transition from the peace which Europe was enjoying, owing to the accession of a military premier, the confidence in the liberal policy of England was consider-

the suspicions of his own country and Europe; but the George IV. office. The duke indeed seemed to have retained them lenient eye with which the proceedings of Don Miguel were regarded, and the disparaging terms applied to the action at Navarino in the king's speech, were laid hold of

as unfavourable symptoms. The first step taken by the new ministry after the meeting of parliament was to appoint a finance committee. The nomination of its chairman was the ostensible reason of that schism in the late cabinet which had caused its dissolution. On the 15th of February Mr Peel proposed "That a select committee be appointed to inquire into the state of the public income and expenditure of the united kingdom, and to consider and report to the house what further regulations and checks it may be proper in their opinion to adopt, for establishing an effectual control upon all charges incurred in the receipt, custody, and application of public money; and what further measures can be adopted for reducing any part of the public expenditure without detriment to the public service." The subject of inquiry to which the mover adverted as most worthy of the attention of the committee, and most likely to be productive of benefit, was the simplification of the public accounts. He alluded to the superior manner in which those of France and the United States were kept. This admission of the propriety of taking a lesson on such a subject from these countries, when viewed in connection with Mr Canning's declamatory opposition to Mr Brougham's motion respecting the droits of admiralty in 1820, was a most remarkable sign of the times. A minister who had opposed that very Mr Canning on the ground that he conceded too much to the innovating spirit of the age, was ready to advance before him in the path of innovation. Mr Peel's motion encountered no stronger opposition than arose from a proposal made by Mr Hume, that as one committee was inadequate to overtake the immense number of topics embraced by the proposed investigation, several should be appointed. Mr Brougham, with a view to reconcile the two plans, suggested the division of the committee into sub-committees, each taking a specific subject of inquiry. Ministers persisted in adhering to their original plan. measures of financial reform were submitted by the committee to the House of Commons during the session. The first related to the system on which government annuities were granted. Mr Perceval's bill for regulating the granting of annuities of 1808 was calculated upon Dr Price's tables. As early as 1819 Mr Finlayson demonstrated to Mr Vansittart that, in consequence of the errors of these tables, the country was losing L.8000 per month on the annuities granted by government. The demonstration, however, did not carry conviction to the mind of the chancellor of the exchequer; and even his successor Mr Robinson paid no attention to the representation. The finance committee soon convinced itself

The next undertaking of the ministry was the settlement of the corn laws. The bill introduced with their sanction adopted the principle of that proposed by their predecessors, but increased the duties imposed. Mr Charles Grant, to whom was intrusted the task of bringing forward the measure, described the enactment as the

that the annuities occasioned loss. Nothing could be done to alter those which had been already sold; but, on the recommendation of the committee, a bill was passed to sus-

pend the operation of the act under which they had been

granted, until a more correct system should be settled.

The other measure recommended by the committee was

the abolition of the office of lieutenant-general of the ord-

nance; but such a concession was not to be expected

from the Duke of Wellington.

Reign of fruit of a compromise, and confessed that he thought it from the temper of the house, that concession was the only Reign of George IV. imperfect. Some other members of the government expressed a similar opinion. The bill was finally carried by

large majorities.

While ministers were thus carrying into effect the measures originated by men with whom they had refused to co-operate, Mr Brougham was astonishing the nation with the display of a degree of legislative industry, of a mind at once indefatigable and comprehensive, that threw into the shade even his own exertions in the cause of education. On the 7th of February he directed the attention of the house to the state of the common law courts, and of the common law itself. He omitted equity in every branch, because he considered it as in some sort already taken up by parliament. For the same reason he passed over the criminal law. The inquiries pressed upon the house by Sir Samuel Romilly and Sir James Mackintosh had, it was true, been followed up timidly and on a narrow scale by Mr Peel; still the exertions of that minister were a pledge that something was to be done. The commercial law, as of modern growth, was comparatively pure. In regard to the law of real property, much had been done and more was hoped for. But to the conflicting jurisdictions, the inadequate and cumbrous forms of the common law courts, and the incongruities of the anomalous mass of consuetudinary and statutory law to which their judgments were conformed, the hand of reform had never yet been stretched out. Mr Brougham entered at great length into the constitution of the English courts, and the state of the law administered in them. For seven hours did his lucid arrangement and impressive earnestness fetter the attention of an assembly little qualified by habits or education to take pleasure in dry legal discussions. He pointed out the danger of paltry piece-meal reform, and concluded by moving an address to the throne, praying the appointment of "a commission for inquiring into the defects occasioned by time and otherwise in the laws of this realm, and into the measures necessary for removing the same." All debate on this motion was suspended until the 29th of February, when Mr Brougham substituted a modified resolution, which, with the assent of government, was unanimously carried. It prayed his majesty to take such measures as might " seem most expedient for the purpose of causing due inquiry to be made into the origin, progress, and termination of actions in the superior courts of common law in this country, and matters connected therewith; and into the state of the law regarding the transfer of real property." The field of inquiry was materially narrowed, and the prospect of efficient reform correspondingly diminished.

It has already been remarked, that the old aristocrats who rebelled against the presumption of a commoner aspiring to the chief honours of the administration, had felt themselves obliged, on their return to office, to pay homage to public feeling, and adopt the very line of policy which they had blamed in others. A more striking proof that they were merely allowed to hold the reins of government by sufferance was this year afforded in the success of the dissenters in asserting their rights. Lord John Russell moved on the 26th of February that the house should resolve itself into a committee for the purpose of taking into consideration the regulations of the corporation and test acts. A keen debate ensued, which terminated in a division, when two hundred and thirty-seven voted for the committee and a hundred and ninety-three against its appointment. This was the first successful blow aimed at the supremacy of the church of England since the revolution. The committee, notwithstanding the earnest entreaties of ministers for delay, agreed to a resolution approving of

course left open for government. A bill founded upon George IV. the resolution was introduced and read a second time without opposition. When the motion for going into committee was made, Mr Peel rose and declared, that after the decision to which the house had come, he was prepared to dismiss at once from his mind every idea of adhering to the existing law. All that he asked for was, the substitution of a declaration that the predominancy of the established church should be secured for the sacramental test. His request being complied with, the ministers withdrew their opposition to the bill, which was speedily passed, notwithstanding the tears of the Earl of Eldon.

But a more important concession to public opinion yet remained to be made by the ministers; they had, in fact, to purchase the continuance of their power at the price of a complete abandonment of all their previous professions, and the simultaneous adoption of a line of policy which they could not defend upon any principle except that of an over-

ruling necessity.

On the 8th of May Sir Francis Burdett moved for a committee of the whole house to take into consideration the claims of the Catholics, with a view to a final and conciliatory adjustment. The debate on this motion, which was continued for three evenings, ended in a majority of six in favour of the house going into committee. The resolution subsequently adopted was, that the time had arrived when a final settlement of the Catholic claims was expedient. A conference with the Lords was requested, for the purpose of ascertaining whether the sentiments of that house had undergone the same change with those of the Commons. The managers for the Lords having received the resolution, it was ordered to be taken into consideration by their house on the 9th of June. The discussion was entirely destitute of interest beyond what resulted from its being the first occasion on which the Duke of Wellington had expressed his opinion of the question at length. He grounded his opposition to concession entirely on expediency. The discussion would lead, he thought, to no practical result, and would tend only to disturb the public mind. He was desirous that the agitation of the country might be allowed to subside; and in the end it might be possible to do something, for he was most desirous of seeing the subject brought to an amicable conclusion. The motion of the Marquis of Lansdown, that the house should concur in the resolution which had been adopted by the Commons, was lost by a majority of forty-four.

Whilst the claims of the Catholics stood in the legislative assemblies "like the swan's down at full of tide, which neither way inclines," the power which was to establish justice was carrying all before it in Ireland. The Catholics had paused to see what measures would be adopted by Mr Canning; but the elevation of the Duke of Wellington set them again in motion. The first opportunity of showing their determined spirit of opposition to him was afforded by the election for the county of Clare. Mr Vesey Fitzgerald, one of the members representing that county, had vacated his seat by accepting the office of president of the board of trade when Mr Charles Grant resigned. He had uniformly given his vote and influence in favour of emancipation; but he had identified himself with the Duke of Wellington, and was esteemed no longer worthy of confidence. Besides, a new mode of annoying government had suggested itself to the fertile invention of the Association. The laws might prevent a Catholic from taking his seat in parliament, by ordering that an oath should be tendered to him when he appeared to claim his right of sitting; but they did not forbid his being returned to serve. Taking advantage of this omission would afford the administration the instant repeal of the obnoxious acts. It was evident, a test of the absolute sway which the Association exer-

George IV. O'Connell was proposed as a candidate for the honour of gerald. Emissaries of the Association were dispatched to every barony and parish of the county. The priests, with one exception, exhorted their flocks to vote for the advocate of their rights. A fund was prepared to pay up the arrears of all tenants distrained on account of the votes they might give, upon their finding security for repayment within a reasonable time. The day of election came. Mr Fitzgerald threatened the voters with the displeasure of their landlords. "Is it," he asked, "the payment of an arrear of rent by any body of men that will compensate to the unfortunate peasant for being deprived of his natural protector? Is it the payment of a few pounds that can compensate to the unfortunate peasant for the total alienation of his landlord? When the poor man is sick, men be, who, to gratify a public, perhaps a private, pique, burst the bonds which for years have bound together the landlord and tenant by what was considered an indissoluble tie? Alas! they will be far distant; and the unfortunate tenant will have nobody to look to for relief and comfort, except that landlord whom he is now called upon to desert." Mr O'Connell, on the other hand, dwelt upon the utter hopelessness of good legislation for Ireland so long as the people were not represented. He expatiated shrunk back from asserting them in person, and were willing to receive them from the bounty of a patron. He reminded his hearers of the unjust and unequal taxation under which they were labouring. He warned government that "the young blood of Ireland was in a ferment." The result of the election proved that the Catholics of Ireland had determined to rely upon their own efforts alone. The tenantry had awakened to a sense of their degraded situation; a race of paupers tolerated in the land because once in seven years they were of use, and allowed to perish of hunger and cold except when it became necessary to win assert their right to equal laws and legislative attention to their interests. This spirit was mainly owing to the efforts of the Association; and to the credit of the gentlemen composing that body, a spirit of forbearance from violence had likewise been fostered in the peasantry. Notwithstanding the violence of party feeling, the Clare election was attended with less outrage than the average of standing a protest taken by some of the freeholders, was declared duly elected.

In the month of July the law which had been directed against the Catholic Association expired, and that body immediately re-assembled in its original form, to improve the victory it had gained in Clare. They issued an enumeration of four pledges to be required of every person who should at any time come forward as candidate for a seat in parliament. By the first he was to bind himself to oppose the Duke of Wellington's ministry in every thing until emancipation was conceded; by the second, to support religious and civil liberty; by the third, to procure the repeal of the sub-letting act; and by the fourth, to support reform in parliament. It was declared that every canby the men, influence, and funds of the Catholic Association. The next step was to organize local clubs. These bodies speedily spread throughout the three southern provinces, and embraced in their number many of the higher as well as of the lower orders. As far as possible, a club was instituted in every parish, consisting of the principal

Reign of cised over the tenantry of Ireland. Accordingly Mr mers as could read. The club was to meet monthly. It Reign of was to keep a register of all electors within its bounds; to George IV representing Clare in parliament, in opposition to Mr Fitz- have every man in readiness for future elections; and to promote good order, perfect subordination to the laws, political knowledge, and liberal feeling, as much as possible. Every club was to report once in three months to the secretary of the Association, and to receive a weekly paper for a weekly contribution of three pence. Aggregate meetings of these clubs were held during the autumn in the provinces of Leinster and Munster, and countenanced by many of the aristocracy. The party feuds which raged among the peasantry, and occasioned unintermitting scenes of riot and bloodshed, were hushed at the bidding of the Association. The superfluous flow of Irish animal spirits was turned from the path of crime, and concentrated for the achievement of a great national conquest. Well might Mr Shiel say-" What has government to dread from our and his family famishing with hunger, where will those resentment in peace? An answer is supplied by what we behold. Does not a tremendous organization extend over the whole island? Have not all the natural bonds by which men are tied together been broken and burst asunder? Are not all the relations of society which exist elsewhere gone? Has not property lost its influence has not rank been stripped of the respect which should belong to it—and has not an internal government grown up, which, gradually superseding the legitimate authorities, has armed itself with a complete domination? Is it upon the impossibility of men achieving their rights who nothing that the whole body of the clergy are alienated from the state, and that the Catholic gentry, and peasantry, and priesthood, are all combined in one vast confederacy? So much for Catholic indignation while we are at peace; and when England shall be involved in war----I pause; it is not necessary that I should discuss that branch of the division, or point to the cloud which, charged with thunder, is hanging over our heads."

The first symptom of intimidation on the part of the supporters of Protestant ascendency, was Mr Dawson's speech at a public dinner in Londonderry on the 12th of August. This gentleman was a minister of the crown, their voices at an election. They were determined to brother-in-law of Mr Peel, the leader of the Anti-Catholic party in the House of Commons, and himself distinguished for more than ordinary vehemence in opposing Catholic claims. He now declared that his sentiments were changed; that there was but one alternative, either to crush the Association, or to settle the question; that the for-

mer was impossible, the latter inevitable.

The bigots of the Protestant ascendency were on their English county elections; and Mr O'Connell, notwith- part no less active. No sooner had the act against illegal societies expired, than the Orange lodges were revived, and the grand Orange lodge in Dublin again opened. New associations were formed in various parts of the country, but particularly in Dublin and Ulster, under the name of Brunswick clubs. A Protestant rent was collected in emulation of the Catholic rent. The mass of the Irish population seemed arrayed into two mighty and adverse armies. Men's minds grew heated, and the war-cry of religious intolerance rose fiercer and fiercer. The Protestant friends of emancipation began to hold back from the Association. The mania of Brunswick clubs spread to England, and the spirit first showed itself in Kent, at a great meeting on Pennenden Heath. The Catholics in England were few; the question of emancipation was there didate refusing to take these pledges should be opposed regarded with comparative indifference; and there was a possibility of the prejudices of the lower orders being inflamed, and the Catholic claims made a ground of blind enmity between the sister islands.

The silence and inactivity of ministers while this storm was gathering merited the taunt of Mr Shiel. " Meanwhile the government stands by, and the minister folds gentry, clergy, churchwardens, and such respectable far- his arms as if he were a mere indifferent observer, and

George IV amusement of his official leisure. He sits as if two gladiators were crossing their swords for his recreation. The cabinet seems to be little better than a box in an amphitheatre, from whence his majesty's ministers may survey the business of blood." The truth was, that the members of the cabinet were irresolute, and divided among themselves, and that the king was unmanageable. His pride was hurt at the opposition to his sovereign will, displayed in the proceedings of the Association; and his worn-out and irritable constitution was stung to frenzy by the interruption of his pleasures. The Duke of Wellington, in a communication to the Marquis of Anglesey, dated the 28th of September, told the lord-lieutenant that the Catholic question was "a subject of which the king never hears or speaks without being disturbed." On the 11th of November the duke wrote to the same nobleman:-" I cannot express to you adequately the extent of the difficulties which these and other occurrences in Ireland create, in all discussions with his majesty. He feels that in Ireland the public peace is violated every day with impunity, by those whose duty it is to preserve it, and that a formidable conspiracy exists, and that the supposed principal conspirators-those whose language and conduct point them out as the avowed principal agitators of the country—are admitted to the presence of his majesty's representative in Ireland, and equally well received with the king's most loyal subjects." Again, on the 19th of November:—"I might have at an earlier period expressed the pain I felt at the attendance of gentlemen of your household, and even of your family, at the Roman Catholic Association. I could not but feel that such attendance must expose your government to misconstruction; but I was silent, because it is painful to notice such things. But I have always felt, that if these impressions on the king's mind should remain, and I must say that recent transactions have given fresh cause for them, I could not avoid to mention them to you in a private communication, and to let you know the embarrassment you occasion.'

The silence and inaction of the duke, circumstanced as he was, were unavoidable. They tended, however, to precipitate the final issue. Dr Curtis, the Catholic primate of Ireland, had long cultivated an intimacy with the Duke of Wellington, which had its origin in some important services rendered to the army in Spain, the doctor having held a high office in the university of Salamanca. He availed himself of the footing on which he stood with the premier to address to him a letter on the state of the country, and the importance of settling the Catholic ques-The duke's reply was in these words:--" I assure you that you do me but justice in believing that I am sincerely anxious to witness the settlement of the Roman Catholic question, which, by benefiting the state, would confer a benefit upon every individual belonging to it. But I confess that I see no prospect of such a settlement. Party has been mixed up with the consideration of the question to such a degree, and such violence pervades every discussion of it, that it is impossible to expect to prevail upon men to consider it dispassionately. If we could bury it in oblivion for a short time, and employ that time diligently in the consideration of its difficulties on all sides (for they are very great), I should not despair of seeing a satisfactory remedy." A copy of the duke's letter was forwarded to Mr O'Connell, and received by him and the Association as a declaration that the minister was no longer unfavourable to the Catholic claims. A copy of the letter was likewise transmitted to the Marquis of Anglesey. In his reply to Dr Curtis the marquis pointed out that the duke could only be considered as wavering

Reign of the terrific contest only afforded him a spectacle for the guage as might further conciliate him; and earnestly dis-Reign of suaded from every appeal to brute force. The most re-George IV. markable passage in the letter was the following:-"I differ from the opinion of the duke, that an attempt should be made to bury in oblivion the question for a short time. First, because the thing is utterly impossible; and next, if the thing were possible, I fear that advantage might be taken of the pause, by representing it as a panic achieved by the late violent re-action, and by proclaiming, that if the government at once and peremptorily decided against concession, the Catholics would cease to agitate, and then all the miseries of the last years of Ireland will have to be re-acted. What I do recommend is, that the measure should not for a moment be lost sight of—that anxiety should continue to be manifested—that all constitutional (in contradistinction to merely legal) means should be resorted to to forward the cause; but that, at the same time, the most patient forbearance—the most submissive obedience to the laws-should be inculcated; that no personal and offensive language should be held towards those who oppose the claims." This letter was produced at a meeting of the Association, and received with the warmest encomiums. The next wind that blew from England brought the mandate recalling the Marquis of Anglesey, and appointing the Duke of Northumberland to succeed The rage of the Catholics was unbounded, as their hopes had been premature. The storm howled more loudly than ever.

1829.

Wellington's resolution was at last fixed. It may be that pride had some share in prompting his resolves. was known, or believed, that in his own person he had no great objections to concede what was claimed by the Catholics; and he was not a man to defer to the prejudices of others, however high in station, although he might to The danger was too imminent to allow him to hesitate longer. Having secured the assent of his colleagues, and wrung his slow leave from the king, he prepared to force upon parliament a measure which it had often with seeming loathing rejected. The session of 1829 was opened on the 5th of February by a speech from the throne, which contained the following unwonted expressions:- "His majesty recommends that you should take into your deliberate consideration the whole condition of Ireland; and that you should review the laws which impose civil disabilities on his majesty's Roman Catholic subjects. You will consider whether the removal of these disabilities can be effected consistently with the full and permanent security of our establishments in church and state, with the maintenance of the reformed religion established by law, and of the rights and privileges of the bishops and of the clergy of this realm, and of the churches committed to their charge. These are institutions which must ever be held sacred in this Protestant kingdom, and which it is the duty and determination of his majesty to preserve inviolate. His majesty most earnestly recommends to you to enter upon the consideration of a subject of such paramount importance, deeply interesting to the best feelings of his people, and involving the tranquillity and concord of the united kingdom, with the temper and the moderation which will best insure the successful issue of your deliberations." The Anti-Catholics were not taken by surprise, for it had been whispered about, a few days before the meeting of parliament, that ministers intended to recommend concessions to the Catholics. But they were not yet sufficiently masters of the course intended to be pursued by the duke to organize an effective opposition, and their first burst of discontent is unworthy of being recorded.

The first measure of the ministry was one of punishin his previous opinions; advised the adoption of such lan- ment to the sturdy beggars whose importunity had ex-

Reign of torted their charity. The Catholic Association was de- worship; no Catholic prelate was to assume the name and Reign of trumpets was followed up by a bill, which Mr Peel introduced on the 10th of February, to terminate the existence of the Association. He proposed to give to the lordlieutenant, and to him alone, the power of suppressing any association or meeting which he might think dangerous to the peace, or inconsistent with the due administration of law; together with the power of interdicting the meeting of any assembly of a similar character, of which previous notice had been given. In case it should be necessary to enforce the provisions of the law, the lord-lieutenant was authorized to select two magistrates, for the purpose of suppressing the meeting, and requiring the people to disperse. Finally, every meeting and association which fell under the provisions of the act were prohibited from receiving and placing at their disposal any monies, by the name of rent, or any other name. The operation of the act was limited to the end of the then next session of parliament. This bill met with no opposition. The friends of the Catholics regarded it as a part of the system of emancipation—as a concession to the wounded feelings of men in power. Their adversaries were pleased even with this dying blow at the Association. Several members who voted felt themselves called upon to apologise for supporting the bill; whilst others taunted them for not having introduced such a measure before. It received the royal assent on the 5th of March; but the Asblow struck for the gratification of offended vanity was lost in the empty air.

On the same day that the bill aimed at the Catholic Association received the royal assent, Mr Peel moved in the House of Commons that the house should resolve itself into a committee on the laws which imposed disabilities on the Catholics. A call of the house had been moved for that day, and the consequence was an unusually crowded attendance. The speech with which the home secretary prefaced his recommendation of the ministerial measure had two remarkable features. In the first place, every fact that he stated as influencing the decision to which he had come, must have been known for years, or he must have been unfit for his office. In the second place, while confessing that the object of the measure was to mediate between contending interests, he conceived it necessary for the honour of government to affect a stern disregard of all. His reasons for yielding to the Catholic claims were, That the evils of divided councils were palpably so great, that something must be done to form a government with one common opinion on the subject; that a united government must either grant further political rights to the Catholics, or deprive them of those they already possessed; and that the latter alternative was impossible. Having made up their minds to bring back the Catholics within the pale of the constitution, ministers wisely brushed off all the incumbrances with which the concession had from time to time been surrounded, with the view of assuring alarmists. great object of the measure was to abolish civil distinctions, and establish equality of civil rights. Catholic, when promoted to office, was only called upon to swear allegiance in the usual terms; to disclaim the deposing power of the pope; and to abjure any intention of employing his privileges to weaken the Protestant religion or government. The only offices from which Catholics were excluded were that of lord-lieutenant of Ireland, that of lord high chancellor, and appointments in any of the universities, colleges, or ecclesiastical schools.

George IV. nounced in the king's speech as dangerous to the public, title of any dignitary of the church of England; and the George IV. and inconsistent with the constitution. This flourish of names and numbers of the individuals composing monastic societies were to be registered. Making allowance for the necessity of gilding the pill in order that it might be swallowed, the measure was as liberal as could be desired. It was, however, beyond the power of the narrow-minded faction into whose hands fortune, in one of her freaks, had placed the office of effecting this great act of justice, to have kept it pure from every indication of their own want of magnanimity. The provision that the oath recited in the act, and no other, should be taken by a Catholic, was expressly limited to the case of "any person professing the Catholic religion who shall, after the commencement of this act, be returned as a member of the House of Commons." This specification was evidently levelled against Mr O'Connell, who had been returned for Clare before "the commencement of this act;" and was worthy of the temper that punished the Catholic Association at the very moment it confessed that that body had demanded no more than justice. Ministers had been terrified into an honest action, and were determined to show their resentment by performing it with as bad a grace as possible.

The burden of defending the measure fell upon the recently-converted ministerialists; the old and tried friends of emancipation contenting themselves with throwing in an occasional word of encouragement to their new allies. The line of argument adopted by all was much the same as that made use of by Mr Peel. The opposition was sociation had already declared itself dissolved. The last characterized rather by a dogged and sullen pertinacity, than by debating talent. The speakers had followed the lord of the ascendant; and the only things which enlivened the dulness of the minority were some very bitter sneers at the deserters. The main argument relied upon was, that a majority of the nation were opposed to concession. Ministers were repeatedly challenged to appeal to the sense of the country by a dissolution of parliament. But they who urged such reasons knew very well, that, as parliament was then constituted, a new election would not have expressed the sense of the nation. They knew, that even though England and Scotland had been bigoted enough to wish to rivet the fetters of the Catholics, Ireland had still a right to appeal from their decision. Ireland was all but unanimous on the question; -Ireland was the principal party interested;—Ireland had assented to the union, under the conviction that emancipation was to be conceded;-Ireland had a right, if it was withheld, to demand the repeal of an alliance into which she had entered on the faith and understanding that the removal of the Catholic disabilities and an equality of civil rights would be amongst its earliest fruits. Parliament was certainly not the fairest tribunal; but, in the circumstances of the case, it was perhaps the best that could be had recourse to.

> The majority in the committee, three hundred and forty-eight for the motion, and a hundred and sixty against it, decided the fate of the measure in the Commons. No important variation in the relative numbers occurred during the remaining discussions, neither was any new argument adduced. The speakers came forward for the purpose of recording their own opinions, not with the hope of influencing those of others. The bill was carried up to the Lords, and read a first time on the 31st of March.

In this house the demands of the Catholics had hitherto met with the most determined and uniform resistance. Its members were men of high feelings, of personal honour, and independent circumstances. They were contemplated by the panegyrists of the constitution as the representatives of what was permanent in the English frame of go-No official insignia were to be borne to a Catholic place of vernment, and as the check upon the over-hasty resolves of

George IV. dexterity in following the veering inclinations of the minister as their humbler colleagues in the task of legislation. On the 11th of June 1828 a majority of forty-four refused even to entertain the question of the Catholic claims. On the 10th of April 1829 a majority of a hundred and four passed a bill granting every thing that the Catholics asked for. The debates were equally lengthy and unsatisfactory with those in the lower house. The bill received the royal assent on the 13th of April.

The bill which admitted Catholics to both houses of parliament, and to almost every office of political power, trust, and emolument, was accompanied throughout its progress by another bill for disfranchising the whole body of forty-shilling freeholders in Ireland. This measure, as described by Mr Peel, restricted the possession of the elective franchise to the possessors of a real ten-pound freehold. This restriction did not extend to corporate towns; for had the franchise been raised within their jurisdictions to ten pound, the corporations could have overpowered the public voice by their right to make freemen. The bill fixed a day for the opening, in every county in Ireland, of a bona fide register of ten-pound freeholds. An act of more flagrant injustice was never perpetrated. The landlords finding that the serfs, whom they had bred for electioneering purposes, had emancipated themselves, threw them carelessly away. The wealthier Catholics had served their own purposes, and abandoned those who had fought their battles. The Irish forty-shillings freeholder had as good a title to his elective franchise as the proudest nobleman to his barony. He might be all that his calumniators represented him, but the fault lay in the system under which he was born, and in the ambitious landholders who had made it an engine to serve their own selfish purposes. He was punished for having rescued himself from the degradation of being a mere unthinking tool. Lords Duncannon and Palmerston, and Mr Huskisson, deserve to be had in remembrance for having raised their voices against this filching of men's rights. Only seventeen members voted against the bill in the Commons, and scarcely a murmur was heard from Ireland when it passed into a law. And thus a question which had vexed the nation for half a century was set at rest.

No other question of importance succeeded in arresting the attention of parliament during this agitated year. Even the budget was hurried over without its due allowance of wrangling. On the 24th of June parliament was prorogued, in order that the nation and the government might have time to reflect upon their novel situation.

The ceding of the Catholic claims was the last important act of the reign of George IV. The ministers gained by this desertion of their professed principles what every body of men adopting a similar line of conduct may reasonably expect, the enmity of their former friends, and a cold distrustful toleration at the hands of their former opponents. The country was partially disquieted during the autumn and winter of 1829. The labourers were suffering in many places from want of employment, and distress to a considerable extent was insinuating itself among the agricultural classes. England's productive powers continued unabated, and the prevalence of want showed that there was something wrong in her internal arrangements, interfering with the natural tendency of wealth to diffuse itself. In Ireland public tranquillity was far from being re-established, nor was such a consummation reasonably to be hoped for from the redress of one grievance alone in a country which had been governed for centuries by men ignorant of its wants and feelings. The boon of emancipation had been attended, as we have seen, by an act of injustice and a gratuitous insult. The former was

Reign of a popular assembly. Yet they evinced as much haste and scarcely remembered in the hour of triumph, but it afford- Reign of ed a topic for declamation when the hour of agitation George IV. should arrive; and the latter sent back to Ireland, as the avowed and embittered enemy of government, the man who had more power than any other over popular feeling. O'Connell's progress through Ireland was a continued triumph. His re-election for Clare was not contested. And wherever he went he held out ministers to the popular odium, recounting all their misdeeds, real or imaginary, and appealing in turns to every passion that could be supposed to animate the peasant. The Orangemen, on the other hand, galled by the loss of their ascendency, continued to vociferate empty menaces, which had at least the effect of producing irritation. The waves of popular hatred and prejudice continued to dash after the storm that raised them had blown over.

Amidst all this trouble, a conviction began to gain ground that ministers were unequal to the task of carrying on the government. It was apparent, indeed, that they had chalked out for themselves no system by which to regulate their conduct. They undertook nothing of their own accord, and they adopted almost every suggestion which was made to them by others. Nor was this strange. With the exception of some inferior officials, men trained in the discharge of routine duties, but who could only execute a task prescribed to them, there was not amongst them one man who had a knowledge of public business. The leaders were of that unyielding aristocratical party which had revolted at the idea of following the leadership of a man like Mr Canning. They believed that the honours of the state belonged to them in virtue of their birth, and they managed to secure these by influence and intrigue; but they could not use the power which they had succeeded in acquiring. Masters of their own wishes alone, they stared idly around, asking what they were to do next. The dilemma in which they had involved themselves soon became visible to every eye, and its effect was to revive dormant feelings. At the commencement of the reign of George IV. parliamentary reform was loudly called for by two bodies of men; by the Whigs, with whom the belief of its necessity partook largely of the character of a theoretical tenet; and by the radicals, who, without correct or extensive views, felt that something was wrong, and stumbled upon the remedy. The conciliatory policy of the cabinet after the accession of Mr Canning deluded the nation with the hope that an efficient and enlightened government might be obtained even under the old system; and the cry of reform was stilled for a time. But the intrigues by which it was sought to keep Mr Canning out of the premiership, and the success with which they were employed after his death, revived the conviction that an enlightened ministry, acting for the national good, must remain weak, unless, by parliamentary reform, the body of the people obtained a more direct control over the executive. This spirit, to which subsequent events soon imparted a more determined character, was rapidly spreading when parliament re-assembled in February 1830.

The ministers were conscious that they did not command a majority of the house. The old Tories stood in an attitude of avowed hostility. The Whigs lent a patronising but uncertain support. The Duke of Wellington, however, flattered himself that the incompatible principles of these two parties would keep them from coalescing against him. He dreamed of receiving alternate assistance from both, and, by playing off their mutual jealousy, of avoiding the necessity of throwing himself into the arms Thus situated, his conduct was marked with the same tinge of feebleness as during the preceding session. When any measure to which he was averse was energetically pressed upon him, he evaded the appearance of a defeat by introducing one slightly varied in form, but

large augmentations had taken place in the salaries and pay of persons in civil and military employments, on account of the diminished value of money; and whereas the alleged reason for such augmentations had ceased to operate, in consequence of the passing of 59th George III., which restored a metallic standard of value; it was expedient, in order to relieve the country from its excessive load of taxation, to revise our present system of expenditure, for the purpose of making every possible reduction that could be effected, without violation of good faith or public justice." This motion was opposed by ministers; but, in the temper of the house, it was judged expedient merely to substitute a motion to the following effect:-"That whereas his majesty has been graciously pleased, &c. to assure the house that he would cause an inquiry to be made into all the departments of the civil government, with a view of reducing the number of persons employed, and the amount of the salaries paid; resolved, that an humble address be presented to his majesty, that his majesty might be graciously pleased to lay before the house an account of the progress which had been made in such inquiry: also, that it was the opinion of the house that, in every establishment of the state, every saving ought to be made consistently with the due performance of the public service, and without the violation of existing engagements.' Ministers did not insist upon taking the lead; they only asked leave to walk foremost. So that they rode on the crest of the billow, they cared not in what direction it was

A variety of subjects forced on the attention of parliament, confirmed the fact that men's minds were full of doubts and questionings. Lord Stanhope moved for an inquiry into the state of the nation. Mr P. Thomson moved for a committee to revise the whole system of taxation. The question of the East India charter was unavoidably brought forward. Parliamentary reform was suggested in the most various forms, and from the most unexpected quarters. The Marquis of Blandford, once a vio-lent Tory, proposed, on the 18th of February, the appointment of a committee by ballot, to take a review of all the boroughs and cities in the kingdom, and to report to the home secretary such as had fallen into decay or forfeited their right to representation. That minister was immediately to relieve these places from the burden of sending members to parliament in future, and to fill up the vacancies by towns hitherto unrepresented. The elective franchise was to be enjoyed by all persons paying scot and lot. The plan of the marquis contemplated the revival of the custom of paying wages to members in parliament. Lord John Russell moved, on the 23d of the same month, for leave to bring in a bill to enable Leeds, Manchester, and Birmingham, to return members to the House of Commons. Mr O'Connell brought his plan of reform before parliament on the 28th of May. He moved for leave to bring in a bill to Russell submitted two resolutions to the house, first, "That it was expedient the number of representatives in was expedient to give members to the large manufacturing towns, and additional members to counties of great wealth and population." All these schemes were negatived by

Reign of of the same tendency. On the 12th of February, Sir formers,—had not come to a right understanding with each Reign of George IV. James Graham moved a resolution to the effect—"That other. But taken in connection with the voice of the pub-George IV. whereas subsequently to the act of the 37th George III., lic out of doors, they showed that the cry for reform, siby which a suspension of cash payments was effected, lenced for a while, was again rising with increased urgency, and that an extensive change in the constitution of the House of Commons could not much longer be evaded.

At this ominous crisis George IV. breathed his last. He had long been in an infirm state, but no immediate danger was anticipated till the commencement of April. On the 15th of that month the first bulletin was issued. He continued to grow weaker, and latterly the slightest exertion became intensely painful. A message was sent to both houses of parliament on the 24th of May, stating that his majesty found it painful to sign with his own hand documents which required his sign-manual, and requesting parliament to provide for the temporary discharge of that function of the crown. A bill was immediately passed, allowing the sign manual to be adhibited by a stamp. The disease continued to run its course, and upon the 26th of June his majesty expired.

George IV. had no public virtues. He is said to have possessed a taste for the arts and for letters; and the instances which have been given of his attachment to the latter indicate a pretty correct estimate of the merits of some lighter works. In the rich and voluptuous decoration of apartments he excelled. In painting, his taste does not seem to have gone beyond a feeling of elegant execution, and a recognition of strongly-expressed character. Neither science, literature, nor art, found in him a very active patron; and he took but little interest in the affairs of government. He was at one time in habits of intimacy with the Whigs; but finding their opponents firmly seated in power, he allowed them to remain. The character of his minister, and the course of policy adopted by him, were comparatively indifferent, provided the royal repose was left undisturbed. His habits were retired, and he shrunk from every species of annoyance. This was perhaps rather the result of exhausted energy and constitutional decay, than of self-indulgence, or haughtiness of character. Yet, upon public occasions, he was fond of display and parade. He could enjoy the pageantry of monarchy, though he shrunk from its more laborious duties. The spectacle of a gorgeous coronation had greater attractions for him than even the solid possession of kingly power. On some points, however, where his own private feelings or opinions were concerned, he was firm, even to obstinacy. Hence he risked the peace of the empire to get rid of an obnoxious queen; and he resisted all concession to the Catholics, until the urgency of danger compelled him to yield. But there was something engaging in his appearance, which made him popular whenever he showed himself amongst his people; his manners were confessedly those of an accomplished gentleman; and though fastidiously jealous of his royal dignity, his habits were social and agreeable.

Yet his reign was not uneventful. It commenced at the close of the extensive wars which had desolated Europe. The nation, no longer engrossed with its own exploits in foreign lands, but deranged as to its internal economy by a long-continued struggle, was forced to turn establish triennial parliaments and vote by ballot, and its eyes inwards. The consequences of this reflex study extend the franchise to every man who paid a tax or was developed themselves slowly. First the government shook liable to serve in the militia. The same day Lord John itself free from the alliance of despots; and next endeavoured to check the gambling spirit of trade, by giving a healthy and substantial character to the currency. A the house should be increased;" and secondly, "That it more frank and liberal intercourse with other nations was encouraged. Retrenchment of state expenditure, and an equable apportionment of national burdens, were loudly demanded, and in outward show at least attempted. The large majorities, and their discordant nature showed that old inadequate customs of the law began gradually to rethe reformers,—for the old parties of Whigs and Tories cede before a more rational system. The unalienable had now well nigh merged into reformers and anti-re- right of a nation to regulate its internal concerns without

Reign of foreign interference was recognised. It was not to be ex-William pected that such important changes could be effected without exciting individual discontent, and causing individual suffering. The consequent discussions led men to inquire into the distribution of power and privilege. The rights of citizens were warmly asserted. The equal political rights of all religious denominations were conquered. The adherents of rational principles of government felt their strength, and prosecuted their assaults upon antiquated prejudice and abuses with more vivacity. This period of preparation was terminated by the death of George IV. The seeds of future activity were germinating in silence. The unsettled state of men's minds was as a chaos, upon which the news of the expulsion of the Bourbons from France descended like an animating spirit. The huge mass heaved at once with the throes of new life. The first fruits have been the achievement of parliamentary reform.

## CHAP. XXI.

## REIGN OF WILLIAM IV.

Accession of William IV.—Popularity of the new King.—No change made in the Ministry.—Dissolution of Parliament.—The Revolution of July in France.—Effect produced by it in Britain.—Parliamentary Reform.—Result of the Elections unfavourable to the Ministry.-Disturbed state of the Country.-Ireland.—Anti-Union Associations.—Distress and outrages in the English Agricultural Counties.—Demand for Reform.— Political Unions and Reform Associations.—Meeting of Parliament.—Speech from the Throne.—Debates on the Address Duke of Wellington's Declaration against Reform.—The King and Queen induced to decline dining at Guildhall on the Lord Mayor's Day.—Sir Henry Parnell's motion on the Civil List.— Ministers defeated.—Their Resignation.—Earl Grey authorized to form a New Administration, on the basis of making Reform a Cabinet Question.—Parliament adjourned till February 1831.—Decline of the outrages in the agricultural districts.—Punishment of the Rioters.—Meeting of Parliament.—Ministerial plan of Reform.—Its reception by the country.—Debate on Lord John Russell's Motion.—Leave granted to bring in Bills to amend the Representation of Scotland, England, and Ireland.—Bills introduced.—Debate on the Second Reading of the English Bill.—Second Reading carried by a majority of one...General Gascoygne's Motion carried by, a majority of eight...Dissolution of Parliament...Scene on this occasion—Result of the Elections.—Bill re-introduced and carried through the House of Commons.—Debate on the Second Reading in the Lords.—Bill thrown out by a majority of fortyone.—Indignation of the country.—Proceedings of the Commons.—Parliament prorogued.—Riots at Derby, Nottingham, and Bristol.—Re-assembling of Parliament on 6th December 1831.—English Bill again introduced.—Debates.—Passed on 22d March 1832.—Carried to the House of Lords—Read a second time by a majority of nine.—Adjournment of the House during the Easter Recess.—Great Public Meetings in all parts of the country.—Secret intrigues.—Meeting of the House.—Lord Lyndhurst's amendment carried.—Resignation of Ministers.—Lord Ebrington's Motion.—State of the Country.— Duke of Wellington undertakes to form a Cabinet on the principle of carrying the Reform Bills.—His utter failure.—Lord Grey recalled.—Subsequent discussions on the Bills.—Secession of the Opposition.—Irish Affairs.—Death of William IV.

William IV. ascended the throne of Great Britain on the 26th of June 1830. The change of the monarch did not occasion any immediate change in the state of public affairs. The Duke of Clarence had accepted office under Mr Canning, and had been rather unceremoniously deprived of it by the Duke of Wellington; hence some people augured that he would be unfavourable to his ministry. In the political world he was scarcely known. An old grudge existed against him from the time of the queen's The Tories, who more than half feared his revolt, spread caricatured accounts of the proceedings at Bushy

House during his brother's illness. The plainness of the Reign of new king's manners, however, soon rendered him highly popular. He mingled with the people, and his familiar address and unostentatious appearance contrasted so strongly with those of the late king, that he completely won the affections of that part of the community which, as it is the first to deify a monarch, is also the first to cast him off No change, however, took place in the ministry. William IV. declared himself friendly to their policy, and determined to retain them.

They were, however, incapable of being much longer sustained in office, even by the royal support. The party which they had irritated by carrying the Catholic bill was strong in the Commons, and stronger in the Lords. The Whigs had lost confidence in the Duke of Wellington and his coadjutors, whose system of policy was temporising, calculated to keep themselves in power, but not to forward the business of the country. It was evident that every measure having in view the better organization of the state must be wrung from them, like Catholic emancipation, by demonstrations of power. War was in consequence declared against the cabinet, and prosecuted vehemently by the Ultra-Tories, but by the Whigs with more caution. The first question that gave rise to serious discussion was, whether the parliament, after voting such supplies as were immediately necessary, should be at once dissolved, or whether provision ought first to be made for a regency in the event of the king's demise before the re-assembling of that body. Ministers obtained a small majority after a violent debate. A few matters of business which could not be postponed were afterwards hurried through the house with little opposition, and on the 23d of July parliament was prorogued by the king in person; and being next day dissolved by proclamation, writs were issued for the election of a new one, returnable on the 14th of September.

A few days afterwards the news of the revolution, by which the elder branch of the Bourbons was finally expelled from France, reached England. The intelligence, as already mentioned, had a powerful effect. The delusion which the conciliatory policy of Canning had occasioned, and the belief that an enlightened and energetic government was attainable under the old rotten system of parliamentary election, had received a severe shock from the circumstances of his death. The liberal measures into which the Duke of Wellington had reluctantly been forced, had for a short time delayed the disabusing of the nation. But late events had shown that nothing was to be expected from him and the men of mere routine who formed his ministry. The longing for parliamentary reform returned with redoubled efficacy. Men were not prepared with any definite scheme, nor were they agreed as to the principles upon which they vindicated the justice of innovation. The news of the three days in Paris ripened men's views, and showed that wishes were useless whilst unproductive of action. The French received the homage of universal sympathy. This circumstance was turned to use by some active friends of liberty. Meetings were called in every important town to congratulate the freemen of France; and thus reformers were brought together, and taught how numerous a body they were.

All these circumstances operated unfavourably for ministers at the elections. Wherever the election was popular, the reformers supported a candidate of their own principles; and of the close burghs, with the exception of those commanded by government, a decided majority were in the hands of the Duke's adversaries. The suspicions under which his administration lay, of coqueting with Prince Polignac, materially augmented its unpopularity. Not one candidate appeared on the hustings to claim the

Reign of suffrages of the electors as a supporter of ministers. The everywhere established. The most important of these Reign of William general result of the election diminished by fifty the bodies were the Birmingham union, the model of all the William votes upon which the government could depend.

At the same time the disturbed state of the country, by showing the incapacity of government, went far to swell the ranks of its enemies. Ireland had not been pacified, because the concession of its claims had been accompanied by personal insult and perseverance in a hostile attitude. Emancipation had never been demanded by any reasonable man as a measure that could do good further than by allaying religious feuds, and bringing the nation to a temper in which an honest government might with rational hopes of success look for support in pursuing measures of reform. But, on every question that regarded Ireland, government evinced a hostile spirit, the growth either of ignorance or bigotry. The cry for the repeal of the union was again raised, and a society established, bearing the title of "The Friends of Ireland of all religious denominations." This body announced its determination to agitate till every one of its objects should be conceded. The most essential of these were, a repeal of the sub-letting act, a radical reform in the representation, and a repeal of the union. Mr O'Connell was at the time absent in England; and there being no other man of his party equally fertile in resources and undaunted in pertinacity, the lord-lieutenant easily suppressed the new association under the act passed along with that which admitted the Catholics to a participation in the privileges of the constitution. But no sooner did the dissolution restore O'Connell to Ireland than he engaged in re-organizing his adherents into an "Anti-Union Association." This society was likewise prohibited by proclamation of the lord-lieutenant, but was succeeded by the "Association of Irish volun-teers for the repeal of the Union." Many who had hitherto acted with Mr O'Connell, felt the necessity of a legislative union with England, and took alarm at these proceedings. A numerous meeting, convened by the Duke of Leinster, declared their adherence to the union. After this step the lord-lieutenant's proclamation directed against the volunteers was obeyed, nor was the repeal of the union proposed at any of the elections as a test to candidates.

Even England began to rival Ireland in misery and disturbances. While parliament continued to sit, its table was covered with petitions, describing in the strongest terms the distress suffered by the lower classes engaged in agriculture. It was predicted that unless a change for the better took place it would be impossible to restrain them from outrage. The harvest was scarcely concluded when this prophecy was fulfilled. The disturbances began in the county of Kent. Threatening letters were dispersed throughout the county, machinery destroyed, money extorted, and barns and stack-yards set on fire. The commotions were the wild aimless efforts of men suffering almost beyond nature and without hope. Viewing the matter in this light, the first rioters apprehended were treated with a degree of lenity which encouraged fresh outrages. During October, November, and December, the riots increased in frequency and boldness, and spread from Kent into Hants, Wilts, Bucks, Sussex, and Surrey. The frame of civil society seemed breaking up, and a wild deluge of human passion, untamed by moral feeling, uncheck-

ed by law, threatened to overwhelm all. With a nation apparently resolving into anarchy, and a

government helpless and stubborn, there was no hope. Like sailors in a shipwreck, men began to search for something to cling to in the impending convulsion. The demand for reform was raised more clamorously than ever. Political unions and reform associations, having for their object the propagation of definite political principles, and a demonstration of the physical strength of the reformers, were

others; the great northern union, extending over the counties of Northumberland and Durham; and the Renfrewshire political union. But others of less note were to be found in almost every town and village in the kingdom.

Such was the threatening aspect of the country when parliament opened on the 2d of November. The speech from the throne contained no indications of the means by which ministers proposed to meet the threatening emergency. It was simply announced in regard to France, that "the elder branch of the Bourbons no longer reigned," and that "the Duke of Orleans had been called to the throne by the title of King of the French." events in Belgium were branded with the title of "revolt." The disturbances among the peasantry were attributed to " efforts industriously made to excite discontent and disaffection." A determination was expressed to exert every means which the constitution had placed at the king's disposal for the repression of outrage. No distant allusion was made to that reform which the nation demanded as with one voice. The ministerial declaration showed that the Duke of Wellington, in proud ignorance, was determined to cling to a system whose props one after another

had for years been dropping down.

Any doubt that remained upon this subject was removed by the debate which took place in the House of Lords when the address to the throne was moved. Earl Grey, adverting to the opprobrious designation applied in the king's speech to the Belgian revolution, observed,-"We ought to learn wisdom from what was passing before our eyes. He felt persuaded, that unless reform were granted, we must make up our minds to witness the destruction of the constitution. He had been a reformer all his life, and at no period had he been inclined to go farther than he would be prepared to go now, if the opportunity were offered." The Duke of Wellington's reply to this portion of this speech is only memorable by the declaration made in it, which occasioned his subsequent downfal. "The noble earl has alluded to something in the shape of a parliamentary reform, but he has acknowledged that he is not prepared with any measure of reform; and I have as little scruple to say, that his majesty's government is as totally unprepared as the noble lord. Nay, on my own part, I will go farther and say, that I have never read or heard of any measure up to the present moment, which could in any degree satisfy my mind that the state of representation could be improved or rendered more satisfactory to the country at large. *** I am fully convinced that the country possesses at the present moment a legislature which answers all the good purposes of legislation; and this to a greater degree than any legislature ever has answered in any country whatever. * * * Under these circumstances I am not only not prepared to bring forward any measure of this nature, but I will at once declare, that, as far as I am concerned, as long as I hold any station in the government of the country, I shall always feel it my duty to resist such measures when proposed by others."

The tone assumed by the opposition in both houses after this haughty declaration convinced ministers of their rashness in venturing to meet such a parliament in an official capacity. Their embarrassment was increased in consequence of an injudicious manœuvre, intended to terrify the more timid of their opponents, by impressing them with an exaggerated notion of popular violence. The king and queen were to dine at Guildhall on the Lord Mayor's day; but, under the pretext that there was a conspiracy on the part of some abandoned characters to attack the Duke of Wellington, their majesties were induced to

William loyalty of the nation, and adroitly confounding the king with his advisers, to give greater firmness to a wavering government, failed signally. The ministers became ridiculous. The invectives of the opposition in parliament became more pointed and inveterate; and on the 15th of November Sir Henry Parnell moved "that a select committee be appointed to take into consideration the estimates and accounts presented by command of his majesty respecting the civil list." After a short debate ministers were left in a minority of twenty-nine in an unusually full house. Mr Hobhouse asked Sir Robert Peel whether it was the intention of ministers to retain their places after such an expression of the sentiments of the house, but received no answer. Next day the Duke of Wellington in the Peers, and Sir Robert Peel in the Commons, announced, that in consequence of the vote of the preceding evening, they had tendered, and his majesty had accepted, their resignations.

The king immediately authorized Earl Grey to form an administration upon the basis of making parliamentary reform a cabinet question. His lordship had refused his support to the Canning administration on the ground that its premier was opposed to reform. His son-in-law Lord Durham, Lord Althorp, the Marquis of Lansdown, and Lord John Russell, were tried adherents of the Whig party, and friendly to reform. These, with Lord Holland, may be regarded as the nucleus of the reform administration. Its ranks were filled up by Mr Canning's friends, who had gathered from the signs of the times the impossibility of longer withstanding those innovations which timidity of character or the prejudices of education had led them to oppose. The treatment which their leader had experienced at the hands of the high aristocratic party rendered them less averse to any measure that promised to sap its power. The Duke of Richmond was the only leading member of the old Tory party who accepted office under Earl Grey. Others of that party had joined, after the concession of the Catholic claims, in calling for reform; but their object was merely to raise a clamour against a political adversary, and they ceased the moment they saw Brougham was appointed lord high chancellor.

There was necessarily a suspension of business in parliament till the ministers who had vacated their seats by accepting office should be re-elected. By the time that they were all restored to their places, it was too late to think of maturing and developing their system of policy before the Christmas holidays. Accordingly, Earl Grey contented himself with declaring, that it was the intention of the cabinet to introduce a plan for the reform of the Commons House of Parliament. The regency bill was passed in conformity with the recommendation in the speech from the throne. And on the 23d of December 1830 both houses adjourned to the 3d of February; ministers having declared that a long interval was necessary to enable them to concoct that plan of reform to which they had pledged themselves on accepting office.

The interval of parliamentary exertion was an uneasy one for the country. The riots and outrages in the agricultural districts had begun to decline; but the duty of punishing the convicted transgressors of the law remained to be fulfilled. During the latter half of December and the beginning of January, upwards of eight hundred rioters were tried before special commissions. Of those against whom sentence of death was recorded, only four were executed; the rest were ultimately sentenced to various terms of transportation and imprisonment. Com-

Reign of retract their assent. This attempt, by stimulating the dence between the lower classes and their employers re- Reign of stored.

William IV.

1831.

Neither had the change of administration been entirely successful in restoring public confidence in the constituted authorities. The stern unbending adherence of Earl Grey and his immediate friends to the cause of reform was in their favour; but the country was determined to trust no man, and meetings were held in every county and town to petition for such an alteration of the elective system as might have a tendency to secure good government.

Parliament met, as appointed, on the 3d of February 1831. Ministers announced that their plan of parliamentary reform should be brought forward by Lord John Russell on the 1st of March. The interim was occupied by discussions on the arrangement of the civil list prepared by ministers, on the budget, and on a plan for reforming abuses in the court of chancery, proposed by the lord chancellor. On that evening accordingly his lordship explained the nature and extent of the ministerial plan-The general outline bore a marked resemblance to that of the measure brought forward on a former occasion by Mr Lambton, and thrown out by a manœuvre on the part of Mr Canning. The chief grievances complained of by the people, it was remarked by Lord John, were the nomination of members by individuals, and elections by close corporations, the limited extent of the elective franchise, and the expense of elections. With a view to do away with the two first-mentioned evils, in as far as regarded England, ministers proposed to introduce a bill proceeding upon the three principles of disfranchisement, enfranchisement, and extension of the right of suffrage. In order to reduce expense, they intended to recommend an alteration in the system of registering voters and of taking the votes at elections. The extent of disfranchisement deemed necessary to extirpate close and nomination boroughs went to deprive such places as had a population of fewer than two thousand inhabitants of their right to send any members to parliament, and to restrict such as had a population of only four thousand to one member each. Weymouth, which had previously returned four members, was to lose two of them. By this measure sixty burghs would be there was danger of their request being granted. Mr totally disfranchised, and forty-seven partially, exclusive of Weymouth. The number of members thus withdrawn would amount to 168. Ministers did not propose to fill up the former number of the House. Seven large towns, which had previously been wholly unrepresented, were to receive two members each. Twenty other towns, smaller in size, and of less importance, were to receive one member each. The metropolis was to be subdivided into four additional districts, which were to return among them eight members. An addition of two members was to be given to each of the twenty-seven largest counties, and each riding of the county of York was to return two additional members, and the Isle of Wight one. The distribution of the elective franchise through the country having been thus arranged, the next point to be settled was the persons to whom the right of voting should extend. The object of ministers was not to communicate the franchise to every subject, but at the same time to extend it so far that every man who persevered in habits of honest industry might fairly calculate upon being able to attain it. Non-resident voters, as productive of much expense and bribery, were deprived of their privilege. Every householder rated at ten pounds per annum, whether the house he inhabited were his own or rented, received the right of voting. In counties, the possession of copyhold property rated to the amount of ten pounds per annum, or a lease for twenty-one years parative tranquillity was restored; but the mischief that of the yearly value of fifty pounds, likewise entitled to a had been done was not amended, nor was a healthy confi- vote. The last object contemplated by the ministerial

in towns, and a person appointed by the judge of assize in counties, was to hold a court for the purpose of hearing in towns, and three in counties. The counties were to be divided into polling districts, so arranged that no voter should have to go more than fifteen miles in order to exercise his franchise. This ample measure of reform for former country, it was to receive five additional members. Twenty-two counties were to return one member each. The remaining twelve were to be conjoined into pairs, returning one each. Edinburgh and Glasgow were each to return two members; while Aberdeen, Paisley, Dundee, Greenock, and Leith, were each to return one member. The remaining thirteen districts of royal burghs were to return each one member, as before, but the elective francils to the inhabitants possessed of a certain qualification. The qualification required in burghs was the occupancy of a dwelling-house of ten pounds per annum; in counyear, or holding as a tenant at the annual value of fifty reform of the Irish system was much less extensive, behad been entirely re-modelled little more than thirty years before, at the time of the union. It was proposed that occupancy to the amount of ten pounds per annum should give the right of voting for burghs, and that Belfast, Waterford, and Limerick should each return an additional member. It was calculated that by this great measure 500,000 persons would be added to the national constituency, all having a stake in the country, and so dispersed over its extent as to place them beyond the influence of any faction.

This bold measure produced an electrical effect upon parliament. The sincere reformers hailed its searching character as indicative of the honesty of its authors, and fruitful of good to the nation. The timid wavering reformers stood aghast, and so did all the champions of old abuses. Mr he felt himself bound to admit that they had completely redeemed the pledge which they had given. Mr Macaulay, speaking the sentiments of the young and highly educated liberals, thought it "a great, noble, and comprehensive plan." Lord Ebrington, the model of a sturdy, sagacious, independent country gentleman, "hailed the measure, as it gave due weight to every interest, and was calculated to stem the torrent of corruption." Sir R. Inglis, as legal formalists, denounced the measure as "a corporation robbery." The debate on Lord John Russell's mominated on the 9th of March without a division. Leave courts were with horse, while the guns boomed, and mar-

Reign of plan of reform was the diminution of election expenses. was on the same evening given, after a short discussion, Reign of William With a view to prevent the disgraceful tricks frequently to bring in bills to amend the representation of the people William practised on the hustings, the most fertile source of ex- in Scotland and Ireland. The English bill was introduced pense, a list of all qualified persons in every parish was by Lord John Russell on the 14th of March, and read a ordered to be prepared by the parish officers and church first time; the same step was taken with the Scotch bill wardens. This list was to be placed on the church door, by the Lord Advocate on the 15th, and with the Irish and at a certain period of the year the returning officer bill by Mr Stanley on the 24th. The discussion on the second reading of the English bill was characterized by a yet more fierce and inveterate spirit of hostility to all and deciding upon the claims of persons whose votes had reform, than that which took place when the measure was been held objectionable. The list, as finally adjusted, first propounded. After a debate which lasted for two was to be published, so that every person might obtain a evenings, the motion that the bill be read a second time copy, and was to serve as the election roll for the ensuing was carried by a majority of one. The opposition, thereyear. The duration of the poll was limited to two days fore, went into committee with a fair prospect of being able to mutilate, and finally defeat the bill. Their first demonstration was a declaration, moved by General Gascoyne, "that it is the opinion of the house that the total number of members returned to parliament for England England it was proposed to follow up by similar measures and Wales ought not to be diminished." The General's applicable to Scotland and Ireland. With regard to the motion was carried by a majority of eight; a result which intimated to ministers that they had not such a hold upon the house as afforded them the most distant chance of carrying the measure by which they stood pledged to stand or fall. In order to appreciate the propriety of the line of conduct adopted by them on this occasion, it will be necessary to look to the effect which the promulgation of the ministerial plan had produced upon the national mind.

The boldness of the measure, so much beyond what chise was transferred from the delegates of the town counhad been expected, had greatly conciliated the radical party, of which the unions might be considered as the representatives. Even the vital questions of the shortened duration of parliaments, and a secret mode of taking the ties, the ownership of land or houses worth ten pounds a votes, were postponed by one consent, lest any difference of opinion should endanger the success of so efficient a pounds on lease for nineteen years or upwards. The measure. The popular sense accepted the bills as satisfactory, and the nation crowded to their defence. Riot and cause, as was alleged, the representation of that country destruction ceased; for every man was intent upon the prospect held out of good government and better days. The tables of both houses were loaded with petitions in favour of the bill. The more apparent it became that the Commons would not pass it, the more intense became the affection manifested by the people for its provisions. It was evident that they regarded it as the standard to which they were to look as a rallying point amid the whirls and eddies of the headlong fight in which they were engaged. With the people in such a mood, and the king remaining true to his promises, the ministers were quite safe in throwing themselves upon the sense of the electors by a dissolution of parliament.

But the intimation that such a step was in contemplation was received with anger and alarm by the opponents of re-Hume, a fair representative of the radical party, said the form. They were not prepared for so determined a meaplan of ministers had so far exceeded his expectations, that sure; and notwithstanding their declarations that the bill was contrary to the national wish, they knew that the people were against them. The exhibition of petty anger which took place in both houses, but particularly in the Lords, on the day of dissolution, baffles all description. An eye-witness speaks thus: "A hope had remained that the project of stopping the king's speech, and interposing an address, might succeed. That hope rested entirely upon the speech being read by the chancellor or by his majesty the organ of the high-church party, declared that the in person. Suddenly the thunder of the guns was heard to " plan of the noble lord meant revolution, not reforma- roar, breaking the silence of the anxious crowds without, Sir Charles Wetherell, as representative of the and drowning even the noise that filled the walls of parliament. In the fulness of his royal state, and attended by all his magnificent court, the monarch approached the tion for leave to bring in a bill to amend the repre- House of Lords. Preceded by the great officers of state sentation of the people of England, was kept up with ex- and of the household, he moved through the vast halls, treme keenness for seven successive meetings, but ter- which were filled with troops in iron mail, as the outside

Reign of tial music filled the air. Having stopped in the robing chamber in order to put on his crown, he entered the house and ascended the throne, while his officers and mi-As soon as he was seated, nisters crowded around him. he ordered the usher of the black rod to summon the Commons; and his majesty, after passing some bills, addressed them. By those who were present the effect will not soon be forgotten, of the first words he pronounced, or the firmness with which they were uttered, when he said, that 'he had come to meet his parliament in order to prorogue it with a view to its dissolution!' He then with an audible voice commanded the lord chancellor to prorogue, which being done, the houses dispersed, and the royal procession returned amidst the hearty and enthusiastic shouts of thousands of the people."1

In the state of the national mind, the result of the elections could not be doubted. "The bill, the whole bill, and nothing but the bill," became the general cry of the reforming electors; and to this the candidates were called to pledge themselves at every open election. The Duke of Newcastle, who had formerly returned two members for Newark, and two for the county of Notts at large, found his interest reduced to four rotten borough seats, where no man could interfere with him. The Duke of Beaufort's brother, and his eldest son, both justly popular noblemen, were flung out, solely because they were opposed to reform. The Duke of Rutland's nominees were rejected in his own county. In Northumberland the minister's son, who had not ventured to enter the field at the preceding election, was returned, notwithstanding the indolence of his friends. In short, out of eighty-two county members, England returned seventy-six pledged to support the bill; the members for the cities and great towns were for it to a man. Ireland returned a great majority, and even Scotland a majority of friends to reform.

The success of the ministerial measure in a House of Commons so constituted was beyond a doubt. Its enemies, however, exerted every device to delay and baffle the English reform bill. By trifling motions pushed repeatedly to division, the opposition succeeded in retaining the English bill in the House of Commons from the 15th of June till the 22d of September, when it was finally agreed to

by a majority of one hundred and nine.

The eyes of the people followed it with anxiety to the House of Lords. It struck at the roots of an influence which that body possessed over the house which ought to have been the representative of the people; and this influence, it was known, a majority of their number were resolved to preserve. When submitted to them, the bill was brought before a tribunal of prejudiced and interested judges. Its fate, if left to the House of Lords as then constituted, was sealed before the debate had begun. The nation knew this, and loudly and urgently was the necessity of a new creation of peers pressed upon ministers, but in vain. Earl Grey had determined to give his noble colleagues an opportunity of dealing justly by the nation.

The debate on the second reading commenced on the 3d of October, and continued during that and four succeeding evenings. The arguments brought forward against the bill were various and contradictory. After this long and fatiguing debate, the Peers of England, by a majority of forty-one, decided, in opposition to a majority nearly triple that amount of the House of Commons, and to the almost unanimous voice of the nation, that a system of cunningly veiled oppression and corruption should be perpetuated.

The indignation of the country was great, although Reign of happily prevented from breaking out into open violence by the firmness of ministers and the House of Commons. The chancellor of the exchequer declared in the House of Commons on the 10th of October, the earliest day on which that house assembled after the rejection of the bill by the Lords, "that unless he entertained a hope that a measure of reform equally efficient with that which had been rejected would be carried hereafter, he would not remain in office a single hour longer." Lord Ebrington brought forward the same evening a motion for a vote of confidence in ministers, which was carried by a majority of a hundred and thirty-one in a house of five hundred and twenty-seven; and the house by this means pledged to support ministers and the reform bill. On the 20th,

parliament was prorogued by the king in person.

Owing to the firmness of the king, his ministers, and the House of Commons, the decision of the Lords was received by the people with deep-felt disgust; but, except in two or three isolated cases, without any alarming bursts of violence. At Derby the rabble broke open the town jail, and demolished the property of some anti-reformers, and were only prevented from the perpetration of further violence by the interference of the military. The castle at Nottingham, the property of the Duke of Newcastle, was burned by a band of rioters. Some rioting, but not of a very serious character, took place in Somersetshire and Devonshire. And at Bristol, the arrival of Sir Charles Wetherell, a strenuous anti-reformer, to discharge his judicial duties, excited a popular ferment, which, being met on the part of the magistrates at first with precipitate violence, and afterwards by cowardly supineness, hurried the populace on to works of extensive destruction. In every other part of the kingdom, however, large meetings were held, and perfect obedience to the law enforced.

Parliament re-assembled on the 6th of December 1831. In the speech from the throne, a speedy and satisfactory settlement of the question of reform was urgently recommended. The ministry adhered to their original purpose of remodelling the representation by three separate bills applicable to the varying social relations of the three incorporated nations. That which had for its object the reform of the English representation was introduced on the 12th of December. It was confessedly superior to the former in precision of expression; and some of the subordinate arrangements had been modified with a view to avoid the captious quibbling of the preceding session. The opposition modestly claimed all the improvements as their own, and yet attacked the measure as inveterately as ever. The ministerial members adopted the prudent resolution of leaving all the speaking to their opponents; but, nevertheless, the pertinacious volubility of these orators was so far successful in retarding the bill, that it did not pass through the House of Commons before the 22d of March.

It was carried up to the Lords with even more gloomy anticipations than on the former occasion. No new peers had been created. Lords Harrowby and Wharncliffe, who had seemed at one time inclined to come to terms, resumed a hostile attitude. Between the first and second reading of the bill, however, these noblemen and their followers determined to make a concession to public feeling, and allow the bill to go into committee. In consequence of their wavering, the second reading of the bill was carried by a majority of nine, and the bill ordered to be committed the first day on which the house should

Reign of

William

1833.

Reign of sit after the Easter recess. The house, immediately after lated. The discussions of the measure in the House of William coming to this resolution, adjourned for the holidays. Lords, subsequent to this communication, were mere mat-During the interval, the whole country was kept in a ferment by meetings assembled for the purpose of expressing their satisfaction that the bill had passed the second reading, and earnestly adjuring the Lords to give it the sancof the full measure introduced by Earl Grey.

While the people were thus openly busy, their enemies were privately at work with equal assiduity, and not without some success. Earl Grey, unsuspicious of the mine about to be sprung under his feet, moved, on the 7th of May, in a committee of the whole house, the adoption of the clause disfranchising all burghs having a population beneath two thousand. Lord Lyndhurst moved, as an amendment, the postponement of the first and second clauses until the question of enfranchisement should have been taken into consideration. The object of this manœuvre was to leave the opposition an opportunity of conciliating the unrepresented great towns before it proceeded to mutilate the bill. A suspicion to this effect was raised by the care which some noble lords took to vindicate the fairness of their intentions before any body had called them in question; and suspicion was rendered certainty when Lord Ellenborough favoured the house with an outline of the plan of reform which he and his friends had in contemplation. Ministers were left in a minority of thirty-five. immediately postponed the discussion, and next day recommended to the king, in prosecution of a former understanding, a creation of peers sufficient to insure the passing of the bill. His majesty refused, and ministers immediately resigned.

Lord Althorp no sooner announced the ministerial resignation in the House of Commons, than Lord Ebrington gave notice of a motion to address the king on the state of affairs next evening. The address which, in pursuance of this notice, his lordship moved, expressed the most entire confidence in the late ministry, warned the king of the unabated ardour of the nation in favour of reform, and prayed that no men might be called to his mathe reform bill, unimpaired in all its essential provisions. The debate which ensued was eminently characterized by boldness and determination on the part of the reformers. The address was agreed to by a majority of eighty, in a house of four hundred and ninety-six. The House of Commons was supported by the nation. Wherever the news arrived of the resignation of Earl Grey, and it was circulated with unexampled rapidity, the inhabitants rose in mass, and feeling confidence of their representatives, petitioned them to stop the supplies; while it was announced in many places, that in the event of the House of Commons refusing to do its duty, no more taxes would be paid until the reform bill passed into a law. Not one act of rioting was perpetrated from one end of the kingdom to the other, but the orderly conduct of the assembled multitudes only made their anger the more terrible.

The Duke of Wellington undertook to form an administration which should take office upon condition of carrying through a large measure of reform. At the first hint of this project, the national indignation blazed up more fiercely; the timid class of politicians shrunk from the side of their leader; and the duke having abandoned the task as hopeless, the king was obliged to recal Lord Grey.

On the evening of Friday the 18th May, Lord Althorp announced to the House of Commons that ministers had again accepted office, after receiving assurance that every power would be placed in their hands which should be found necessary to secure the passing of the reform bill unmuti-

ters of form. Few of the amendments proposed were ever pushed to a division. Even the most obnoxious clause of all, that which gave members to the metropolitan districts, reading, and earnestly adjuring the Lords to give it the sanc- was carried by a majority of fifty-five, in a house of a hun-tion of a law. These assemblages were more frequent, dred and twenty-seven. A creation of peers was not reand attended by greater multitudes, than had ever previ- sorted to for the purpose of carrying the bill. In order to ously been witnessed; and at all of them it was unequivo- render that supposed evil unnecessary, a sufficient number cally declared that nothing would satisfy the nation short of noble lords absented themselves from the house to leave ministers in a majority on the third reading. The few who remained, however, expressed in their speeches the concentrated resentment of all the absentees. The royal assent was given to the English bill by commission on the 7th of June 1832.

The bills for Scotland and Ireland had been merely read a first time, and then allowed to lie over until the key-stone of the arch, the English bill, had been secured. As soon as that object was attained, the discussions upon the other two were resumed. Those regarding the Scotch bill were little more than a mere matter of form, no serious opposition being offered. It received the royal assent by commission on the 17th of July. Greater difficulty threatened to arise on the question of the Irish bill, tor a strong body of the Irish members were dissatisfied with the provisions for the extension of the franchise, regarding them as insufficient. But timely concession on the part of ministers conciliated the malcontents; the bill passed the House of Commons on Friday the 20th of July; no essential alterations were made by the House of Lords; and the new constitution of the imperial parliament was thus, after an arduous struggle, completely established.

On the meeting of the first reformed parliament in January 1833, a trial of strength between the parties in the house, and a test of the efficiency of the bill, was eagerly expected by the public. An opportunity seemed to be afforded by the election of a new speaker for the House of Commons, Mr Manners Sutton having expressed his purpose to resign; and on this occasion Mr Hume and his party, who were anxious that the reformed parliament should have an adherent of reform for its speaker, proposed Mr Littleton as his successor. Happily, however, the contest was avoided by the re-election of Mr Sutton, ministers being apprehenjesty's councils who were not prepared to carry into effect sive of a too sudden influx of ardent inexperienced members into the house; and the motion of Mr Hume, although supported by Mr O'Connell, having only 31 votes in its favour against 241, showed that the spirit of reform was for the present satisfied with what it had already secured. The chief struggle, however, succeeded in the settlement of Irish affairs, this subject having been earnestly recommended to parliament in the opening speech of His Majesty. In reference to these, he had expressed his confidence that they would entrust him with such additional powers as might be found necessary for controlling and punishing the disturbers of the public peace in Ireland, and for preserving and strengthening the legislative union between the two countries, which, he added, "I am determined to maintain by all the measures in my power, as indissolubly connected with the peace, security, and welfare of my people." fierce attack followed from Mr O'Connell, who characterized the speech as a "bloody, brutal, unconstitutional address," and ended by moving, that the house should resolve itself into a committee for its consideration. A keen debate ensued, which was carried through four adjournments, when Mr O'Connell's proposal was rejected by 428 against 40, of which minority, 35 were Irish members. The coercion bill for the suppression of disturbances in Ireland was then introduced by Earl Grey into the House of Lords, and carried through without opposition. But no such tranquil reception awaited it in the lower house, where a stormy debate of six days ensued before the first reading of the bill was carried by 466 votes against 89, this majority having been obtained

Reign of by the conservative party supporting the ministers. Undismayed by such a union, the Irish members and their adherents continued to oppose the bill at every step of debate, until it was passed with some alterations through a third reading by a majority of 345 to 86. The prospect, however, of coercive pacification was so discouraging that Mr Stanley resigned his office of secretary for Ireland, and was suc-

ceeded by Sir John Cam Hobhouse.

As a palliation to the severity of the coercive bill, it was resolved to gratify the bulk of the Irish community at the expense of the Established Protestant Church. Accordingly, it was proposed that its revenues, amounting to L.800,000 per annum, should be taxed from 5 to 15 per cent., with the exception of livings under L.200, and the first fruits abolished; that ten bishoprics should be annulled, and the revenues of the primate and the bishop of Derry diminished; and that out of the fund accruing from these and such reductions, estimated at L.300,000, the levying of church cess was to be discontinued, poor livings augmented, and the religious education of the people more widely and effectually promoted. This bill, which alarmed the Protestant, without satisfying the Romish party, encountered much opposition out of doors, although it passed through its third reading in the Commons on the 6th of July by a large majority. In the House of Lords it only passed after much debate and with several modifications. Another measure for the pacification of Ireland originated in the collection of tithes, a process that was everywhere the source of resistance, riot, and bloodshed. It was now proposed that a sum not exceeding L.1,000,000 should be issued in exchequer bills for the purpose of advancing "under certain conditions the arrears of tithes due for 1831 and 1832, subject to a deduction of 25 per cent.; and the value of the tithes for 1833, subject to a deduction of 15 per cent., to such persons as may be entitled to such arrears or such tithes, and as may be desirous of receiving such advances; and that the amount advanced shall be included in the tithe composition, so as to be repaid in the course of five years, being payable by half-yearly instalments." This resolution was likewise carried, although it was alleged that such a pretended loan would ultimately be converted into a gift, and that England besides paying her own tithes would be obliged to pay those of Ireland also.

Another important parliamentary measure of this year successfully closed the long struggle for negro emancipation. On this occasion an act was passed, that on the 1st of August 1834 slavery should wholly cease throughout all the British colonies, while the immense sum of twenty millions sterling was voted to the West India planters as a compensation for their loss through the abolition of compulsory labour. Never, indeed, had the cause of humanity received a sacrifice so great, so national, and so disinterested. To avoid the danger of the reaction that might result from such a sudden change, it was also provided that every emancipated negro, instead of being thrown loose upon society, should become an apprentice to his late master for a term not exceeding six years, and work for him forty-five hours in the week.

On the following year the attention of parliament was chiefly occupied, as before, with the affairs of Ireland. The late concessions to that country had been received by O'Connell and his party merely as the first instalments of a debt, and Catholic emancipation itself as a prelude to the repeal of the union; and thus there was no end to their demands, or limits to their discontent. This was now shown upon the question of Irish tithes, connected with the renewal of the coercion bill, in which the difficulties became so complicated, that Earl Grey resigned, and was succeeded in office by Lord Melbourne. The new premier then brought forward his plan for the adjustment of the tithe question, which he stated to be the ultimatum, beyond which nothing was to be granted or expected. It was, that the tithes were to be collected by the crown and paid by the landlord, and

thus the odium, as well as riots, occasioned by the former Reign of mode of levying them, would be avoided. But as the revenues of the clergy, in consequence of this change, were to undergo a diminution of  $22\frac{1}{3}$  per cent., to defray the expenses of collecting them, the bill was rejected at the second reading, and the clergy of the Irish Established Church consigned to their former poverty and uncertainty. This hasty escape from one difficulty, only plunged the ministry into another. On seeing the Irish Church thus left to its fate. the English Dissenters who had supported the reform bill through all its stages, imagined that their season for remonstrance and redress had fully arrived; and a shower of petitions followed, demanding exemption from the payment of church rates, and, in some cases, for the entire abolition of all connection between church and state, or at least, for the general adoption of the voluntary system, by which every person should not only choose his own church, but support his own minister. These petitions, however, only provoked a storm of counter-petitions, in which parliament was entreated with equal urgency to preserve the rights of the Established Church inviolate. But the chief grievance of which the Dissenters complained, was their virtual exclusion from literary degrees at the universities of Cambridge and Oxford, by the demand of conformity to the Church of England, and subscription to its articles; and they therefore prayed that these halls of learning should be thrown open to all, and their honours made accessible to every competitor. This petition was signed by sixty-three resident members of the senate of Cambridge, and introduced to both houses; but although its demand was limited to the abolition of university tests, it was regarded as a prelude to the overthrow of church establishment itself, and as such, was rejected in the Lords by a majority of 187 against 85 votes, and in the Commons of 321 against 174.

The only other important measure of this season was the bill for altering and amending the poor laws, upon which a commission of inquiry had been instituted soon after the accession of the new ministry to office. The bill was introduced by Lord Althorp on the 17th of April, and its chief proposal was, that instead of magistrates being invested with power to relieve the poor in their own dwellings, or on the roadside, the right in bestowing relief should be intrusted to the entire management of a board of commissioners named and appointed by ministers. Long and keen discussions followed, and several alterations and amendments were made upon the bill, until the Act 4th and 5th of Wil-

liam IV. was passed in the month of August.

The whig ministry that had satisfied neither the Irish agitators nor English radicals, and had generally become unpopular, was now superseded by a new administration, in which Sir Robert Peel succeeded Lord Melbourne as premier. The events that followed this change were neither numerous nor important. At the first meeting of the new parliament, which was convoked for assembling on the 19th of February 1835, Mr Abercromby was chosen speaker of the House of Commons, instead of Sir Charles Manners Sutton, and parliament was opened by the king in person on the 24th. The principal question at issue when the business commenced, was the vexatious one of Irish tithes, and an inquiry into the nature, extent, and tendency of orange lodges. But a still more momentous subject of discussion was embodied in a motion of Lord John Russell, "That the house should resolve itself into a committee of the whole house, to consider respecting the temporalities of the Church of Ireland." Another motion of his lordship consequent upon this was, "That any surplus which may remain, after fully providing for the spiritual instruction of the members of the Established Church in Ireland, ought to be applied to the general instruction of all classes of Christians." A third motion of his Lordship on the 7th of April, after several adjourned debates upon the subject was, "That it is the opinion of the house, that

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Reign of no measure on the subject of tithes in Ireland can lead to a satisfactory and final adjustment, which does not embody the principle contained in the foregoing resolution." motion was carried by a majority of 285 against 258. Sir Robert Peel on finding the current thus strongly set against him, resigned his brief two months' tenure of office, and an administration succeeded, having Lord Melbourne at its head, as first lord of the treasury. This change, however, was followed by no important consequences, for the bill which the new ministers introduced for the regulation of the Irish Church, after passing through the House of Commons, was rejected by the Lords.

In the ensuing year several important measures were proposed and carried successfully through both houses. The first was a cabinet plan for the commutation of tithes in England, by which provision was made for the extinction within two years of the right of exacting them in kind, by the payment of a money rate, according to the value of corn ascertained by a seven years' average. Another was the general registration of births, marriages, and deaths. A third concerned the marriage laws, by which Dissenters were allowed to celebrate the rite of marriage in their own places of worship, or wherever they thought fit, instead of submitting to the usages of the Church of England. It was also intended during this session to bring in four bills, having for their object certain reforms in the English Church; but on account of the hostility of the radical party, and the lateness of the season, only one was passed, under the name of the Established Church bill, by which certain bishoprics were united, two new ones erected, and a reduction effected upon their revenues to the amount of L.28,500 per annum.

Such were the principal occurrences of this reign after the passing of the Reform bill, an event that constitutes its chief point of interest. It was now closed by the demise of William IV., who died at Windsor Castle on the 20th of June 1837, in the seventy-second year of his age, and when he had he all but completed the seventh year of his reign.

## CHAPTER XXII.

Succession of Victoria to the Throne.—Revolts in Lower and Upper Canada.—Measures for their suppression.—Earl of Durham's unsuccessful government of the Canadas.-Discontents in Jamaica. -The Bed-Chamber controversy.—Chartist insurrection.—Marriage of the Queen with Prince Albert.—Afghan war.—Unfortunate retreat of the British from Cabul.—Successful termination of the war in Afghanistan.-War in Syria and bombardment of Acre.—War in China, and submission of the Chinese.—War in Sinde.—Disruption of the Church of Scotland.—War with the Sikhs, and its successful results.—Abolition of the Corn Laws.— Compromise in the Sugar Duties.—The Potato Blight.—Remedies for the Famine in Ireland.—Death of O'Connell.—Relief given to the West Indian Colonies .- Irish Rebellion .- Encumbered Estates bill.-War with the Sikhs.-Movements of the Protectionist party in behalf of Agriculture.—Right of Self-government granted to our Colonies.—Papal Aggression.—Ecclesiastical Titles' bill.—Death of the Duke of Wellington.

On the accession of Queen Victoria to the throne of Great Britain, every thing gave promise of a prosperous and happy reign. The country was tranquil; and people of all classes, mindful of the prosperity in arts and arms, that had crowned the eras of Anne and Elizabeth, were ready to welcome once more the rule of a female sovereign. The little kingdom of Hanover also, which for more than a century had been a source of vexation to Britain, was at last severed from the empire, in consequence of the Salic law which prevents the succession of a female to the Hanoverian crown. The moderation of the young queen's first step in government justified the hopes of her people, for instead of yielding to the temptations of innovation and change, she retained the officers of state in their places, and honoured them with her confidence. In consequence of this disinterested commencement, the elections of members for the

new parliament went onward as tranquilly as if no change in the occupation of the throne had been experienced.

1837.

Reign of Queen Victoria.

But while harmony thus prevailed throughout the United Kingdom, the case was very different in our colonial province of Lower Canada, where the French part of the popu lation had long been in a state of insubordination; and as, out of forty members who composed the Legislative Council, eighteen were French Canadians, there was fuel enough to inflame the general discontent. The grievances chiefly complained of, as exhibited in a memorial sent to the British parliament in 1828, and signed by 87,000 inhabitants of Lower Canada, were—arbitrary conduct on the part of the governors-the appointment of none but creatures of the executive government to the legislative council—the illegal appropriation of public money-violent prorogations and dissolutions of the provincial parliament—connivance of the government at the insolvency of Sir John Caldwell the receiver-general—and certain acts of the imperial parliament relative to Canadian trade and tenures. Since the publication of that report, the attention of parliament had been repeatedly occupied with its details, and in most cases a strong disposition had been evinced to meet them with concession. These concessions, however, liberal though they were, did. not satisfy the colonists, who only became the more extortionate in their demands, so that at last they announced their purpose to withold any rate of supply, until the alterations in the constitution which they demanded were fully satisfied. Thus matters went on until 1837, when the discontent broke out into open revolt, headed by Mr Papineau, their chief agitator, who, however, fled at the commencement of action, and left his followers to shift for themselves. This they did by a gallant resistance in several encounters with the royalist forces, until they were finally defeated and dispersed by Sir John Colbourne, the British commander-in-chief. This example of rebellion in Lower Canada was not lost upon the Upper province, whose malcontents had been tampered with by emissaries from the United States; and towards the close of the year, an association calling itself the Provincial Convention, issued a manifesto inviting their follow-colonists to arms, in language as wild as that of the fifth-monarchy saints of the days of Cromwell. It invited them to buckle on their armour, and establish a government and perpetual peace "founded upon the eternal heaven-born principles of the Lord Jesus Christ," and no longer to be "hood-winked by Baal's ministers, and tampered with by wolves in sheep's clothing, who take the wages of sin, and do the works of iniquity." For this outburst, Sir Francis Head, the governor of Upper Canada, was utterly unprepared; strangely enough, even when the insurrection was expected, and on the eve of explosion, he had cleared the province of all the regular troops, and left nothing for its defence but six thousand stand of arms under the peaceful custody of the mayor of Toronto. He was suddenly roused from his security, and even from his bed, at ten o'clock at night, by the advance of the insurgents, estimated at three thousand strong, but in reality not more than five hundred, who entered Toronto under the command of Mr M'Kenzie, editor of a republican newspaper, M. Van Egmont, an ex-officer of Napoleon, Mr Gibson, a land-surveyer, and Mr Lount, a blacksmith. Roused into decisive action by this sudden emergency, the governor extemporized a militia force that was soon sufficient to keep this motley rebellion at bay, until the arrival of reinforcements of loyal volunteers to the amount of ten or twelve thousand, obliged the insurgents to betake themselves to flight.

These increasing difficulties in the government of Canada, that seemed only to have awaited the commencement of a female reign to break out into actual rebellion, perplexed the ministry at home. In spite of all their conciliatory measures, the colonial discontent had swelled into open insurrection, and although this had been promptly suppressed, a second attempt might soon follow more perfectly matured

Reign of than the first, and more formidable in its consequences. There were many also at home, and of these, some were in parliament, who asserted that Canada was now ripe for selfgovernment, and should therefore be released from its dependence on the mother country; and that the example of the United States should warn us of the danger of a refusal. These consideration occupied the attention of parliament in 1838; and after several debates, the Canada bill of Lord John Russell was moved, and passed through both houses. Although sufficiently stringent in its character, it was reckoned not more so than the crisis required; and, notwithstanding a fierce resistance from the Canadian sympathizers, it was carried, after undergoing several amendments, by large majorities. The principal provisions of this bill were in substance the following:—"The constitution of Lower Canada was suspended till November 1840. Her Majesty in council was empowered to constitute a special council, and to appoint or authorize the governor to appoint such and so many special councillors as she might think proper. It was declared that, until November 1840, it should be lawful for the governor, with the consent and advice of the majority of the said councillors convened for the purpose, to make such laws or ordinances for the peace, welfare, and good government of Lower Canada, as the legislature of that province, at the time of passing the act, was empowered to make; and that all laws or ordinances so made, subject to the provisions thereafter contained for disallowance thereof by Her Majesty, should have the like force and effect as laws passed before the passing of the act by the legislative bodies. The governor was to have the initiative of all measures proposed to the council, five of whom were required for a quorum." The governor, under whom this new experiment of colonial government over nearly a million and a half of discontented subjects was to be attempted, was also nominated; this was the Earl of Durham, son-in-law of Earl Grey, whom Lord John Russell characterized as possessed of large political experience, combined with such liberality of sentiment as would best secure the confidence of the Canadians. Lord Durham accepted the charge with reluctance, and proceeded to his seat of government; but there his rule was both brief and unhappy. Trying at once to punish and conciliate, he only exposed himself to the hostility of the Canadians, and the reproaches of the home government; and, at last disgusted with his charge, he suddenly resigned it after six months of occupation, and returned to England, loudly complaining that the ministry at home had not supported him as they ought to have done. His arrival under such circumstances was so unprecedented and ungracious, that on landing, the usual salute of guns to him as a representative of royalty was withheld, and he was even threatened with impeachment. Indeed, almost simultaneously with his landing, tidings arrived from Lower Canada that the rebels were again in arms, and in greater force than ever. The debates that followed upon Canadian affairs bore so hard upon the earl, that to justify himself to the country at large, he published his report upon the condition of the colony, which he had originally drawn up for the enlightenment of the ministry. In the Queen's speech at the opening of parliament for 1839, the rebellion of Lower Canada, and the intrigues of the inhabitants of the United States to promote a similar spirit in the Upper province, had been pressed upon the attention of both houses; and in the debates that followed, the Duke of Wellington urgently insisted upon the disturbed state of our North American possessions, as well as the precarious tenure by which we held them. He declared that it was nothing less than a great national war, which could only be successfully terminated by an extensive scale of action; and he expressed his regret that not only American citizens should have entered these territories with American arms and cannon, but also that their government should have no power to prevent such interference.

Victoria,

1838.

The affairs of Canada, which occupied the attention of Reign of parliament during this year, were alternated with petitions for the abrogation of the corn-laws, and premature attempts to make this great question the subject of parliamentary discussion-with the condition of Afghanistan, into which an Anglo-Indian army had been marched-with proposals for further parliamentary reform—and the appointment of a committee of inquiry into the state of Ireland, occasioned by the assassination of the Earl of Norbury. But of still more urgent consequence was the condition of Jamaica, where the planters were so discontented with the changes introduced into their government, consequent on the abolition of negro slavery, as to cause apprehension of serious commotions. In consequence of this, a bill was introduced into parliament, proposing to suspend the existing constitution of the colony for five years—a daring remedy, which was met by the most decided opposition on the part of Sir Robert Peel. The bill, which was a ministerial one, was gained by only a majority of five, 289 being against it, and 294 in its favour; and in consequence of this significant indication, the Melbourne cabinet, whose popularity had been gradually decreasing, sent in their resignation. On the Duke of Wellington being invited by Her Majesty to assist in forming a new cabinet, he recommended Sir Robert Peel as the fittest person to be at the head of affairs; and Sir Robert having agreed to accept the premiership, proceeded to fill up the cabinet appointments. But here his first movement was an utter shipwreck, for it was a proposal that certain ladies of the bed-chamber, connected by close relationship with his political opponents, should be either dismissed, or persuaded to resign their offices. To a cool calculating politician this requirement may have appeared just and necessary in a female court, where ladies must naturally possess more than the usual influence of their sex; but by the public in general it was indignantly complained of as a most unchivalrous proceeding, which no argument of statesmanship could justify, while the queen at once rejected the proposal as being both contrary to usage, and revolting to her feelings. Such a long period, indeed, had elapsed since the days of Queen Anne, that politicians had to learn anew the application of established court usages to the emergencies of a female sovereignty. Finding this difficulty at the outset unsurmountable, Sir Robert rejected the offered premiership, and the Melbourne cabinet was restored to office. At the same time, Mr Abercromby, owing to ill health, resigned his office as speaker of the House of Commons; and Mr Shaw Lefevre, member for North Hants, the ministerial candidate, was elected in his stead by a majority of 317 against 299.

After this temporary bed-chamber interruption had subsided, parliament proceeded in its ordinary routine. And foremost among the measures presented for consideration, was a ministerial plan for a general and national system of education, proposed by Lord John Russell, in which a board, composed of a president, assisted by councillors not exceeding five in number, should preside over the distribution of the ministerial grants, and the management of the system in general, which was to consist of religious and moral as well as intellectual training. But here the high church party took the alarm at the latitude which it allowed to the different religious denominations, while the Dissenters themselves opposed it as too exclusively devoted to the interests of the Established Church. It was not in this fashion, or thus early, that the momentous question of the present day was to be settled. Another subject urgently brought before the attention of parliament by a message from the queen, was the administration of government in Canada, in which it was proposed that the upper and lower provinces should be united into one—a measure that was successfully accomplished in the following year. The obstacles to a complete suppression of the slave-trade still continued also Victoria.

1839.

Reign of to be the ground of parliamentary complaint and remonstrance, arising from the conduct of Portugal, which, although it had received an indemnity from the British government of L.800,000, on condition of suppressing negro slavery within its colonies, still continued to tolerate the evil, so that slave-ships pursued their wonted trade under Portuguese and Brazilian flags. At home also the Chartists, who had risen into such portentous strength as seriously to alarm the government, by transmitting a monster petition in behalf of their five points, signed by 1,200,000 of the working-classes, became so riotous on its rejection, especially at Birmingham, that the police force of that city had to be largely increased, and 5000 soldiers added to the military establishment. Even these precautions were insufficient, for towards the close of the year their discontent broke out into action. This was in Monmouthshire, where four or five thousand rioters, armed with various weapons, and headed by John Frost, a magistrate, attacked the town of Newport; but happily they were dispersed, after a few volleys of musketry by a handful of soldiers and policemen. One of the most important proceedings of this year was the plan of a uniform penny postage, devised by Mr Rowland Hill, and proposed to parliament by Mr Spring Rice, which was passed after a long and keen opposition. Although the vaticinations of its consequences were of the most alarming character, the plan soon justified the hopes of its supporters, by the benefits it conferred upon every class of the community.

In the parliament of 1840, which was opened by Her Majesty in person on the 16th of January, her approaching marriage with Prince Albert of Saxe Coburg-Gotha, was announced in the opening of the queen's speech; and on this occasion, the annual sum of L.30,000 was voted out of the consolidated fund as a provision for her royal consort.

Passing over the events of less importance by which this year was distinguished, we would now confine our attention to those melancholy disasters which awaited our arms in the East. For a long period, the chief dread of the security of our empire in India had arisen from the growing ambition of Russia, and its machinations with Persia and Afghanistan, of which last country Runjeet Sing, commonly called the Lion of Lahore, who was suspected of leanings towards the designs of Russia, had obtained dominion over the greater part by intrigue and conquest. In the course of these successful aggressions, Dost Mohammed, sovereign of Cabul, finding himself in danger of being dispossessed by the Lion of Lahore, had recourse to the British for protection; but as our Indian government was at peace with his enemy, the application was refused, whereupon he sought assistance not only from the Tartars, but also from Persia and Russia. In this way a door was opened for Muscovite intrigue and aggression. Instigated, as was alleged, by pecuniary aid from Russia, the Shah of Persia marched in July 1837, at the head of 40,000 men, from Teheran to Herat, to which he laid siege; upon which it was determined by our Indian government that the young sovereign of Persia should be driven out of Cabul, and Shah Sujah, one of the deposed Afghan kings, but now a British pensionary, placed upon the throne. In this way, it was hoped, a grateful ally would be secured, and a frontier barrier erected against Persian and Russian encroachments. Accordingly, in the middle of June 1838, a British army was landed at Karrack in the Persian Gulf, of which it took possession; and the Shah finding his own dominions thus invaded, broke up the siege of Herat, in which he had made little progress, and hastily retreated homewards. A city that was the key to our Indian possessions against Persia and Russia was thus fully recovered; but unsatisfied with this result, our Anglo-Indian government resolved to complete the work by the subjugation of Afghanistan itself. Accordingly war was declared by Lord Auckland, governor-

general of India, while the conduct of it was committed to Sir Henry Fane, the commander-in-chief of all India, who unwillingly undertook the charge, from a melancholy foreknowledge of the difficulties with which it was certain to be attended.

These difficulties were not long in commencing. The first was the refusal of Runjeet Sing to allow the British troops to cross his territories at the Punjaub, notwithstanding his previous agreement by treaty to that effect. Then came the treachery of the Ameers of Scinde, who had engaged to furnish provisions and the means of transport to our armies; but who, when the crisis arrived, not only broke their engagement, but turned against us, and attacked our troops in the mountain passes. Finally, the health of Sir Henry Fane, which had been affected at the commencement, so completely failed, that he was obliged to resign the command, which was conferred upon Sir John Keane; and this change occasioned others, that led to jealousy and misunderstanding among the officers, and produced some of the worst errors of the war. In spite of these and other obstacles, the Anglo-Indian army advanced, and was everywhere successful: Ghuzna was taken by storm, Cabul entered in triumph, and Shah Sujah seated upon the musnud. All danger being now thought at an end, Sir John Keane returned to England, where he was raised to the peerage by the title of Baron Keane of Ghuzna and Cappoquin, and Lord Auckland was rewarded with the rank of Earl. But while the whole nation triumphed in this conquest of Afghanistan, by which the British dominion was completed over India, the sagacity of the Duke of Wellington was not deceived. Understanding too well the nature of Eastern affairs, he expressed his apprehensions of a coming reaction, and that these conquests in Afghanistan were but the commencement of fresh difficulties.

These forebodings were but too well verified. withdrawal of our army, 8000 of the troops, British and Sepoy, were left at Cabul, independently of Shah Sujah's contingent, which was commanded by British officers. In the spring of 1840, as soon as the melting of the ice and snow had opened the mountain passes, hostilities were resumed by the Afghan tribes, aided by the Ameers of Scinde; and although our army was increased by reinforcements to 16,000, it seemed to be blockaded in a hostile country, rather than a force in successful military occupation, while already an expense equal to three millions per annum was the price of such an undesirable tenure. In November 1841, Sir A. Burnes, the British resident at Cabul, and two officers, one of whom was his brother, were attacked and murdered in their own house by the insurgent Afghans, whose formidable bands had surrounded the city and shut out all communication between the British army and the government; the British encampment itself was attacked; and our troops demoralized by the confusion of counsels that prevailed among their officers, fled from the commissariat fort, leaving their provisions, clothing, and stores in the hands of the enemy. A dangerous retreat or negotiation was now the only alternative, and unhappily the latter was adopted. For this purpose, Sir William Macnaughton, the British commander, went out from the cantonment to an interview with Akbar Khan and the other insurgent chiefs, and the latter agreed to allow the British army to retire without molestation, and furnish them with provisions and the means of transport. But instead of fulfilling their bargain, these faithless barbarians murdered all the sick and wounded that fell into their hands, and withheld the promised provisions; and when the British troops were exhausted with hunger, sickness, and severity of the weather, they rose in their demands, and insisted on a new treaty. A fresh interview followed, and Sir William Macnaughton was basely murdered in the midst of the conference. Utterly dispirited by this atrocious deed, the army abandoned all thought of re-

Reign of

Reign of sistance, and entered into such a composition to secure their further retreat as was new in the annals of British warfare, and astounding in the history of its Indian conquests, by agreeing to abandon all their guns except six, and all their treasures to the enemy; to give bills for the payment of five lacs of rupees; and to leave the married officers, with their wives and children as hostages until these terms were fulfilled. It was a miserable treaty for the conquerors of India to make-a treaty in which the væ victis was sure to be returned upon them in double and treble measure. The retreat purchased under such humiliating circumstances was as disastrous, proportioned to the number of the sufferers. as any which history has recorded. It was in the depth of winter, and 26,000 human beings, comprising soldiers, camp followers, women and children, are calculated to have perished by the severity of the weather, by privations of every kind, and by the swords of the perfidious enemy, who hung upon their march and cut down every straggler who was unable to keep up with his companions. In short, of the whole military force who were thought sufficient for the conquest and possession of any eastern kingdom, only a few sepoys and camp followers succeeded in escaping to Jellalabad, still held out by General Sale, who had cleared the pass of Khoord Cabul at the commencement of the insurrection, and who gallantly retained possession of the fortress notwithstanding the desponding orders of his superior, Elphinstone, to evacuate it.

A reverse so remarkable in the history of British conquest in India produced a correspondent depression, and it was resolved to obtain the liberation of the captive women and children by treaty and ransom. But this abject step, which would have destroyed our prestige in India, and commenced a train of disasters under which our eastern government would have been shaken if not finally overthrown, was happily abandoned, and a war of retrieval commenced. For this, Jellalabad afforded a centre and rallying point, as it was still gallantly held out by General Sale, who disturbed the leaguer of Akbar Khan by several successful sallies, and at length defeated him on the 7th of April (1842), in an open engagement, with only a part of the garrison. In the meantime, General Pollock, who had been pressing forward to the relief of the fortress, reached it nine days afterwards, when its provisions were all but exhausted, and the siege was instantly raised. The British army then advanced upon Cabul in the middle of August, and met with little or no resistance, the successful Afghan chiefs being now engaged in war with each other, and that too in the very neighbourhood of the city which it was their common interest to defend. At the same time, General Nott, who had gained two victories over the Afghans, and recaptured Ghuznee, advanced to effect a junction with Pollock. The chiefs who had hitherto sided with Akbar Khan, now turned against him; and a treaty in which pecuniary recompense was largely promised them by the British government was eagerly accepted. The consequence was, that after a liberal ransom, the officers, with their wives and children, who had been abandoned to the enemy as hostages, and who had been often menaced with the most infamous treatment, arrived in safety at headquarters, and were received by their friends as those who had escaped from a den of cut-throats, or even risen from the dead. Thus was humanity satisfied, and the British arms, for a time so woefully degraded, restored to their former lustre. The reaction also produced by the victories of Nott and Pollock in favour of our eastern ascendency was not confined to the turbulent chieftainry of Afghanistan: Burmah, Nepaul, and other independent states of Hindustan that had been on the eve of breaking out against our Indian government, and trying once more the chance of arms for its suppression, were now eager to renew the terms of former amity, and make fresh professions of peace.

Victoria.

1842.

This Afghan war was not the only eastern question that Reign of occupied the attention of our home government; the maintenance of the integrity of the Turkish empire, in which Britain has so deep an interest, was also at issue, in consequence of the ambition of Mehemet Ali, the most formidable of Ottoman viceroys. Soon after his accession, Abdul Medjid, the young Grand Seignor, had offered to his dangerous vassal a full pardon for the past, and the hereditary sovereignty of Egypt; but the Pacha, not contented with this, demanded possession of Syria also, by which Turkey would have been dismembered, and its very existence placed at his mercy. Upon this unreasonable demand which Mehemet had full means to enforce, the allied powers, England, Austria, Russia, and Prussia, interposed; and as the Sultan had no naval power for the recovery of Syria, his navy having deserted to the viceroy, the allied powers, who found that something more than remonstrance was necessary, entered into an agreement to that effect at London on the 15th of September 1840. Accordingly, a British fleet, aided by an Austrian naval and land force, reduced the city of Beyrout, defeated Ibrahim Pacha, and so effectually aided the Syrian mountaineers, who were disgusted with the oppressive rule of the Egyptian army, that the latter was compelled to retreat upon Acre. The city of Sidon was then captured; and on the 3d of November the British fleet advanced to the attack of St Jean d'Acre, that city which Napoleon regarded as the key of the east. But those ramparts which had resisted him so long and successfully, were in less than four hours battered to pieces by the British cannon; and our naval force, which only lost 12 men killed and 42 wounded in the attack, inflicted upon the enemy a loss of more than two thousand in killed, wounded, and prisoners. This signal victory destroyed the pretensions of Mehemet Ali, who yielded to the terms imposed upon him by the allies through Admiral Sir Charles Napier, the conqueror of Acre. These were, that he should give up the Turkish fleet to the Sultan, abandon for ever his claims upon Syria, and hold Egypt as an hereditary dependency of the Ottoman Porte. In this way the dismember-ment of Turkey was delayed. As for Napier, the Nelson of the war, his capture of Acre was declared by the Duke of Wellington to be one of the most brilliant of modern achievements, and he was honoured by a vote of thanks from both houses of parliament.

It was not merely in the Afghanistan war that our commercial interests in the East had for some time been in danger: in China also a war had been commenced against the British, originating in the alterations that had been made in the East India Company's charter, by which their exclusive monopoly in the China trade was abolished. The Chinese, who were immoderately addicted to the use of opium, had hitherto been supplied, though in limited degree, with that pernicious drug from India through the Company; but no sooner was the trade thrown open, than opium was poured into the Chinese market without stint, until its effects were soon felt as one of the worst of national evils. Alarmed at this, the Chinese government adopted a remedy in its own despotic fashion, by suspending all trade with the British, seizing and destroying the opium and other British property, and firing upon our ships in their passage up the river to Canton. These aggressions were so frequent, and the treaties that followed them were so ineffectual, that in 1840 war was proclaimed, and Canton blockaded by a British fleet. The result of the encounters that followed was such as might have been expected: the Chinese soon found that mere barbarism, courage, and numbers, were no match for European military science, discipline, and experience; and that when they had recourse to temporizing and treachery, these were only followed by fresh disasters. Thus matters went on in 1840 and the two following years, until the Chinese government was humbled into submission, and a

Victoria.

1843,

1842.

Reign of treaty was signed on the 20th of August 1842, in which they made full reparation. The principal concessions were, an indemnity of twenty-one millions of dollars for the destruction of the property of the British merchants, the cession to them of the island of Hong Kong in perpetuity, and the opening of the ports of Canton, Amoy, Foo-choo-Foo, Nang-po, and Shang-hai to their commerce, and that of other nations, with the right of establishing consuls at them, and the correspondence of the officers of both governments to be conducted on terms of perfect equality. In this way, and for the first time, the wedge was effectually introduced by which China, hitherto impenetrably closed against improvement, has been opened to the advance of European civilization, and the prospect of a new and better era.

The course of eastern warfare was once more shifted from China to India. The Ameers of Scinde, encouraged by the disasters of our army among the Afghan mountains in the retreat from Cabul, incensed at the loss of their transit duties on merchandise passing up and down the Indus, and apprehensive of losing their hunting-grounds upon the banks of the river by the continued encroachments of British dominion, took up arms for a general resistance. It was now full time to suppress these Ameers, as they were the rulers of a restless warlike people whom they were unable to control, and to whose cry for war and plunder they were compelled to yield. In addition to a former treaty of peace, which only a part of them had subscribed, a new one had been agreed to on the 14th of February 1843; but they broke it only the day after, by an attack upon the residence of the British commissioners. Against these dangerous enemies the brave old general, Sir Charles Napier, was sent; and on the 17th of February, two days after the violation of the treaty, he attacked them within twenty miles of Hydrabad, upon which city he was advancing. The Ameers, who had mustered a numerous army, gallantly contested the ground, and for some time made victory doubtful; but at length they were routed by the greatly inferior British force, who on this occasion rivalled the brightest achievements of the soldiers of Lake and Clive. Three days after the victory, the conquerors entered and took possession of Hydrabad; in consequence of which Scinde was reduced to a British province with Napier for its governor, slavery was abolished, and the Indus opened to the trade of every nation.

During the same year, and towards its close, a war was commenced with the Mahrattas, who had rebelled against their young Maharajah, whom we were bound by treaties to support, and committed other excesses that made chastisement inevitable. An army was sent against them under the command of Sir Hugh Gough, and a battle fought at Maharajpoor on the 29th of December 1843, in which the Mahrattas were defeated, though not without severe loss to the British, whose number almost equalled that of the enemy. Upon the same day a victory was obtained over a Mahratta force at Punniar by a division of the British army under the command of Major-General Grey. In consequence of this twofold defeat the Mahrattas submitted, and their country was garrisoned by military occupation. During this course of a four years' war, extending over Syria, India, and China, events at home were of such minor importance that we can scarcely afford them a passing glance. The principal affairs with which parliament was occupied, independent of these important movements in the East, were an alarming diminution in the revenue, and the question for the repeal of the corn-laws, which in consequence of the fall of the revenue was forced into final discussion. Against these restrictions on the importation of grain parliament had been petitioned in 1839; in 1841 the subject was resumed, with almost as much urgency as that which had carried the Reform bill; and, in the following year, the popular agitation for the repeal of the corn-laws was so over-

whelming, that a new cabinet under Sir Robert Peel, after Reign of carrying the property and income tax, found that it could do nothing less than abate, if it did not wholly abolish, these obnoxious restrictions. This accordingly was done by Sir Robert in March 1842, when his modification of the sliding scale, instead of an entire free trade in corn, was introduced and carried by a majority of 306 against

The year 1843 was memorable for an event in the history of the Church of Scotland. This was the voluntary separation of above four hundred ministers from the Established Church; a movement popularly known as the "Disruption," and which gave rise to that large and influential body calling itself the Free Church.

Previous to this occurrence the law of patronage, always obnoxions to the popular feeling of Scotland, had become such a ground of contention and fruitful source of dissent, that a majority of the General Assembly in 1834 embodied their views and resolutions upon the subject in the Veto Act, by which no minister was to be imposed upon a congregation where a majority, consisting of heads of families and communicants, subscribed against his admission. But patronage was too valuable a privilege both in the eyes of patron and presentee to be relinquished without a struggle; and in several cases where parishes exercised their right of veto against the entrance of a new minister, their decision was carried by appeal to the Court of Session, and there reversed as illegal. The ecclesiastical and civil courts were thus brought into hostile contact, and the claims of the church to independence and self-government in spiritual matters, as well as what constituted their spiritual character and the range they occupied, were the trying questions at issue. In this difficulty the only remedy for the General Assembly was to appeal to the House of Lords: but at this highest tribunal, the decisions of the Court of Session were confirmed, and the rights of patronage fully recognised. It was evident that the party in the church by whom the Veto Act had been framed, could no longer carry out their antipatronage principles, nor their views of spiritual independence with which it was connected; and as they had all along announced these as questions of conscience which they could neither abandon nor compromise, they had declared their purpose to forsake their livings rather than submit to that authority which the state claimed in church rule, by the final decision of the House of Lords. And this resolution they fully carried out at the meeting of the General Assembly in May 1843, by tendering their protest, subscribed by more than 400 ministers; after which they departed in procession to a large hall that had been prepared for the event, and there constituted themselves into what has since been called the Free Church of Scotland.

The affairs of India once more became the subjects of public attention. Lord Ellenborough, the governor-general, was recalled in April 1844, and Sir Henry Hardinge appointed in his room. The latter, on his arrival in India, found the Sikhs in a state of wild disorder in consequence of the death of the energetic Runjeet Sing, the Lion of Lahore, and ready to invade the British territories, which they soon afterwards did by crossing the Sutledge; upon which a military force that had been in readiness for the occasion was marched against them with great celerity. An encounter took place at Moodkee on the 18th of December 1845, and although the Sikhs were in great force and advantageously posted, as well as defended by a numerous artillery, in the use of which they had been trained by European officers, while the British, consisting of only four regiments of foot, and one of light dragoons, were exhausted with a long march, and provided with only a few six-pounders, the latter were victorious, although with a heavy loss in killed and wounded. Undismayed by this defeat, which fell only upon their advanced troops, the main army of the Sikhs on the opposite Victoria.

1845.

Reign of side of the river, crossed the Sutledge, with an overwhelming array of horse, foot, and cannon, and entrenched themselves at Ferozeshah. There a terrible engagement took place between them and the British, who were now not only reinforced with fresh troops, but aided by the presence of Sir Henry Hardinge, the governor-general, who on this trying occasion set aside his superiority of rank, and took the command of the left wing under Sir Hugh Gough. This great battle, to which that of Moodkee had been but a prelude, commenced on the 21st of December, and lasted two days; while the British, who were defective in cavalry and artillery, with which the enemy were abundantly provided, were obliged to depend upon the steadiness of their infantry, and charges of the bayonet. On this occasion the Sikhs were at last driven out of their camp after a gallant resistance, in which the British sustained a loss of more than two thousand in killed and wounded. After this double engagement, the Sikhs, still undismayed, entrenched themselves at Sobraon; but there they were attacked by Sir Hugh Gough on the 10th of February 1846, and in spite of their discipline under Italian and European officers, their numerous and well-served artillery, and great superiority of numbers, they were totally defeated, and driven across the Sutledge, while the British army entered the Punjaub. Lahore, the capital, surrendered at their approach; the authority of the young Maharajah, Goolab Sing, was restored; and all opposition terminated. Since that period, the affairs of India have been more tranquil, and our authority over its many provinces more confirmed than before.

While these eastern events were in progress, a great agricultural conflict had been carrying on at home, in which interests were at stake to the full as important as the extension of our commerce by foreign and colonial conquests. This was for the repeal of the corn-laws, which, having lasted their day, were now to be dismissed as mere wornout relics of departed feudalism. The agitation to that effect, chiefly conducted by Mr Cobden, had acquired a formidable consistency and strength by the organization of an anti-corn-law league, well furnished with influential names and pecuniary contributions; and at the close of 1845 the demand for a free trade was so loud over England and Scotland, that Sir Robert Peel and his cabinet, who were divided upon the question, gave in their resignation. A new ministry, however, could not be formed, and Sir Robert was persuaded to resume office only ten days after. But more urgent still than the fiercest popular clamour, was the failure of the potato crop, and the famine that followed, so that even the agricultural interest was obliged to acknowledge the necessity of a repeal. It was hunger that at last ate through these stone walls of protection, and prepared the openings for a free trade in corn; and it was Sir Robert Peel himself who brought into parliament a bill to that effect, which was passed through the House of Commons on the 16th of May 1845, and through that of the Lords on the 21st of June. With this daring experiment, not upon individual interests, but the national existence itself, the popular desire was satisfied, and the present famine forgot in the hopes of future abundance.

After the repeal of the corn-laws and establishment of free trade, by which Sir Robert Peel had sacrificed the principles of his past political life to the demand of stern necessity, and declaring his conviction that for this he would leave a name that would be execrated by every monopolist. he resigned office and was succeeded by Lord John Russell. The first consideration of the new ministry was the sugarduties, almost as obnoxious as the corn-laws themselves, and the repeal of which was almost as loudly demanded. As this could not at present be granted, a compromise was offered, by which a gradual diminution, extending over five years, was to meet the difficulty; but this measure was equally opposed by those who advocated the cause of our

West India planters, now deprived of cheap compulsory la- Reign of bour, and by those who were anxious for the entire abolition of negro slavery in those colonies where the evil still existed. Through the midst of this twofold opposition, the government proposal was carried by large majorities. During the present session of parliament also, a plan that had been proposed by the Peel administration was happily carried into effect, by which mercantile confidence, especially among the lower classes, was materially benefited. This was the establishment of local tribunals in every district of England for the recovery of small debts, over which about sixty local judges were appointed to go in periodical circuit, and hold courts in all the principal towns twice in every month. Such were the labours of this critical session of parliament, which was congratulated by the royal address "for the present relaxation and ultimate repeal of protective duties on

corn and sugar."

The year 1847 was signalized by political difficulties that would have tried the wisdom as well as tested the stability of any political administration. The commercial prosperity of 1845, so flattering at its commencement, had encountered a sudden shock chiefly through the disease in the potato crop, by which there was a deficiency in the available wealth of the country to the amount of several millions. But fearfully this calamity had fallen upon Ireland, where the potato constitutes the principal article of food, and for the loss of which an immediate remedy was urgently demanded. A whole nation was at the starving point. The opening of the session was, therefore, earlier than usual, the parliament meeting on the 19th of January, and the subject of Irish destitution was the chief subject of discussion. The temporary expedients proposed and adopted on this occasion were parliamentary labour upon the farms and public works, the reclaiming of waste lands, and the eleemosynary relief of gratuitous rations and soup-kitchens. The more permanent remedies introduced to the consideration of parliament, were the sale of encumbered estates, the conversion of long leaseholds into copyholds, and the construction of railways; for which changes it was stated that grants from government to the amount of sixteen millions would be necessary. But costly though the price was, these remedies were subsequently adopted, and put in practice. Other measures connected with Ireland that occupied the attention of parliament during the same session, had reference to the suppression of crime which had increased to a fearful amount, especially in the form of open murder, assassination, and conspiracies against the rights of property; and to suppress these evils, a bill was introduced and passed through parliament investing the Lord Lieutenant with almost dictatorial power, which was to continue in full force until the 31st of December 1849. It was wonderful how easily this measure passed through the ordeal of the Irish members, few opposing it except those of the O'Connell family. But for this silence there was sufficient cause, as their great leader, whose voice would have been loudest on such an occasion when his country was to be colonized by the Saxons, had ended his political career. Daniel O'Connell, the great tribune of Ireland, who had won as popular demagogue a more than kingly ascendency, died at Genoa, on his way to Rome, on the 15th of May 1847. But formidable as he was, he was but the John Wilkes of his day, rather than the Arteveldt or the Gracchus. Having served the temporary purposes to which he devoted himself, and won the shortlived renown for which he laboured, he is already all but forgot, not only in England which he so bitterly traduced, but even in Ireland where he was worshipped with almost religious veneration.

The troubles of our West India colonies, occasioned by the abolition of the slave-trade, were not yet ended, and parliament was occupied in 1848 with petitions from the planters and their adherents in Britain, praying for the re-

Victoria.

peal of restraints imposed upon emigration, for the removal of burdens on the supply of African labour, for an alteration of the navigation laws, and for an assimilation of the duties on colonial rum to those paid by the British distillers. These, with the exception of the petition about the navigation laws, were embodied in a bill presented to parliament by Lord George Bentinck, and the result was, that a loan of L.170,000 was granted for promoting the emigration of free labourers into the colonies of British Guiana and Trinidad, while a more extensive plan of relief was afterwards proposed by Lord John Russell, as necessary to save the West Indies from insolvency and ruin. This chiefly consisted of an additional loan of L.500,000, a reduction of the duty on colonial sugar, and a reduction of the differential duty on colonial rum; by which concessions a considerable step was made in appeasing the West India planters, and extricating them from their difficulties. A still more serious question was occasioned by the state of the public finances, a deficiency being anticipated for the next year, mainly occasioned by the expenses of the Caffre war, and estimated at L.3,200,000; and the remedy proposed was an augmentation of the income-tax from three to five per cent., to be continued for three years. This suggestion of aggravating an already obnoxious tax excited a general alarm, and called forth petitions from every quarter; and in the parliamentary discussions that followed, in which the idea of an increase was quickly abandoned, the questions at issue were, whether this income-tax as it originally stood could not be imposed in a more just proportion than by a uniform per-centage on incomes; or whether it could not be altogether repealed? These were alarming inquiries which it was found necessary to silence, and therefore to save the tax itself, a loan of two millions not drawn from the consolidated fund, but raised by an issue of Exchequer bills, or by a creation of stock, was proposed to meet the coming de-

While the nation was thus suffering from deficient harvests, mercantile depression, and a defective revenue, the magnanimity with which these evils were endured, and the energy with which they were surmounted, bore full evidence to the deep-rooted strength and stability of the British constitution. This was the more remarkable as contrasted with the rest of Europe, where almost every throne at this period was tottering, and royalty itself all but annihilated. An attempt, indeed, was made on the part of Chartism to avail itself of the universal commotion, but all that it could effect was a few monster meetings that evaporated in speeches, or paltry riots that were easily suppressed by the police. In Ireland also an attempt at open rebellion upon a grand scale ended still more contemptibly in a trifling skirmish in a cabbage garden, and the capture of Mr Smith O'Brien, the redoubted leader of the movement. Still agrarian riots, violence, and assassination, continued in that unhappy country as before, and with more formidable results than open rebellion, so that Irish affairs occasioned much parliamentary solicitude during the following year. To meet those difficulties arising from the destitution which the potato blight had occasioned, and which still continued to increase in severity, various temporary measures were adopted, that sufficed for a few weeks or months to hold the evil at bay, and give the sufferers a chance of recovery. But the most permanent benefit that could be imparted to such a country was the Encumbered Estates bill, proposed during the previous year, and now carried through both houses, by which land hitherto useless was thrown into the market, and made available to those who had wealth to purchase and spirit to cultivate it. In this way English and Scottish merchants became Irish proprietors; Saxon capital, perseverance, and skill, were brought to a rich but hitherto unproductive soil; and all gave promise that in a few generations more the marked superiority by which Ulster

stands alone will be fully shared by all the provinces of Ire- Reign of

An affair of scarcely less, if not of equal importance, which occurred during this year, was the repeal of the navigation laws, which also had been brought under the notice of parliament in 1848, but remanded for future settlement. The strictly exclusive character of these laws, which secured for Britain the monopoly of the colonial trade, the long-voyage trade, and the carrying or indirect European trade, had not only been a grievance to our colonies, especially to Canada, but was incompatible with those principles of free trade which were now a part of the constitution. Such, however, was the dread of foreign competition, and so great was the commercial interest at stake, represented by 4,000,000 tons of shipping, navigated by 230,000 seamen, that it was not wonderful if the boldest statesmen paused, or were hostile to the proposed abolition. But the navigation laws could not retain their hold consistently with our opened ports, and their final extinction was but a question of time which the present year decided. The bill, notwithstanding the strenuous opposition it encountered, was passed through both houses, and the 1st of January 1850 was the date at which it was to enter into full operation.

During the settlement of these important measures, and while peace still continued at home, a short but sharp war had broken out in India, where our dangerous enemies the Sikhs, notwithstanding their former defeats and subjection, had again risen against our Indian government, and commenced their insurrection with the murder of two British officers. The gallant resistance which they made in the field cast an ominous shadow over the security of our rule in India, until the public anxiety was tranquillized by the capture of Mooltan, a stronghold of the Sikhs, and their final defeat at Goojerat. As it was thought dangerous to enter into further treaty with such enemies, or continue to recognise them as an independent power, their country, the Punjaub, was annexed to our Anglo-Indian empire.

The triumph obtained by the free trade party in the abolition of the navigation laws was not lost upon the protectionists; and thinking that their opportunity had fully arrived, they followed up the movement of their opponents by similar appeals and arguments in behalf of the agricultural interest. For this purpose, a motion was made by Mr Disraeli, now the leader of the protection party, to throw a portion of the rates charged upon agricultural produce into the general taxation of the country. In favour of this demand it was stated, that as more than one-third of the whole revenue of the excise was levied upon home produce, it was unable to compete with the untaxed produce of foreign countries; and coming more closely to the argument of figures it was shown, that from a rental of sixtyseven millions, twelve were extracted by county rates, highway rates, church rates, poor rates, and the land tax. But though the complaints of the agricultural classes, owing to the depression which free trade had introduced among them, were both loud and formidable, the motion of Mr Disraeli was negatived by a majority of 280 to 189. In the following year, a more favourable opportunity still seemed to have arrived, as the excess of the national income over the expenditure was somewhat more than two millions; and accordingly the proposal was again brought forward in 1850, but only again to be negatived, on this occasion, however, by a diminished majority of 21, 252 being in favour of the protectionist bill, and 273 against it. A still greater parliamentary unanimity happily prevailed in favour of the claims of the colonies to a constitutional government—a benefit which, if not freely conceded, it was thought they would soon be strong enough to take without the formality of asking In this way the privilege of selfgovernment was claimed for the North American colonies, the South African colonies, the Australian colonies. Van

Queen Victoria.

Brixen

Broach.

British Gum

Diemen's Land, and New Zealand. These demands were separately discussed; and after many amendments, such concessions were made as were judged best fitted for the Gailliarde. progress and necessities of each community. As for the Canadas, at present the most important of them all, little further remained to be done, as already they had been very closely approximated to the constitutional practice of Great Britain. The Australian colonies occupied the chief share of attention; already these golden regions were on the eve of revealing their exhaustless treasures, and providing the resources of that immense increase in population and prosperity which has no parallel in the history of colonization.

On the 1st of May 1851, the Great Exhibition of the Industry of all Nations was opened by the Queen with great splendour; it was visited by immense multitudes of both English and foreigners, and it was hoped that the friendly intercourse it had produced would tend to consolidate the peace which Europe had so long enjoyed. During the six months it was open, the receipts for admission amounted to L.505,107, which not only defrayed all the expenses of its construction, but left a surplus of L.150,000, which was expended on the purchase of a site for a National Gallery.

Two months after the close of the session of 1850, the nation was startled, as if by the alarm of a foreign invasion, by the arrival of a papal brief, establishing an episcopal hierarchy of its own in England. For this purpose the country was divided into one archiepiscopal and twelve episcopal sees, over which Dr Wiseman was to have the superintendence with the rank of cardinal and title of archbishop. To meet this arrogant assumption Lord John Russell proposed, on the 7th of February 1851, the Ecclesiastical Titles bill for preventing "the assumption of any title, not only from any diocese now existing, but from any territory or place in any part of the United Kingdom, and to restrain parties from obtaining by virtue of such titles any control over trust property." After many and protracted debates, and the discussion of numerous amendments, the bill passed by a majority of 263 against 46.

The bill for the admission of Jews into parliament, after passing the Commons by 202 against 177 votes, was rejected by the Lords by a majority of 36.1 The only remarkable financial operations of the session which opened on the 14th of February 1851, were the reduction of the coffee and sugar duties, and the abolition of the window-tax.

The ministry having suffered several defeats, though on questions of no great importance, it became apparent that their hold on the house was by no means firm; for while they were vigorously assailed by their opponents they were faintly supported by their adherents. Conscious that with such lukewarm support they could not safely carry on the government of the country, Lord John Russell and his col-

leagues gave in their resignation, and Earl Derby was called to form a new cabinet; but after several attempts he declared his inability to do so. The Duke of Wellington then advised her Majesty to send for Lord John Russell and instruct him to resume office with his late colleagues. The ministry, however, did not continue long united; on the 22d of December the country was surprised with accounts of the dismissal of Lord Palmerston from the foreign office. The ministry, however, were soon made to experience the disadvantage of converting his lordship into an opponent; he made his power be felt by proposing and carrying an amendment to the ministerial Militia bill. Lord John Russell then declared that, having lost the confidence of the house, the ministers resolved to resign, and on the 23d of February Lord Derby and his colleagues entered upon office. They hardly met with any opposition during that session, as the bills they introduced were in substance the same as those proposed by the previous government.

Parliament was dissolved in July, and the elections commenced with all the usual excitement; but the protectionist candidates had considerable difficulty in accommodating their previously expressed opinions, so as to satisfy the electors who had now experienced the benefit of the free-trade measures, which had resulted in commercial prosperity, cheapness of provisions, and abundant employment to the labouring classes.

They generally professed a kind of acquiescence in those measures and their resolution to make no attempts to counteract them; but after making every exertion, and using all their influence, they failed to secure a protectionist majority, and Mr D'Israeli, the new Chancellor of the Exchequer, having introduced his budget, after several nights' debate, and recriminating speeches, the ministry were in a minority of 19, in consequence of which they tendered their resignations and retired from office on the 20th Dec. 1852.

During this year, however important were public events, there was one incident that abated the keenness of political interest, and threw a gloom over the public mind. This was the death of the Duke of Wellington, who, worn out with the toils of a long and most eventful life, expired at Walmer Castle on the 14th of September 1852, in the eighty-fourth year of his age. For such a man, all present eulogium is superfluous; he is one of those few characters who belong to all time. The greatest of modern warriors, he died in the midst—but unhappily at the close—of a long European peace, which his victories had chiefly tended to procure: an ardent disinterested patriot, as well as wise politician, his day was closed amidst the promise of national prosperity. Such a death most fitly terminates a great epoch in the history of this country.

BRITISH GUM is made by heating starch in an oven to between 600° and 700°, when its cells (as seen under the microscope) become obliterated, and it acquires a brown colour, together with the properties of gum. It is used largely in calico-printing to thicken the colours.

BRITANNICUS, son of the emperor Claudius by Messalina, was born A.D. 42. He was excluded from the empire after his father had married Agrippina, whose son Nero ascended the throne, and caused Britannicus to be poisoned, A.D. 55. (See ROMAN HISTORY.) BRITTANY. See Bretagne.

BRIVES-LA-GAILLIARDE, the capital of the arrondissement of Brives, department of Corrèze, France, is situated in a rich plain on the left side of the Corrèze, 14 miles S.W. of Tulle. It has manufactures of cotton, woollen, and silk goods, and an extensive trade in truffles. Pop. (1851) of arrondissement, 116,640; of town, 8413.

BRIXEN, a city in the Tyrol and circle of Pusterthal, at the confluence of the rivers Eisack and Rientz. It is the seat of a bishop, and has a fine cathedral, a theological seminary, and a gymnasium. Pop. 3500.

BRIXHAM, a town in the parish of the same name, in the county of Devon, 200 miles from London, on the south side of Torbay. It has an ancient church, a national, endowed, and other schools, and a very extensive fishing and coasting trade. Market-days, Thursday and Saturday. It is celebrated as the spot where King William landed in 1688. Brixham has become a place of resort for seabathing. Pop. (1851) 5627

BROACH, a town of Hindustan, in the province of

¹ Since then, Jews have been rendered admissible by the clumsy expedient of the Oaths Bill, which was passed in July 23, 1858, by which either house of Parliament may resolve that any person professing to be a Jew may, in taking the oath, omit the words, "I make this declaration on the true faith of a Christian."

Broach Brocchi.

Guzerat, presidency of Bombay, situate on an elevated mound, supposed to be artificial, on the northern bank of the Nerbudda, about 30 miles above its mouth. The river is here a noble sheet of water, two miles wide at ebb-tide, but shallow for the most part even at flood-tide, though there is then a deep but intricate channel admitting vessels of considerable burden. As, however, the Nerbudda is at some seasons unnavigable between Broach and the sea, except for vessels not exceeding 50 tons, the place does not appear destined to become an extensive port for large vessels. The town is surrounded by a wall, and contains between 3000 and 4000 houses, with a population, irrespective of the suburbs, of 13,000 inhabitants. Like the generality of eastern towns, its streets are narrow, and the houses lofty. It has a considerable trade, and annually exports large quantities of raw cotton to Bombay. Broach is thought, with some appearance of probability, to have been the Barygaza of Ptolemy and Arrian. Upon the conquest of Guzerat by the Mussulmans, and the formation of the state of that name, Broach formed part of the new kingdom. On its overthrow by Akbar in 1572, it was annexed to the Mogul empire, and governed by a nawaub. The Mahrattas became its masters in 1685, from which period it was held in subordination to the Peishwa until 1772, when it was captured by a force under General Wedderburn (brother to Lord Loughborough), who was killed in the assault. In 1783 it was ceded by the British to Scindia in acknowledgment of certain services. It was stormed in 1803 by a detachment commanded by Colonel Woodington, and finally ceded to the East India Company by Scindia under the treaty of Serji Anjengaum. Distant north from Bombay 190 miles. Lat. 21. 42. Long. 73. 2.

The British district, of which this town is the capital, is situate between Lat. 21. 22.—22. 11., and Long. 72. 30.— 73. 10., and is bounded on the west by the Gulf of Cambay. It contains an area of 1319 square miles, with 429 villages, and a population, according to a late census, of 290,984

inhabitants.

Broach, or Brooch, Brocha (from the French broche), an awl or bodkin. A spit is sometimes called a broach; and hence the term to broach a barrel.

The ornament known as the Highland broach, brooch, or brotche, is used, like the fibula of the Romans, to fasten the plaid. It is usually made of silver, of a round figure, with a tongue crossing its diameter. There are preserved in several families ancient brooches of very elegant workmanship, and richly ornamented. One of the most beautiful is the wellknown Hunterston brooch. Some of these brooches are inscribed with names, to which particular virtues used to be attributed; others have receptacles for relics, and are supposed to have been regarded as amulets. (See Pennant's Tour in Scotland, i. 90, iii. 14.)

BROAD PIECE, a name given to certain gold coins larger than a guinea; particularly the Carolus and Jacobus. Broadside, a discharge of all the guns on one side of a

ship at the same time.

BROADSTAIRS, a small seaport-town of England, county of Kent, and parish of St Peter, on the east coast of the Isle of Thanet, two miles from Ramsgate. It is much frequented as a watering-place, and has many good lodginghouses, two public libraries, warm baths, &c. Its port is subordinate to that of Dover. Pop. (1851) of parish, 2975.

BROCADE (Spanish, brocado), a stuff of gold, silver, or silk, raised and enriched with flowers, foliages, and other ornaments. Formerly the word signified only a stuff woven all of gold, both in the warp and in the woof, or all of silver, or of both mixed; at present all stuffs which are raised and enriched with flowers or other figures are called brocades.

BROCCHI, GIOVANNI BATTISTA, a celebrated Italian mineralogist and geologist, was born at Bassano in February 1772. He studed in the university of Pisa, where his attention was especially turned to mineralogy and botany. Brock

In 1802 he was appointed professor of botany in the new Lyceum of Brescia; but he more particularly de-voted himself to mineralogy and geology, in the numerous Brocklesby excursions he made into the adjacent districts. The fruits of these labours appeared in different publications, particularly in his Treatise on the Iron Mines in the department of Mella, and his Essay on the Physical Constitution of the Metalliferous Mountains of the Valley of Trompia, which appeared in 1807. His valuable researches procured him, in the following year, the office of inspector of mines in the recently established kingdom of Italy; which enabled him to extend his investigations over a great part of Central and Southern Italy, as well as its northern districts. In 1811 he produced a valuable memoir On the Mineralogy of the Valley of Fassa and the Tyrol; but his most important work is the great Geologia Fossile Subapennina, con Osservazioni Geologiche sulle Apennini, e sul suola Adjacente, which was published at Milan, in 2 volumes 4to, in 1814. In this work we have most accurate details of the structure of the Apennine range, and an account of the fossils of their strata; subjects further illustrated by his valuable geognostic map and his Catologo raggionato di una Raccolta di Rocche, disposto con ordine Geografico, por servire d'Illustrazione della Carta Geognostica dell' Italia. This last work also appeared at Milan in 1817. His work Dello Stato Fisico del Suolo di Roma, with its accompanying map, is admirable for accuracy and judgment. In it he has corrected the erroneous views of Breislak, who conceived that the Eternal City occupies the site of a volcano, to which he ascribed the tuffa and other volcanic materials that cover the seven hills. Brocchi, on the other hand, has satisfactorily shown that they are derived either from Mont Albano, an extinct volcano 12 miles from Rome, or from Monte Cimini, still further to the north of the city. Indeed he has shown, that the streams or beds of tuffa may be traced almost uninterruptedly from that mountain to Rome.

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Several minor papers by him, on other mineralogical subjects, appeared in the Biblioteca Italiana from 1816 to

1823.

In that year Brocchi sailed for Egypt, and engaged with his usual ardour in exploring the geology of that country and its mineral resources, in which he obtained every facility from Mehemet Ali. In 1825 that politic ruler appointed Brocchi one of a commission to examine and organize his conquest of Sennaar; but the naturalist, unfortunately for science, fell a victim to the climate, at Khartum, in September 1826.

BROCCOLI, a kind of cabbage. See Horticulture. BROCK, a badger; or a hart of the third year.

BROCKEN, or BROCKSBERG, a mountain of Prussia, the highest point of the Hartz mountains, is in Lat. 51. 51. N. Long. 10. 39. E. It is 3740 feet in height, and is remarkable for the singular optical phenomenon called the "Spectre of the Brocken."

BROCKLESBY, RICHARD, a physician of considerable reputation, was born in Somersetshire, August 11th, 1722. He was educated at Ballytore, in Ireland, studied medicine at Edinburgh, and finally graduated at Leyden in 1745. In 1751 he was admitted a licentiate of the Royal College of Physicians at London, of which he afterwards became a fellow. In 1758 he was appointed physician to the army; in which capacity he served in Germany during the greater part of the seven years' war, and in the course of it was chosen physician to the hospitals for British forces. his observations during this period were published in 1764, under the title of Economical and Medical Observations, from 1738 to 1763, tending to the improvement of Medical Hospitals, one vol. 8vo. He had already, however, given to the public many proofs of the activity of his mind and the variety of his attainments, by papers which appeared in the Transactions of the Royal Society. His Dissertation on

Bay

Broker.

Brodeau the Music of the Ancients appeared in 1749, and his Oratro Harveiana in 1760. Shortly after this he was appointed by the Duke of Richmond, physician-general to the royal regiment of artillery and corps of engineers—an appointment that gave him constant access to the laboratory of Woolwich; and it was by his advice that a professorship of chemistry was added to the establishment of the college.

In his latter years he withdrew altogether into the retirement of private life. The circle of his friends comprehended some of the most distinguished literary men of the age. His intimacy with Burke had commenced at school, and soon ripened into the warmest friendship. , He was also warmly attached to Dr Johnson, and attended him in his last illness with assiduity and kindness. He had conferred many kindnesses upon the great moralist during his lifetime, of which the following may be taken as a sample. Understanding that Dr Johnson wished to visit the Continent for the recovery of his health, he offered him an annuity of L.100 during the remainder of his life; and when this offer was declined, pressed him to reside in his house, as more suited to his health than the one in which he then lived. The same generous disposition was manifested in his conduct to Burke, to whom he transmitted L.1000, as a legacy he had intended to leave him by will. Dr Brocklesby expired suddenly. He left his entire fortune, with the exception of a few legacies, between his two nephews Dr Thomas Young and Mr Beeby. (P. M. R.)

BRODEAU, or BRODEUS, JOHN, a celebrated French critic, was born at Tours in 1500. He studied civil law under Alciati, but afterwards devoted himself wholly to languages and the belles lettres. He travelled into Italy, where he became acquainted with Sadolet, Bembo, and other eminent men; and applied himself to the study of mathematics, philosophy, and the sacred languages, in which he made no small proficiency. On returning to his own country, he continued to prosecute his studies with indefatigable zeal, till his death in 1563. His chief works are Commentaries on the Anthologia, Basel, 1549; several books of miscellanies; Notes on Martial, Euripides, &c., Basel, 1558.

BRODERA, or BARODA, a large and wealthy town of Hindustan, in the province of Guzerat, and the capital of the Mahratta prince, known by the family appellation of the Guicowar. It is intersected by two spacious streets, which divide it into four equal parts, and cross at the marketplace. The houses, built of wood, are generally lofty, with sloping, tiled roofs. Among the principal buildings are the British residency, and the palace of the Guicowar; but these edifices, though of large dimensions, are not of imposing ap-Outside the town is the British cantonment, consisting of a number of small brick houses, with trellis work and wooden verandahs, and containing a small church built in the Gothic style of architecture, and capable of accommodating 400 persons. Luxuriant groves surround the town; and within these numerous mosques and Mussulman tombs have been erected, giving an impression of solemnity to the scene; and interspersed are some magnificent wells, with architectural decorations, having grand flights of steps descending to the water through rows of stone pillars. The fortifications of the town are of no great strength. They consist of slight walls with towers at irregular distances, and several double gates. The population is estimated at 140,000. The founder of the family of the Guicowar was one of the chiefs of the great Mahratta confederacy, who acknowledged the rajah of Sattara, the descendant of Sevajee, as their head. His name was Pelajee Guicowar; and in the year 1721 he had been promoted to be second in command of the Mahratta armies. Shortly after, he built the fort of Soneghur on the banks of the Taptee, and from this stronghold he made predatory excursions, which resulted in the

extension of his authority over the province of Guzerat.

Pelajee was murdered in 1732, by the Rajpoot, rajah of Brodick Joudpore, and succeeded by his son Damajee, who being taken prisoner by the Peishwa, regained his liberty by the sacrifice of one-half of his possessions, and under the acknowledgment that he held the remainder in fief to the Peishwa. Damajee dying in 1768, the succession was disputed between his two sons, and ultimately decided in favour of Syajee the younger, to the exclusion of Govind Rao the elder, who, however, ascended the throne in 1792, upon the death of Syajee. In 1800 the government devolved upon Annund Rao; and with this prince the British government concluded a treaty, and thereby secured his independence of the Peishwa. Annund Rao was succeeded in 1819 by Syajee Guicowar, the present ruler, whose revenues are computed at about L.668,700 per annum. The military establishment of this prince, in addition to his regular troops, amounting to 6000 cavalry and infantry, comprises also the subsidiary force furnished by the British government, which consists of five regiments of infantry, two regiments of cavalry, and a company of artillery. He also maintains a contingent force of 3000 cavalry, with a corps of irregular horse, commanded by British officers. His dominions, over which the government of India exercise political superintendence, are described in the article Guze-RAT. The Guicowar has it in contemplation to connect Baroda by railway with Tunkaria, on the coast of the Gulf of Cambay, the intervening distance being about 40 miles. Baroda is distant from Bombay, north 231 miles; from Calcutta, west 980. Lat. 22. 16. Long. 73. 14.

BRODICK BAY. See ARRAN.

BRODY, a large town of Austrian Galicia, circle of Zloczow, 58 miles E.N.E. of Lemberg. It is ill built and dirty, and the houses are mostly of wood; but it carries on an extensive transit trade with Russia, Poland, and Turkey, and has considerable manufactures. It is the seat of a mercantile tribunal, and has a castle, one Catholic and two Greek churches, three synagogues, grammar and commercial schools, theatre, hospital, &c. In 1779 Brody became a free commercial town. Pop. 25,000, of whom about fivesixths are Jews.

BROGUE (Gaelic brog), a kind of shoe used in the Scot-

tish Highlands, and by the Irish.

BROKE, SIR ROBERT, an eminent lawyer, son of Thomas Broke, Esq. of Claverly in Shropshire, was educated at Oxford, whence he removed to the Middle Temple. In 1542 he was chosen summer reader, and in 1550 double reader. In 1552 he was made serjeant-at-law; in the year following, lord chief-justice of the common pleas; and about the same time received the honour of knighthood. He was also recorder of London and speaker of the House of Commons. He died in 1558, and was buried at Claverly. Wood gives him the character of a great lawyer and an upright judge.

BROKER. Some derive this word from the French broier, "to grind;" others from brocarder, "to cavil, or higgle;" and others again from a trader broken, and that from the Saxon broc, "misfortune."

A broker is an agent or intermediate person appointed for transacting special business on account of another, but differing somewhat from an ordinary factor in functions and responsibility. Of this class there are various descriptions, exercising employment without the smallest analogy, though all are brought under the general name of brokers; and of these the principal are, exchange-brokers, whose province is to ascertain the rates and relation of exchange between countries; stock-brokers, who negotiate transactions in the public-funds; insurance-brokers, who effect insurances on lives or property; and pawn-brokers, who advance money on goods, on the condition of being allowed to sell the goods, if the sum advanced is not repaid with interest, within a limited time. See Agent, Insurance, and Sale.

Separating pawn-brokers, and those dealers in old wares

Bromberg who are called brokers, as both distinct from the class to whom the term in its broader acceptation applies, the broker is an agent for both parties, the buyer and the seller; and for the general principles of jurisprudence applicable to his position, reference may be made to the word Agent. It is a marked peculiarity, however, of the broker as an agent, that his quality of agency is not only palpable in the face of the transaction, but he is agent for both parties, and therefore those subtle niceties of law which arise out of the agent acting as principal, cannot apply to this class of agencies. The function of the broker is indeed a very simple one, and easily separates itself from the usual intricacies of the law of sale and of agency. It is his proper function to find buyers and sellers, and to bring them together that they may transact with each other. Hence the rise of such a class in any department of business, is an indication of its great increase. In small towns, and in narrow and peculiar departments of business, the buyers and the sellers know each other, and need not be at the expense of employing a third party. But where both bodies are numerous, and the individual members of each find enough to occupy their attention in the production of their commodity, or its purchase and distribution, there is economy in the establishment of a distinct class who bring the buyer and the seller together. The late enlargement of the railway system has created a peculiar and extensive system of brokerage transactions. They are affected by the statutory regulations applicable to railway companies; and all kinds of joint-stock brokerage are more or less affected by the late legislation as to joint-stock companies in England and Ireland (see 7th and 8th Vict., c. 110). The brokers for the purchase and sale of goods within the city of London are a body with peculiar privileges, and acting under special licensing regulations, some of which date back to the reign of Henry VIII. (л. н. в.)

BROMBERG, one of the governments of the Prussian province of Posen, is bounded N. by West Prussia, E. by Poland, S. by the government of Posen, and W. by the province of Brandenburg. Area 4547 square miles. It comprehends 9 circles, 54 towns, and 1302 villages, with (in 1849) 454,675 inhabitants, of whom 251,432 are Catholics, and the remainder Protestants of various sects, with 24,428 Jews. The soil is generally a light sand. The face of the country is level, and a great portion of it is covered with woods. The agricultural productions are insignificant, being scarcely sufficient for the subsistence of the inhabitants.

Bromberg, the capital of the above government, and also of a circle of the same name, stands on the river Brahe, 70 miles north of Posen. It has manufactures of linen and woollen stuffs, leather, tobacco, sugar, chicory, Prussian blue, &c., and an active transit trade. The canal of Bromberg connects the Brahe with the Netz, and thus establishes communication between the Vistula, the Oder, and the Elbe. Pop. (1849), including the military, 12,852.

BROME, ALEXANDER, an English poet, was born in 1620, and died in 1666. He was an attorney in the lord mayor's court, and was the author of the greater number of the songs and epigrams that were published in favour of the royalists, and against the Rump, as well in Cromwell's time as during the Rebellion. These, together with his epistles and epigrams translated from different authors, were all printed in one volume octavo after the Restoration. He published a translation of Horace, by himself and others; and was the author of a comedy entitled The Cunning Lovers. He also edited two volumes of Richard Brome's plays.

Brome, Richard, a dramatic writer in the reign of Charles I. and a contemporary of Dekker, Ford, Shirley, and others. He was originally a servant of Ben Jonson; but he soon acquired a high literary reputation, and was addressed in some lines by his quondam master on account of his

comedy entitled The Northern Lass. Brome's genius lay Bromelia entirely in comedy. His plots are original, and far from Bröndsted. being ill conducted; and his characters, which for the most part are strongly marked, were the offspring of his own experience, and close attention to the foibles of the human heart. He has left fifteen comedies.

BROMELIA, the PINE-APPLE. See HORTICULTURE. BROMINE, a remarkable fluid discovered in 1826 by Balard. See CHEMISTRY.

BROMLEY, a market-town in the hundred of Bromley and Beckenham, lathe of Sutton-at-Hone, and county of Kent, ten miles S.E. of London. It consists chiefly of one long street with some good houses, and has an old markethouse, savings-bank, literary institution, and a college for the residence and support of 40 widows of clergymen. church is a fine Gothic edifice, containing some handsome monuments; and in the vicinity is a palace belonging to the bishops of Rochester. Pop. of parish (1851) 4127.

BROMSGROVE, a market-town of England, in the county of Worcester and hundred of Halfshire, near the Birmingham and Gloucester railway, 13 miles S. by W. of the former town. The church is a fine old building, with a tower and spire 189 feet in height. grammar school, founded by Edward VI., has 7 scholarships and 6 fellowships in Worcester College, Oxford. It formerly returned two members to parliament. Its principal manufactures are nails, buttons, needles, and coarse linen stuffs. Market-day, Tuesday. Pop. (1851) 4426.

BROMYARD, a market-town and parish in the county of Hereford, on the river Frome, 125 miles from London. It is situated in a fine orchard district, but is old and ill built, many of the houses being of wood. It has a collegiate church, a free grammar and a national school, almshouses, &c. Market-day, Tuesday. Pop. (1851) 1394.

BRONCHITIS, an inflammation of the bronchi or tubes by which the lungs are supplied with air. It may be acute

BRÖNDSTED, Peter Oluf, an able and judicious archæologist, was the son of a Danish clergyman, and was born at Horsens in Jutland on 17th Nov. 1781. He received his academical education at the university of Copenhagen; and in 1802 he visited Paris in company with his friend M. Koes. After remaining there two years, he accompanied the same gentleman to Italy. Both were zealously attached to the study of antiquities; and congeniality of tastes and pursuits induced them both in 1810 to join Baron Stackelberg, Von Haller, and Linckh of Stutgard, in an expedition to Greece, where they examined with attention the interesting remains of ancient art, and engaged with ardour in excavations among the ruins, which were carried on extensively, especially by Bröndsted and Stackelberg, with very interesting results. The discoveries which Bröndsted made have been since given to the world in several works, which show learning and sagacity seldom applied to the elucidation of antiquity with happier results. After three years of active researches in Greece, Bröndsted returned to Copenhagen, where, as a reward for his labours, he was appointed professor of Greek in the university. He now began to arrange and prepare for publication the vast materials he had collected during his travels; but finding that Copenhagen did not afford him the desired facilities, he exchanged his professorship for the office of Danish envery at the papal court in 1818, and took up his abode at Rome. He also, in 1820 and 1821, went to Sicily and the Ionian Isles to collect additional materials for his great work; and when the artistic illustrations were completed, he obtained leave to visit Paris to superintend the publication. In 1826, he came over to London, chiefly with a view to st udy the Elgin marbles and other antique reliques in the Brit ish Museum, and became acquainted with the principal a :chæologists of England.

His great work appeared at Paris, in parts, in two editions, with a French text, one in quarto and the other in folio, besides a quarto one with German text. The first appeared in 1826, the second in 1830. Eight parts were promised, but only two had appeared at his death. The title of this admirable work, which contains many recently discovered and till then unpublished Grecian remains, with charts and numerous vignettes, is Voyages dans Grèce, accompagnés des recherches archéologiques, et suivis d'un aperçu sur toutes les entreprises scientifiques, qui ont eu lieu en Grèce depuis Pausanias jusqu' à nos jours.

He returned to Copenhagen in 1832; when he immediately received the appointment of director of the royal museum of antiquities, and the professorship of archæology His merits were ten years afterwards further and philology. rewarded with the honourable office of Rector of the University; but an unlucky fall from his horse caused the death

of this eminent man on the 26th of June 1842.

Besides the great work above noticed, Bröndsted wrote numerous dissertations on archæological subjects, which he illustrated with great learning. Among these we may notice two published by the Dilettanti Society of London, viz., A description of thirty-two painted Greek Vases, found near Vulsci, 1832; and on the Bronzes of Siris, 1836. (T. S. T.)

BRONGNIART, ALEXANDRE, a distinguished French mineralogist, was the son of the eminent architect who designed the Bourse and other public buildings of Paris, and was born in that city in 1770. At an early age he joined the army of the Pyrenees; but having committed some slight political offence, he was thrown into prison, and detained there for some time. On his release he was appointed professor of natural history in the Collége des Quatre Nations, and soon after succeeded Haüy as professor in the school of mines. In 1800 he was made director of the Sèvres porcelain factory, in which he revived the almost forgotten art of painting on glass. He did not confine himself entirely to mineralogy, for it is to him that we owe the division of reptiles into the four orders of Saurians, Batrachians, Chelonians, and Ophidians. In 1816 he was elected into the Academy; and in the following year he visited the Alps of Switzerland and Italy, and afterwards Sweden and Norway. The result of his researches he published from time to time in the Journal des Mines and Dictionnaire des Sciences Naturelles. He died at Paris, October 7. 1847. His principal works are Traité Elémentaire de Minéralogie appliquée aux Arts; and the Tableau des terrains qui composent l'écorce du globe, ou Essai sur la structure de la partie connue de la terre. Brongniart was also the coadjutor of Cuvier in the admirable Essai sur la Géographie Minéralogique des Environs de Paris.

BRONTE, a city in the intendency of Catania, in Sicily. It stands in a healthy situation on the river Giaretta, near a celebrated water-fall. It has considerable manufactures of linen and woollen cloths, and some paper-mills. Good wine is produced in the neighbourhood. Bronte gave the title of duke to the late Lord Nelson. Pop. 9500

BRONTEION, in Grecian Antiquity, a machine used in the theatre to imitate thunder. It consisted of large brazen vessels containing stones, and was placed beneath the stage

BRÖNTOLOGY (βροντη and λογος), a discourse upon thunder, or an explanation of its causes, phenomena, &c.

BRONZE.—A combination of metals which has received the name of bronze was employed by the ancients in the fabrication of different utensils, and in casting busts, statues, and other objects. The Egyptians, Greeks, and Romans, used this compound metal in the greater part of the decorations of those magnificent temples and palaces whose ruins only have remained to later eras. But amidst the general wreck there are still some fragments preserved, which in-"cate the perfection which had been attained in the employ- tutes the value of bronzes, not the colour, because it is the

ment of bronze. The wealth of some ancient cities was esti- Bronze mated by the number of their brazen statues; and Delphos, casting. Athens, and Rhodes, are reported to have each possessed three thousand. Some distinguished Romans adorned the public edifices of their city in this manner; and so strong a propensity was excited for multiplying works of this kind, that an observation became current, that in Rome the people of brass were not less numerous than the Roman people. It has been remarked, that the works which we now execute in iron or steel were little known to the ancients; that their arms and armour were usually of brass, or the compound now alluded to; and that a set of surgeon's instruments consisting entirely of bronze was discovered at Pompeii.

The ancient bronzes are alloys of copper and tin. examined by Klaproth, Davy, and others, whether from Egypt, Greece, or Italy, contain from 11 to 13 per cent. of tin. Nearly the same proportions are used in modern bronze in casting statues. Steell of Edinburgh, in his fine statue of Wellington, used 90 of copper and 10 of tin; proportions used also by Chantrey and Westmacott. The best gun-metal consists of 96 of copper and 11 of tin.

Bronze is extremely hard and sonorous, more brittle than brass, and more fusible than copper; from which, and its not being liable to tarnish, it is peculiarly adapted for casts of statues. Various nations have compounded the metals employed in different proportions. The Egyptians are said to have taken two-thirds of brass and one-third of copper. According to Pliny, the bronze of the Grecians was formed in the same way, with the addition of one-tenth part of lead and a twentieth of silver; which proportions were adopted by the Romans. In modern times bronze is generally composed of two-thirds of copper and one-third of brass; and sometimes small quantities of lead and zinc have been added. These latter render the cast more compact and brilliant; and the combination of different substances occasions the readier fusibility of the whole than when separate. The ancient bronzes, however, present a difference in appearance and composition from those executed by the moderns; and the fact is ascertained in respect to the metallic proportions, on analysis by skilful chemists. An illustration of this fact is sometimes given in the four celebrated horses of bronze, supposed to be the work of Lysippus, a Greek artist; which were brought from Venice, by command of Bonaparte, to the Tuilleries at Paris, and, on the fall of that extraordinary man, restored to their original position.

Bronze-casting.—The casting of bronze statues is a nice and difficult art, requiring long experience and the judicious management of a great apparatus. An exact model must be made of the subject to be cast, and nicely coated over with wax not less than an inch thick, on which the artist works the impression meant to be taken. A mould is then formed, consisting of several hollow pieces of wood or other resisting substance, filled with a mixture of clay and sand, which is applied to the model, in order that its outline may be received. The mould being united together, is perforated by a number of channels, and the melted metal being discharged from a furnace by means of these into the interior, thus produces the cast. When cold, the external covering is taken off, and the subjects appear as if covered with spines, which are the channels filled with metal: these are removed by saws, files, and chisels; and any imperfections on the surface being corrected, the whole is completed. But this in detail is a tedious, laborious, and expensive process; and the difficulty of producing beautiful works in bronze conspires to give them a high value in the estimation of the lovers of the arts. Seldom does the natural colour of the composition remain unaltered, but with the lapse of time it tends to black, or particular shades of green; though some artists render it black artificially, or give it a green colour from the first. It is the delicacy of the workmanship, however, that consti-

Bronzing. former alone which constitutes the difficulty, and calls for the skill of the artist. Colossal figures are sometimes obtained in bronze; but more usually, when of very large dimensions, they are formed by the union of several pieces, and are hollow within; as is also the case with some of those of smaller size. See Foundery.

Bronzing.—The substances on which bronzing is employed are either metals, wood, ivory, clay, or plaster; but more general preference is given to wood or plaster. The colours are of various shades and intensity; their composition and application being in a great measure arbitrary, according to the will of the artist. This art is nothing but a species of painting, far from the most delicate kind; and, when applied to plaster figures, may be done either with or without cement, the latter rendering it more durable. One principal ingredient in bronzing is gold powder, for the preparation of which the following receipt is given. A quantity of leaf-gold is ground with virgin honey on a stone, until the texture of the leaf be completely broken, and the parts divided to the most minute degree. The mixture of gold and honey is then removed from the stone and put into a basin of water, whereby the honey is melted, and the gold freed from it; and the basin is allowed to stand at rest until the gold subsides. When it has done so, the water is poured off, and fresh quantities are added, until the honey be entirely washed away; after which the gold is put in paper, and dried for use. This is the true gold powder; besides which, there is another, called German gold, in common use; and also a third, called aurum mosaicum, or musivum greatly employed in bronzing, and which is thus prepared. A pound of tin, seven ounces of flour of sulphur, half a pound of purified quicksilver, and the same quantity of sal ammoniac, are taken as the necessary ingredients. The tin being melted in a crucible, the quicksilver is added to it; and, when this mixture is cold, it is reduced to powder, and ground with the sal ammoniac and sulphur, until the whole They are then to be heated in a be thoroughly mixed. matrass, and the sublimation of the other ingredients will leave the tin converted into the aurum mosaicum, which is found at the bottom of the glass like a mass of bright flaky gold powder. The substance sublimed is chiefly vermilion, and is carefully collected. Should any black or discoloured particles appear, they must be removed. The sal ammoniac used must be very clean, and the mercury pure. These colours are commonly employed in bronzing; but when a shade more of a red, resembling copper, is required, it can easily be obtained by grinding a very small quantity of red lead along with them. Copper powder may be procured by dissolving filings or slips of that metal with nitrous acid in a receiver. When the acid is saturated the slips are to be removed; or, if filings be employed, the solution is to be poured off from what remains undissolved. Small iron bars are then put in, which will precipitate the copper from the saturated acid, in a powder of the peculiar appearance and colour of copper; and the liquid being poured from the powder, this is to be washed clean off the crystals by repeated levigations. In addition to these compounds, we may name gold size, which is of particular use in bronzing and several other branches of the arts. This is prepared from a pound of linseed oil, with four ounces of gum animi. The latter is gradually supplied in powder to the oil, while boiling; and it is necessary that it should be stirred with every successive dose, until the whole be dissolved and incorporated with the oil. The mixture is still allowed to continue boiling, until a small quantity, when taken out, appears of a thicker consistence than tar; and the whole is then strained through a coarse cloth, and put aside. When used, it must be ground with as much vermilion as will render it opaque, and, at the same time, diluted with such a quantity of oil of turpentine as will bring it to a proper consistence for working freely with the brush.

In regard to the operation of bronzing itself, if a cement Bronzing. is to be used, the powders now described may be mixed with strong gum water or isinglass, and laid on the subject with a brush or pencil; in doing which, some artists recommend beginning at the bottom and proceeding upwards. By a different process, gold size, prepared with a due proportion of turpentine, may be taken, and the subject covered with it. This is allowed to dry very nearly, but while still preserving a certain clamminess, a piece of soft leather wrapped round the finger is dipped in the powder, and rubbed over the work; or, what is judged preferable, it may be spread with a soft camel-hair pencil. The whole, now covered, must be left to dry, and the loose powder then cleared away by a hair pencil also. Here the principal nicety consists in ascertaining the proper period of dryness for applying the powder, as much of the effect depends on it. But this method of bronzing is esteemed better, because the gold size binds the powders to the ground, without any hazard of their scaling or rubbing off, which sometimes happens when gum or isinglass is employed. The precise tint of bronzing is regulated by taste; and, indeed, a very perceptible difference appears both in ancient and modern statues, resulting either from age or the metallic proportions.

Bronzing on wood may be effected by a particular process, somewhat varying from the general rules. Prussian blue, patent yellow, raw umber, lamp-black, and pipe-clay, are ground separately with water, on a stone, and as much of them as will make a good colour put into a small vessel three-fourths full of size, not quite so strong as what is called clean size in gilding. This mixture is found to succeed best on using about half as much more pipe-clay as of the rest; but this depends on taste and fancy in preferring a peculiar tint. The wood, which has been previously cleaned, smoothed, and coated with a mixture of clean size and lamp-black, receives a new coating with the preceding ingredients, twice successively, the first being allowed to dry: afterwards the bronze-powder is to be laid on with a pencil, and the whole burnished or cleaned anew, observing to repair the parts which may be injured by this operation. Next, the work must be coated over with a thin lather of Castile soap, which will take off the glare of the burnishing, and afterwards carefully rubbed with a woollen cloth. The unseemly appearance of the cavities is removed by slightly wetting them with a camel-hair pencil dipped in the lather, and then sprinkling them with a little dust of verditer. The superfluous powder may be rubbed off when dry.

In bronzing iron, the subject should be heated to a greater degree than the hand can bear, and German gold, mixed with a small quantity of spirit of wine varnish, spread over it with a pencil. Should the iron be already polished. it is necessary to heat it well and moisten it with a linen rag wet in vinegar, on purpose to obscure the polish, that the bronze powder may be sufficiently incorporated with the surface. There are other methods of accomplishing the same object, as by employing some coloured mordant, when the iron is not to be exposed to heat, and spreading the bronze over the mordant, when half dry, with a pencil. The bronzing of gun-barrels may be effected in various ways, as for example the following: -- Moisten the surface with dilute muriatic or nitric acid, in order that it may acquire a brown rust; or apply for this purpose the butter or chloride of antimony. This is to be mixed with olive oil, and rubbed on the barrel, which should be slightly heated. Then expose the piece to the air, and rub it with aquafortis to hasten the operation. The barrel is next to be well cleaned and washed with water, dried, and finally polished, either with a steel burnisher, or rubbed with wax, or varnished with a very weak solution of shell-lac in spirit of wine. (Ure's Dict. of Arts, &c.)

There is a method of silvering casts of plaster of Paris, and other substances, which is also called bronzing, and

Brookes.

Bronzino conducted after the manner above described for plaster bronzing; but it is not in general repute.

Conjectures have been entertained, that artists originally resorted to bronzing solely for the purpose of correcting the glare of colours; but this is exceedingly improbable; and it is certainly unnecessary to seek farther than the inducement of easily imitating metallic figures, so greatly esteemed

by persons of taste.

BRONZINO, Angiolo, a Florentine painter, born in 1502. This artist was, like his friend Vasari, a follower of the school of Buonarotti. His historical fresco pictures in the Palazze Vecchio at Florence, and some of his altar-pieces, are graceful and spirited; but some of the latter are in a feeble style. His portraits are in many Italian collections, and are praiseworthy for truth and expression; but the flesh tints are often too leaden, or too raw, from the want of that gradation of middle tints that give harmony to a picture. He died about 1571.

BROOKBANK, JOSEPH, an English divine, born at Halifax in Yorkshire, in 1612. After graduating at Oxford, he removed to London, where he established a school, for the use of which he published an abbreviation of Lilly's Grammar. Though he distinguished himself during the time of the Commonwealth by his loyalty, he was not fortunate enough to be rewarded with any church preferment at the Restoration. His works have little interest for mo-

dern readers, and are now wholly forgotten.

BROOKE, Frances, a clever novelist and dramatic writer, whose maiden name was Moore, was born in the earlier part of the eighteenth century. Of her novels, some of which enjoyed considerable popularity in their day, we may specify The History of Lady Julia Mandeville, Emily Montague, and The Excursion. Her dramatic pieces and translations from the French are now wholly forgotten. She died in January 1789, two days after her husband.

BROOKE, Henry, an amiable and accomplished writer, born at Rantavan in Ireland, 1706. After studying at Trinity College, Dublin, at an early age he entered the Temple, and soon became the intimate friend of Pope and Swift. Encouraged by Lords Lyttleton and Chatham, he published a tragedy entitled Gustavus Vasa, which had a rapid sale, and amply recompensed the author. Mr Brooke was also the author of the Fool of Quality, Juliet Grenville, Universal Beauty, and other poems. The death of this estimable and benevolent man took place at Dublin, Oct. 10, 1785.

BROOKES, Bartholomaus Heinrich, a learned and amiable German poet and lawyer, was born at Lubeck in 1680. On leaving college he settled at Hamburg, where he practised as a lawyer with such distinguished success, that he was made a senator, and afterwards an aulic counsellor, with the title of Count Palatine. After a useful and laborious life he died in 1747. His most ambitious work is his Earthly Contentment in God, a collection of moral poems still highly esteemed in Germany. His translations from foreign poets are very numerous. Among these may be specified his version of Pope's Essay on Man, and his translations from Marini and other Italian poets.

Brookes, Joshua, a celebrated English anatomist, was born in 1761. At a very early age he devoted himself to medical science, and attended the lectures of the most eminent surgeons in London and Paris. As soon as he had completed his studies, he began to teach anatomy and physiology, and continued to do so during forty years of his life, training no fewer than 5000 students, many of whom afterwards became famous in different parts of the world. His museum, which contained specimens not only of human and comparative anatomy, but also of natural history in all its branches, was arranged on a system combined from the various methods of Cuvier, Blumenbach, Linnæus, and other naturalists, and cost its proprietor about L.30,000.

Many of his treatises are printed in the Transactions of Brooklyn the various scientific societies of which he was a member. He died suddenly at London, Jan. 10, 1833.

Broome.

BROOKLYN, a city, capital of King's County, in the State of New York, North America, stands at the western end of Long Island, immediately opposite New York, from which it is separated by the East river, an arm of the sea about three-quarters of a mile in breadth. The ground on which the city is built exhibits considerable inequalities of surface, which gives it a very picturesque appearance. It is regularly laid out, the streets generally straight, from 60 to 100 feet wide, and crossing each other at right angles. It has numerous handsome and elegant public buildings, among which are the city-hall, a fine marble structure of recent erection; the jail, lyceum, city library, naval hospital, &c. It has 63 churches, of which 11 are Episcopal, 7 Roman Catholic, 6 Baptist, 6 Reformed German, 5 Congregational, 7 Presbyterian, 11 Methodist Episcopal, &c. It contains 13 school districts, under the superintendence of the Board of Education. Each of these has a valuable library

free to the inhabitants of the district, as are likewise the public schools to the children. Academies and high schools are also numerous. The Greenwood cemetery is one of the most picturesque and beautiful places of the kind, and covers an area of nearly 300 acres. It has some fine avenues and ornamental ponds, and contains numerous monuments. The trade of Brooklyn is very considerable; but being included in the district of New York, no separate returns are made. The dock covers 42½ acres, has a pier 3000 feet in length, and is accessible to vessels of the largest size. The United States navy yard on Wallabout bay covers 40 acres; and an immense dry dock, the greatest work of the kind in the United

New York enables many of the merchants of that city to reside here. Brooklyn obtained its charter as a city in 1834, and is divided into 11 wards, governed by a mayor and common council. Pop. (1820) 7175; (1830) 15,396;

States, has lately been completed there. Its proximity to

(1840) 36,233; (1850) 96,838. BROOM. See BOTANY.

Broom-Flower gives the denomination to an order of knights instituted by St Louis of France on his marriage. The motto was Exaltat humiles, and the collar was made up of broom flowers and husks, enamelled and intermixed with fleurs de lis of gold, set in open lozenges, enamelled white, chained together; to which was suspended a cross florence of gold. This answers to what the French called Ordre de la Géneste, from the name of a species of broom.

BROOME, WILLIAM, the coadjutor of Pope in translating the Odyssey, was born in Cheshire, of humble parents. He was educated upon the foundation at Eton, and was captain of the school a whole year, without any vacancy occurring by which he might have obtained a scholarship at King's College. Being by this delay superannuated, he was sent to St John's College by the contributions of his friends, and obtained a small exhibition there. His fondness for metrical composition was then such that his companions familiarly called him Poet. He appeared early in the world as a translator of the Iliad into prose, in conjunction with Ozell and Oldisworth. How their several parts were distributed is not known. This is the translation of which Ozell boasted as superior, in Toland's opinion, to that of Pope. He was introduced to Pope, who was then visiting Sir John Cotton at Madingley, near Cambridge, and gained so much of his esteem that he was employed to make extracts from Eustathius for the notes to the translation of the Iliad; and in the volumes of poetry published by Lintot, commonly called Pope's Miscellanies, many of his early pieces were inserted.

When the success of the Iliad gave encouragement to a version of the Odyssey, Pope, weary of the toil, called Fenton and Broome to his assistance; and taking only

Brosses.

Brooming half the work upon himself, divided the other half between his partners, giving four books to Fenton and eight to Broome. To the lot of Broome fell the second, sixth, eighth, eleventh, twelfth, sixteenth, eighteenth, and twentythird, together with the burden of writing all the notes. The price at which Pope purchased this assistance was L.300 paid to Fenton and L.500 to Broome, with as many copies as he wanted for his friends, which amounted to L.100 more. The payment made to Fenton is known only by hearsay; Broome's is very distinctly told by Pope in the notes to the Dunciad. It is evident that, according to Pope's own estimate, Broome was unfairly treated. If four books could merit L.300, eight, and all the notes, equivalent at least to four more, had certainly a right to more than L.600. Broome probably considered himself as injured; for he always spoke of Pope as too much a lover of money, and Pope pursued him with avowed hostility. He not only named Broome disrespectfully in the Dunciad, but quoted him more than once in the Bathos, as a proficient in the art of sinking. It has been said that they were afterwards reconciled; but their peace was probably without friendship. Broome afterwards published a Miscellany of Poems. He never rose to very high dignity in the church: he became rector of Sturston in Suffolk, where he married a wealthy widow; and afterwards, when the king visited Cambridge, in 1728, he was made doctor of laws. Towards the close of his life he amused himself with translating some of the Odes of Anacreon, which he published in the Gentleman's Magazine under the name of Chester. He died at Bath in 1745.

BROOMING of a ship. See Breaming.

BROSE, a Scotch dish made by pouring boiling water on oatmeal, with the addition of salt, and sometimes butter or milk. It is also prepared in various other ways.

BROSELEY, a market-town on the Severn, in the county of Salop, 146 miles from London. It is a place of considerable trade in iron, having near it productive mines of that mineral, as well as of coal. Market-day Wednesday. Pop. of parish (1851) 4739.

BROSSARD, SEBASTIEN DE, an eminent French musician, born A.D. 1660. In early life he had been prebendary and chapel-master of the cathedral church of Strasburg: he afterwards became grand chaplain and maître de chapelle in the cathedral of Meaux. He wrote a work entitled Prodromus Musicalis, 2 vols. folio; and was also the author of Dictionnaire de Musique, first printed at Amsterdam, in folio, 1703. At the end of this useful book there is a catalogue of authors ancient and modern, to the number of nine hundred, who have written on music. It is also interspersed with many curious observations on the history of music. His own compositions were chiefly sacred music. He died August 10, 1730.

BROSSES, CHARLES DE, first president of the parliament of Burgundy, was born at Dijon in 1709. He studied law with a view to the magistracy, but the bent of his mind was towards literature and the sciences. He travelled through Italy in 1739, in company with his friend M. de Sainte-Palaye; and on his return to France published his Lettres sur l'Etat Actuel de la Ville Souterraine d'Herculaneum, Dijon, 1750, 8vo, which was the first work upon that interesting subject. A collection of letters, written during his Italian tour, entitled Lettres Historiques et Critiques, in three vols. 8vo, was published at Paris after his death. In 1760 he published a dissertation Sur le Culte des Dieux Fétiches, 12mo, which was afterwards inserted in the Encyclopédie Méthodique. At the solicitation of his friend Buffon, De Brosses undertook his Histoire des Navigations aux Terres Australes, which was published in 1756, in two vols. 4to, with maps. It was in this work that De Brosses first laid down the geographical divisions of Australasia and Polynesia, which were afterwards adopted by Pinkerton and succeeding geographers. In 1765 ap-

peared his Traité de la Formation Mécanique des Lan- Brother. gues; a work distinguished by much research, and containing many ingenious hypotheses; but, at the same time, marked by that love of theory which is so apt to imbue the cultivators of etymological science.

De Brosses had been occupied, during a great part of his life, on a translation of Sallust, and in attempting to supply the lost chapters in that celebrated historian. At length, in 1777, he published L'Histoire du Septième Siècle de la République Romaine, 3 vols. 4to; to which is prefixed a learned life of Sallust, reprinted at the commencement of the translation of that historian by De Lamalle.

These literary occupations did not prevent De Brosses from discharging with ability his official duties, nor from carrying on a constant and extensive correspondence with the most distinguished literary characters of his time. In 1758 he succeeded the Marquis de Caumont in the Académie de Belles Lettres; but was never admitted a member of the French Academy, in consequence, it is said, of the opposition of Voltaire.

Besides the works already mentioned, he wrote several memoirs and dissertations in the collections of the Academy of Inscriptions, and in those of the Academy of Dijon. He also contributed various articles to the Dictionnaire Encyclopédique, on the subjects of grammar, etymology, music, &c.; and he left behind him several MSS. which were unfortunately lost during the revolution. He died in 1777. (Biographie Universelle.)

BROTHER (in Greek ἀδελφός, in Latin frater), a term of relation between two male children, sprung from the same father, or mother, or both. Scaliger and Vossius derive frater from φρατηρ, for φρατωρ, which properly signifies a person who draws water in the same well. The word, it is said, came originally from the city Argos, where there were only a few φρέατα or wells distributed in certain quarters of the city, to which those of the same neighbourhood

By the civil law, brothers and sisters stand in the second degree of consanguinity; by the canon law, in the first degree. By the Mosaic law the brother of a man who died without issue was enjoined to marry the widow of the deceased. Deuter xxv. 5. The ancients frequently applied the term brother indifferently to almost all who stood related in the collateral line, as uncles and nephews, cousins german, and the like. This we learn not only from a great many passages in the Old Testament, but also from profane authors. Cicero, in his Philippics, calls Antonia both wife and sister of Mark Antony, because she was daughter of his brother C. Antonius. And as to cousins, Tullus Hostilius, in Dionysius Halicarnasseus, calls the Horatii and Curiatii brothers, because they were sisters' children. The language of the Jews included in the name of brethren not only the strict relation of fraternity, but also the larger one of consanguinity. "We be brethren," said Abraham to Lot, (Gen. xiii. 8,) whereas Lot was only his nephew. So Jacob told Rachel that he was her father's brother (Gcn. xxix. 12), whereas he was only his nephew. It is customary for kings to give to each other the title of brother. Nor is the custom modern. Menander mentions a letter of Chosroes king of Persia to the emperor Justinian, beginning thus: "Chosroes, king of kings, to the emperor Justinian my brother." In the civil law, brothers, fratres, in the plural, sometimes comprehends sisters; as Lucius et Titia, fratres; tres fratres, Titius, Mævius, et Seia.

Foster-Brothers, are males nursed at the same breast; more strictly used of those suckled at the same time with the nurse's own child. The French call them frères du lait, or brothers by milk.

Brother was also used by writers of the middle ages for a comes, or governor of a province. It is sometimes used to denote a person of the same profession; and is also a

Brouk.

husius

Broussa.

Brothers customary term by which priests of the same persuasion address one another. Preachers, too, address their hearers as my brethren. This appellation is borrowed from the pri-Broughton, mitive Christians, who all called each other brothers. Brother is likewise an appellation more peculiarly given to certain orders of religious. In the military orders the knights are also called brothers: and in the order of Malta there was a particular class who are called serving brothers (fratres clientes), consisting of such as cannot give proof of their nobility. Brothers of the Rosy Cross. See Rosicrucians.

BROTIER, GABRIEL, was born at Tannay in 1723, and was brought up a Jesuit. On the suppression of the order he devoted himself entirely to literature. He is best known by his edition of Tacitus, which appeared at Paris in 1771, 4 vols. 4to. He also edited Pliny, in 6 vols. 12mo, 1779; and Phædrus, in 1783. His revised edition of Amyot's translation of Plutarch appeared in 22 vols. 1783. This eminent scholar died at Paris, in February 1789.

BROUGH, a market-town in the east ward of the county of Westmoreland, 271 miles from London. It occupies the site of the Verterac of the Romans, and consists of a long street, divided by a brook which runs into the Eden. The church is a spacious ancient building, with a pulpit formed out of one entire stone. The ruins of the castle, which stands upon a lofty eminence, constitute its most interesting feature. Market-day Thursday. Pop. (1851) 773.

BROUGHTON, HUGH, a learned scholar and divine, was born at Oldbury in Shropshire, in 1549. After receiving the rudiments of his education at a provincial school, he went to Cambridge, where in due time he was chosen a fellow of Christ's College, and took orders in the church. During his career at the university, he laid the foundation of the Hebrew scholarship, for which he was afterwards so distinguished. From Cambridge he went to London, where his eloquence gained him many and powerful friends. In 1588 he published his first work, "a little book of great pains," entitled the Consent of Scriptures. This work was strongly opposed at both the great universities, and the author was obliged to defend it, which he did in a series of lectures. In 1589 he went to Germany, where he frequently engaged in discussions, both with papists and with the learned Jews whom he met at Frankfort and elsewhere. In 1591 he returned to England, and published an "Explication of the article of Christ's descent into Hell," which like his last treatise elicited a violent opposition. In 1592 he once more went abroad, and cultivated the acquaintance of the principal scholars of the different countries through which he passed. Such was the esteem in which he was held even by his papist opponents, that he was offered a cardinal's hat if he would renounce the protestant faith; which, however, he declined to do. On the accession of James he returned to England; but not being engaged to co-operate in the new translation of the Bible then begun, he retired to Middleburgh in Holland, where he preached to the English congregation. In 1611 he returned to England, where he died in the following year. Some of his works were collected and published in a large folio volume in 1662, but many of his theological MSS. remain still unedited in the British Museum.

Broughton, Thomas, a learned divine, and one of the original writers in the Biographia Britannica, was born at London, July 5. 1704. At an early age he was sent to Eton, where he soon distinguished himself by his acuteness and studious disposition. Being superannuated on this foundation, he removed about 1722 to the university of Cambridge; and, for the sake of a scholarship, entered himself of Caius College. Here two of the principal objects of his attention were the acquisition of the modern languages, and the study of mathematics, under the famous Professor Sanderson. In May 1727, Broughton, after graduating as B.A., was admitted to deacon's orders, and in

the succeeding year was ordained priest, and took the degree of M.A. He then removed from the university to the curacy of Offley in Hertfordshire. In 1739 he was instituted to the rectory of Stepington, or Stibington, in the county of Huntingdon. He was soon after chosen reader to the Temple, by which means he became known to Bishop Sherlock, then Master, who conceived so high an opinion of Broughton's merit, that in 1744 he presented him to the valuable vicarage of Bedminster, near Bristol. together with the chapels of St Mary Redcliff, St Thomas, and Abbot's Leigh annexed. He was afterwards collated by the same patron to the prebend of Bedminster and Red-cliff, in the cathedral of Salisbury. Upon receiving this preferment he removed from London to Bristol, where he married the daughter of Thomas Harris, clerk of that city, by whom he had seven children. He died December 21, 1774.

For many years of his life, Broughton was engaged in a variety of publications, of which a list is given in the Biographia Britannica, 2d edition. He was a great admirer of ancient music, and furnished Handel with words for many of his compositions. He was distinguished by an active zeal for the Christian cause; and in private life was devoted to the interests and happiness of his family, and possessed a mild, cheerful, and liberal temper. In 1778 a posthumous volume of sermons, on select subjects, was published by his son, the Rev. Thomas Broughton, M.A.

BROUKHUSIUS, or Broekhuizen, Jan, a distinguished scholar, born in 1649 at Amsterdam, where his father was a clerk in the Admiralty. His father dying when he was very young, he was taken from literary pursuits, in which he had made extraordinary progress, and placed with an apothecary at Amsterdam, with whom he lived several years. But not liking the pestle and mortar, he went into the army, where he rose to the rank of lieutenantcaptain; and in 1674 he was sent with his regiment to America, in the fleet under Admiral de Ruyter, but returned to Holland the same year. In 1678 he was sent to the garrison at Utrecht, where he contracted a friendship with the celebrated Grævius; and here he had the misfortune to be so deeply implicated in a duel, that, according to the laws of Holland, his life was forfeited; but Grævius wrote immediately to Nicholas Heinsius, who obtained his pardon from the stadtholder. Not long afterwards he became a captain of one of the companies then at Amsterdam; and was thus enabled to pursue his studies at his leisure. His company being disbanded in 1697, he received a pension, upon which he retired to a country-house near Amsterdam. He died in 1707, aged fifty-eight.

As a classical scholar, he is distinguished by his editions of Propertius and Tibullus, the former published in 1702, the latter in 1708. His Carmina were published at Utrecht, 1684, in 12mo; and more splendidly by Van Hoogstraatten, Amsterdam, 1711, 4to. His Dutch poems were also published at Amsterdam, 1712, 8vo, by the same person, with a life prefixed. Broukhusius also edited the Latin works of Sannazarius and Palearius.

BROUNCKER, WILLIAM, lord viscount of Castle-Lyons, in Ireland, and the first president of the Royal Society, was the son of Sir William Brouncker, and was born about 1620. He was distinguished by his knowledge of mathematics, and enjoyed various posts of honour and profit after the Restoration; for he was at the same time chancellor to the queen, keeper of the great seal, a commissioner of the navy, and master of St Catherine's Hospital, near the Tower of London. Amongst other works he wrote Experiments on the recoiling of Guns; An algebraical paper upon the squaring of the Hyperbola; and several letters to Dr Usher, archbishop of Armagh. He died in 1684.

BROUSSA, or BRUSA, a city of Turkish Anatolia, capital of the Sanjak of Khodavendkiar, is situated in a fertile plain at the northern foot of Mount Olympus, 57 miles S.S.E.

Brown.

Broussais of Constantinople. Pop. estimated at 60,000. The houses are built of wood, and the numerous minarets give the town Broussonet, a very magnificent appearance from a distance, but the streets are narrow and dark. It is abundantly supplied with water, and has many beautiful fountains. It has a castle, numerous mosques, bazaars, khans, colleges, and several churches and synagogues. Its hot and cold mineral springs have been long celebrated. They vary in temperature up to 184° Fahr. Broussa is one of the first commercial cities of Turkey, and has also extensive manufactures of satins, silks, cottons, carpets, tapestry, &c. The celebrated Arab chief Abd-el-Kader, is now living there (1854) in retire-

> BROUSSAIS, FRANÇOIS JOSEPH VICTOR, a celebrated French physician, was born at St Malo in 1772. From his father, who was also a physician, he received his first instructions in medicine; but at an early age he entered the service of the republic, first as a private soldier and non-commissioned officer, and afterwards as a surgeon in the navy. At the end of that period he went to Paris, where in 1803 he graduated as M.D. In 1805 he again joined the army in a professional capacity, and served in Germany, Holland, Italy, and Spain. In 1814 he returned to Paris, and was appointed assistant-professor to the Military Hospital of the  ${f Val}$ -de-Grace, where he first promulgated his peculiar doctrines. His lectures were attended by great numbers of students, who received with the utmost enthusiasm the new theories which he propounded. In 1816 he published his Examen des Doctrines Médicales, which drew down upon its author the hatred of the whole medical faculty of Paris. By degrees these doctrines triumphed; and gradually crept into the writings and practice of the best physicians, and even into the medical school itself, long before their propounder held office in that institution. In 1831 he was appointed professor of general pathology in the academy of medicine, and taught with great applause till his death in 1838. Of his works, which are very numerous, the most important, besides the Examen above mentioned, are the Histoires de Phlegmasies Chroniques, Paris, 1808, 2 vols. 8vo; Traite de la Physiologie appliquée à la Pathologie; Paris, 1824; Commentaires des Propositions de Pathologie consignées dans l'Examen, Paris, 1829, 2 vols. 8vo; Le Choléra-morbus épidemique, Paris, 1832, 8vo, &c., &c.

BROUSSONET, PIERRE MARIE AUGUSTE, a distinguished French naturalist, was the son of a schoolmaster, and was born at Montpellier in 1761. He was educated at Montpellier for the medical profession; and such was the estimation of his abilities in the university, that when only eighteen years of age he was appointed to fill a professor's chair. So great, indeed, was his reputation, that a few years afterwards he was admitted a member of the Academy of Sciences by a unanimous vote, a circumstance till that time without example in the annals of that learned body. Botany seems to have been the science to which he was at first chiefly devoted; and he laboured with much zeal to establish the system of Linnæus in France. With this view, as well as for his own improvement, he went to Paris, and visited the various museums and collections. He next came to England, and was admitted in 1782 an honorary member of the Royal Society. It was at this period that he published at London his work on fishes, describing the most rare species, under the title of Ichthyologia, seu Piscium Descriptiones et Icones. On his return to Paris he was appointed perpetual secretary to the Society of Agriculture, an office which the intendant Berthier de Sauvigny resigned in

In 1789 he was nominated a member of the Electoral Colfege of Paris, an office which required him to serve as magistrate whenever his colleagues were in need of assistance in the exercise of their functions; and on the first of these occasions, as he was proceeding to the Hôtel de Ville, he had

the misfortune to see his friend and protector Berthier barbarously murdered by the populace. His own life was frequently in peril during the tumults that ensued, and when he had the charge of superintending the supply of provisions for the capital. In 1791 he had a seat in the legislative assembly; but, disgusted with politics, he quitted Paris the year following, and repaired to his native city. Persecution followed him in his retreat, and he was glad after many dangers to effect his escape to Madrid, where he was liberally assisted by the literati of that city. The malignity of the French emigrants, however, who could not pardon his having held any office under the revolutionary government, still pursued him, and drove him from Spain, and afterwards from Lisbon, where he had sought an asylum. At last he went out as physician to an embassy which the United States sent to the emperor of Morocco; and on this occasion his friend Sir Joseph Banks, informed of his distresses, remitted him L.1000. After residing for some time at Morocco, he obtained from the French directory permission to return to France; and was appointed by them consul at Teneriffe, where he resided for two years. On his return in 1797 he was chosen member of the institute, and was reinstated in his botanical professorship at Montpellier, with the direction of the botanical garden. He was afterwards elected a member of the legislative body, but died of apoplexy on the 27th July 1807. France is indebted to him for the introduction of the Merino sheep and Angola goats.

Besides the work on fishes, already noticed, the following are his principal productions: Variæ Positiones circa Respirationem, Montellier, 1788 : Essai sur l'Histoire Naturelle de quelques espèces de Moines, décrite à la manière de Linée, 8vo, 1784, which is a translation of a Latin satire on the monks, the original of which appeared in Germany in 1783: Année rurale, ou Calendrier à l'usage des Cultivateurs, 2 vols. 12mo. Paris, 1787-8: Notes pour servir à l'Histoire de l'Ecole de Médecine de Montpellier pendant l'an VI. 8vo, Montpellier, 1795. He was also a conductor, conjointly with Parmentier, Dubois, and Lefebure, of La Feuille du Cultivateur, in 8 vols. 4to, published in 1788 and the following years.

BROWN, JOHN, D.D., an English divine, and ingenious writer, born at Rothbury in Northumberland in November 1715. He was the son of John Brown, a descendant of the Browns of Colstown, near Haddington; and who at the time of his son's birth was curate to Dr Tomlinson, rector of Rothbury. He was educated at St John's, Cambridge; and after taking the degree of bachelor of arts with great reputation, being senior wrangler, he returned to his father's house at Wigton; received deacon's and priest's orders from Sir George Fleming, bishop of Carlisle; and in 1739 went to Cambridge to take his degree of master of arts. In 1745 he distinguished himself as a volunteer in the king's service, and behaved with great intrepidity at the siege of Carlisle.

The attachment displayed by Brown to the royal cause and to the whig party, procured him the friendship of Dr Osbaldeston, afterwards bishop of Carlisle. This gentleman continued to be his friend through life; a remarkable fact, since the peculiarities of Brown's temper involved him in quarrels with almost all his acquaintances. When advanced to the see of Carlisle, Dr Osbaldeston appointed Brown one of his chaplains.

It was probably during his residence at Carlisle that Mr Brown wrote his poem entitled Honour, inscribed to Lordi Viscount Lonsdale. His next poetical production was his Essay on Satire, addressed to Dr Warburton, to whom it was so acceptable, that he took Brown into his friendship. He also introduced him to Ralph Allen, Esq. of Prior Park, near Bath, who behaved to him with great generosity, and to whom in 1751 Brown dedicated his Essay on the characteristics of Lord Shaftesbury. In 1754 he was promoted by the Earl of Hardwicke to the living of Great Horksley in Essex; and in the following year took the degree of doctor of divinity at Cambridge. In this year also he published his

Brown.

tragedy of Barbarossa; which, under the management of Garrick, was acted with considerable applause, though when published it was sharply censured. This tragedy was followed by a second, entitled Athelstane, which was represented at Drury-Lane theatre. This was also well received by the public, but did not become so popular as

In 1757 appeared his well-known Estimate of the Manners and Principles of the Times, which was shortly followed by a second volume, containing additional remarks on the ruling manners and principles, and on their public effects. This was treated with uncommon severity by the periodical critics; and such was the multitude of his antagonists, that he retired for a while into the country. In his retreat he wrote an explanatory defence of the work above mentioned.

In 1760 he published an Additional Dialogue of the Dead, between Pericles and Aristides; being a sequel to Lord Lyttleton's dialogue between Pericles and Cosmo. One design of this additional dialogue was to vindicate the measures of Mr Pitt, against whose administration Lord Lyttleton had been supposed to have thrown out some hints. His next work, in 1763, was the Cure of Saul, a sacred ode; which was followed by A Dissertation on the Rise, Union, and Power, the Progressions, Separations, and Corruptions of Poetry and Music. This is one of the most pleasing of his performances, and abounds with a variety of critical discussions. In reply to various strictures on this piece, he wrote Remarks on some Observations on Dr Brown's Dissertation on Poetry and Music. In 1764 he published, in octavo, The History of the Rise and Progress of Poetry through its several Species; which is no more than the substance of the dissertation above mentioned. The same year he published a volume of sermons, dedicated to his patron Dr Osbaldeston, bishop of London; but most of these had been separately published. In the beginning of 1765 he published Thoughts on Civil Liberty, Licentiousness, and Faction; and in conclusion prescribed a code of education, upon which Dr Priestley made remarks at the end of his Essay on the Course of a liberal Education for civil and active Life. The same year he published a sermon On the Female Character and Education, preached before the guardians of the asylum for deserted female orphans. His last work, published in 1766, was a Letter to the Rev. Dr Lowth, occasioned by his late "Letter to the Right Reverend Author of the Divine Legation of Moses," in which Dr Brown is pointed at as one of the extravagant adulators of Bishop Warburton. Besides these works, Dr Brown published a poem on Liberty, and two or three anonymous pamphlets. Dr Brown, who had an hereditary tendency to insanity, and from early life had been subject at times to fits of excessive melancholy, put a period to his life on the 23d of September 1766

Brown, John, author of the Self-interpreting Bible, was born at Carpow, in Perthshire, in 1722. He was, for a great part of his life, minister of the Burgher branch of the Secession church in Haddington, and also discharged the duties of Professor of Divinity. Though he had not enjoyed the advantages of a regular education, he mastered the classical tongues, as well as several modern and oriental languages, and gained a just reputation for learning and piety. He died in 1787. The best of his works, which are very numerous, are his Self-interpreting Bible, and Dictionary of the Bible, works that are still very popular in He also wrote a valuable Body of Divinity.

Physic, was born in 1735 at Lintlaws or at Preston, Berwickshire. While very young he was apprenticed to a weaver; but having a strong aversion for the drudgery of such a mechanical employment, he was placed at the grammar-school of Dunse, where he soon distinguished himself.

His parents, who belonged to the religious body called Se- Brown. ceders, were flattered with their son's rapid and successful progress in the Latin language, and through the benevolent assistance of his teacher (Mr Cruickshank), young Brown was destined to the ministerial office. But an accident, it is said, made him at once renounce this plan and the sect. Having, while at the grammar-school, been prevailed on to attend a meeting of synod held in the Established church at Dunse, young Brown was called upon to appear before the session of his congregation, and required either to submit to ecclesiastical censure or to suffer expulsion. He spared them all trouble by renouncing their communion, and joining the Established church.

Brown then became a private tutor in a gentleman's family in the country; and at the same time acted as an assistant in the grammar-school of Dunse, where he remained till about his twentieth year. He then went to Edinburgh, and after passing through the preliminary classes, entered himself as a student of divinity in the university. He supported himself for some time by private teaching, and then resumed his former labours as assistant in the grammarschool of Dunse for a year; but returning to Edinburgh about 1759, he finally renounced the study of theology, and

commenced that of physic.

During his medical studies, he supported himself by giving private instructions in Latin to students of medicine, preparatory to the examinations, which formerly were conducted in that language; as well as by translating their theses into Latin. Thus occupied, he soon attracted the notice of Dr Cullen. This eminent man not only employed Brown as a tutor in his own family, but was assiduous in recommending him to others; and he likewise gave him permission to deliver to private pupils illustrations of his own public lectures. Brown now married, and received students to board in his house; but either through recklessness or misconduct, his affairs were soon involved in total bankruptcy. Irritated by this misfortune, and still more, perhaps, by the disappointment he experienced in regard to a medical chair in the university, from which he imagined he was excluded by the interference of Dr Cullen, he quarrelled with his friend and patron, and became from that moment a keen opponent of his doctrines.

It was in 1780 that Brown's Elementa Medicinæ appeared. It is a compendium of his opinions, which he continued for several years to illustrate by public lectures. The excitement produced by the appearance of this work, both in this country and on the Continent, seems now almost incredible; but although it has passed through numerous editions, and its doctrine is detailed in all systematic works on medicine, the Brunonian theory is now maintained by few. Mr Brown now proposed to become a medical practitioner; but as he had quarrelled with all the professors at Edinburgh, he

took the degree of M.D. at St Andrews.

The terms, however, on which he lived with his medical brethren, and his intemperate habits, precluded him from all rational hopes of success, and he therefore removed to London in 1786; but after he had delivered one course of lectures he was cut off by apoplexy in October 1788.

Brown, Robert, a schismatic divine, the founder of the Brownists, a numerous sect of dissenters in the reign of Queen Elizabeth. He was the son of Mr Anthony Brown of Tolthorp in Rutlandshire, whose father obtained, by a charter of Henry VIII., the singular privilege of wearing his cap in the king's presence. Robert was educated at Cambridge, in Corpus Christi, or, according to Collier, at Brown, John, the founder of the Brunonian Theory of Bennet College, and was afterwards a schoolmaster in Southwark. About the year 1580 he began to promulgate his principles of dissent from the Established church; and the following year he preached at Norwich, where he soon attracted a numerous congregation. His violent abuse of the Church of England, and his pretensions to divine in-

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Brown. spiration, gained for him many followers among the ignorant and unwary. His sect daily increasing, Dr Freake bishop of Norwich, with other ecclesiastical commissioners, called him before them. Being insolent to the court, he was committed to the custody of the sheriff's officer, but was released at the intercession of his relative the lord treasurer Burghley. Brown now left the kingdom, and with permission of the States, settled at Middleburg in Zealand, where he formed a church after his own plan, and preached without molestation. In 1585 he returned to England; and at last fixed his residence at Northampton, where, for his indiscreet attempts to gain proselytes, he was cited by the Bishop of Peterborough, and, refusing to appear, was finally excommunicated for contempt. The solemnity of this censure, we are told, immediately effected his reformation. He moved for absolution, which he obtained, and from that time became a dutiful member of the Church of England. This happened about the year 1590; and, in a short time afterwards, Brown was preferred to a rectory in Northamptonshire, where he kept a curate to his duty, and where he might probably have died in peace; but having some dispute with the constable of his parish, he proceeded to blows, and was afterwards so insolent to the justice, that he was committed to Northampton jail, where he died in 1630, aged eighty. Brown boasted on his death-bed that he had been confined in thirty-two different prisons. He wrote a "Treatise of Reformation without tarrying for any;" and two other pieces; making together a thin quarto, published at Middleburg, 1582. See Brownists.

Brown, Thomas, of facetious memory, as he is styled by Addison, was the son of a farmer at Shiffnal in Shropshire, and was entered of Christ-church College, Oxford, whence he soon was obliged to abscond on account of the irregularities of his life. He afterwards went to London, where e had recourse to the usual refuge of half-starved wits, scribbling for bread. He published a great variety of poems, letters, dialogues, &c., full of humour and erudition, but coarse and indelicate. Though a good-natured man, he had one pernicious quality, which was—rather to lose his friend than his joke.

Towards the end of his life, as we are informed by Jacob, Brown was invited by the Earl of Dorset to a Christmas dinner along with Dryden and several other wits; on which occasion, to his agreeable surprise, he found a L.50 banknote under his plate, and Dryden at the same time received one of L 100. Brown died in 1704, and was interred in the cloister of Westminster Abbey. His works were published in 1707, in 4 vols. 12mo.

Brown, Thomas, an eminent metaphysician, was born at Kirkmabreck, in the stewartry of Kirkcudbright, on the 9th of January 1778, and was the youngest son of the Rev. Samuel Brown, minister of the parish of Kirkmabreck, and of Mary Smith, daughter of John Smith, Esq. of Wigton. His father survived his birth only a short time, and he received the first rudiments of his education from his mother. In the first lesson he learned all the letters of the alphabet, and every succeeding step was equally remarkable. From his seventh till his fourteenth year he was placed, under the protection of a maternal uncle, at different schools in the neighbourhood of London, at all of which he distinguished himself, and made great progress in classical literature. Upon the death of his uncle in 1792, he returned to his mother's house in Edinburgh, and entered as a student in the university.

His attention was first directed to metaphysical subjects by the elegant and benevolent biographer of Burns, Dr Currie of Liverpool, to whom he was introduced in the summer of 1793. About that time the first volume of Mr Stewart's Elements of the Philosophy of the Human Mind was published. Dr Currie put a copy of the work into his hands, and was struck not more with the warmth of admi-

ration which the young philosopher expressed, than with the acuteness he displayed in many of his remarks. The next winter he attended Mr Stewart's class; and at the close of one of the lectures of that celebrated philosopher, he went up, though personally unknown, and modestly submitted some difficulties which had occurred to him respecting one of Mr Stewart's theories. Mr Stewart listened to him patiently, and, with a candour which did him infinite honour, informed him that he had just received a communication from the distinguished M. Prevost of Geneva, containing a similar objection. This proved the commencement of a friendship which Dr Brown continued to enjoy till the time of his death.

It has already been mentioned in one of the preliminary dissertations to this work (p. 411, vol. i.), that at the age of nineteen he took a part with others (some of whom became the most memorable men of their time), in the foundation of a private society in Edinburgh under the name of the Academy of Physics. This society is interesting in the history of letters, as having given rise to the publication of the Edinburgh Review. Some articles in the early numbers of that work were written by Dr Brown, and bear the marks of his genius.

In 1798 he published Observations on the Zoonomia of Dr Darwin. When it is considered that the greater part of this work was written in his eighteenth year, it may perhaps be regarded as the most remarkable of his productions; and it may be doubted if, in the history of philosophy, there is to be found any work exhibiting an equal prematurity of talents and attainments. Those who take an interest in tracing the progress of intellect will find in it the germ of all his subsequent views in regard to mind, and of those principles of philosophizing by which he was guided in his future inquiries.

In 1803, after attending the usual course pursued by medical students, he took his degree of doctor of medicine.

In the same year he brought out the first edition of his poems, in two volumes. The greater number of the pieces contained in them were written while he was at college. They are of a very miscellaneous description, and are certainly inferior to many of his subsequent compositions; at the same time they all exhibit marks of an original mind, and of a singularly refined taste.

His next publication was an examination of the principles of Mr Hume respecting causation. Though this tract was occasioned by a local controversy, it is entirely of an abstract nature, and all reference to the circumstances that led to the publication is studiously avoided. Its great merits have been universally acknowledged. It was alluded to in the most flattering manner in the Edinburgh Review, in a very able article by Mr Horner; Mr Stewart also gave a valuable testimony as to its excellence; and Sir James Mackintosh has pronounced it the finest model in mental philosophy since Berkeley and Hume. A second edition, considerably enlarged, was published in 1806; and in 1818 it appeared in a third edition, with so many additions and alterations, as to constitute it almost a new work, under the title of An Inquiry into the Relation of Cause and Effect.

From the time when Dr Brown had taken his degree, he continued for several years to practise as a physician in Edinburgh. In 1806 he was associated in partnership with the late Dr Gregory; and there was every prospect of his attaining in due time the highest eminence in his profession. But success as a physician was not sufficient to satisfy his ambition. The discharge of his professional duties was marked by that assiduous tenderness of attention which might have been expected from a disposition so truly amiable; but still philosophy was his passion, from which he felt it as a misfortune that his duty should so much estrange

The period, however, at last arrived when he was to be elevated to a situation suited to his tastes and habits, and where his public duties corresponded with his inclinations. Mr Stewart, in consequence of the gradual decline of his health, being frequently prevented from attending to the duties of his class, found it necessary to have recourse to the assistance of some of his friends during his temporary absence. He therefore applied to Dr Brown, who undertook the arduous task of supplying his place with lectures of his own composition. He first appeared in the moral philosophy class in the winter of 1808-9. At this time, however, there was no great call for his exertions, as Mr Stewart was soon able to resume his professional duties. In the following winter he again presented himself as Mr Stewart's substitute, and by a succession of eloquent lectures during several weeks, he so decidedly established his character, that when Mr Stewart signified a desire to have Dr Brown united with him in the professorship, but little opposition was made, and in 1810 he was appointed professor of moral philosophy in conjunction with Mr Stewart.

Immediately after his appointment he retired to the country, where he remained till within a few weeks of the meeting of the college; judging that, with a constitution not naturally strong, nothing was so important for his approaching labours as a confirmed state of health and spirits. For many years he had devoted his attention to the science of mind, and was intimately acquainted with the subject; and, from the experience of the two preceding winters, he had acquired sufficient confidence in his own powers to be assured that he could prepare his lectures upon the spur of the occasion. Accordingly, when the college opened, except the lectures that were written during Mr Stewart's absence, he had no other preparation in writing. His exertions during the whole of the winter were very great, and completely successful. The expectations that had been excited among his friends were more than realized, and he secured the highest place in the respect and affections of his students.

For some years after his appointment to the moral philosophy chair, Dr Brown had little leisure for engaging in any literary undertaking. Even the long summer vacation he found to be no more than sufficient for restoring his energies for the exertions of the succeeding season. By degrees, however, he became familiarized with the duties of his situation, and was enabled to indulge occasionally in other pursuits. In the summer of 1814 he brought to a conclusion his Paradise of Coquettes which he published anonymously, and which met with a favourable reception. In succeeding seasons he published various other poetical works.

Any notice of the life of Dr Brown would be incomplete if it did not contain a reference to his mother, whom he loved with a tenderness and reverence of affection that formed a distinguishing feature of his character. This excellent woman died in 1817. Her character is faithfully delineated in the beautiful lines addressed to her memory, prefixed to one of his poetical productions.

In the autumn of 1819, at a favourite retreat in the neighbourhood of Dunkeld, he commenced his text-book, a work which he long intended to prepare for the benefit of his students. At that time he was in excellent health; but towards the end of December of the same year he became indisposed, and after the recess he was in such a state of weakness as to be unable for some time to resume his official duties. When he again met his class, his lecture unfortunately happened to be one which he was never able to deliver without being much moved, and from the manner in which he recited the very affecting lines from Beattie's Hermit, it was conceived by many that the emotion he displayed arose from a foreboding of his own approaching dissolution.

'Tis night, and the landscape is lovely no more,-I mourn, but, ye woodlands, I mourn not for you, For morn is approaching your charms to restore, Perfumed with fresh fragrance, and glittering with dew; Nor yet for the ravage of winter I mourn, Kind Nature the embryo blossom shall save; But when shall spring visit the mouldering urn, O when will it dawn on the night of the grave?

Brown

This was the last lecture he ever delivered. From this period his health rapidly declined. Having upon a former occasion derived great benefit from a sea voyage, he proceeded, by the advice of his medical attendants, to London, accompanied by his two sisters, with the intention of removing, as soon as the season allowed, to a milder climate. But all means of remedy were now too late, and nothing could permanently retard the progress of his disease. Day after day he became weaker.

During the whole period of his illness he was never heard to utter a complaint. Gentle as he ever was, sickness and pain made him still more so. His only anxiety seemed to be the distress which his sufferings occasioned to those around him. A few days after his arrival in London he went to Brompton, where he died on the 2d of April 1820. His remains were put into a leaden coffin, and laid, according to his own request, in the churchyard of his native parish, beside those of his father and mother.

Dr Brown was in height rather above the middle size. The expression of his countenance was that of calm reflection. His likeness is well preserved in a picture by Watson in 1806. Among the more prominent features of Dr Brown's character may be enumerated the most perfect gentleness, and kindness, and delicacy of mind, united with great independence of spirit, a truly British love of liberty, and a most ardent desire for the diffusion of knowledge, and virtue, and happiness among mankind. All his habits were simple, temperate, studious, and domestic; and he was remarkable for nothing more than his love of home, and the happiness he shed around him there.

As a philosopher he was possessed in an eminent degree of that comprehensive energy which, according to his own description, "sees, through a long train of thought, a distant conclusion, and separating at every stage the essential from the accessory circumstances, and gathering and combining analogies as it proceeds, arrives at length at a system of harmonious truth." The predominating quality of his intellectual character was unquestionably the power of analysis, in which he had few equals. In all his prose Dr Brown has shown great powers of eloquence. His poetry has never been popular, though it contains many passages of exquisite beauty. As a writer, simplicity is the quality in which he is most deficient, and subtilty that in which he most excels.

His character as a philosopher will chiefly rest upon his lectures, which were published after his death. It would be foreign to the object of the present sketch to give an account of the principles of his philosophy, or to enter upon a discussion of any of the questions that have been agitated upon the subject. We shall merely observe that the estimation in which his lectures are held by the public appears from the number of editions which, under all the disadvantages of a posthumous publication, have been called for; and his virtues as a man are almost universally allowed to have been in beautiful accordance with his talents as a philosopher.

An account of the life and writings of Dr Brown was published in 1825, in 8vo, by the Rev. Dr Welsh.

Brown, Ulysses Maximilian, a celebrated general in the imperial armies, son of Ulysses, Baron Brown and Camus, colonel of cuirassiers in the emperor's service, was descended of an ancient Irish family, and was born at Basle in 1705. After studying at Limerick in Ireland, he was sent for into Hungary by his uncle, Count George Brown, who was a

Brown. colonel of infantry. He was present at the battle of Belgrade in 1717; and he afterwards continued his studies in the Clementine College at Rome till 1721, when he went to Prague to study the civil law. At the end of 1723 he became captain in his uncle's regiment, and in 1725 lieutenantcolonel. In 1730 he served in Corsica, and contributed greatly to the taking of Callansara. In 1732 the emperor made him chamberlain. He was raised to the rank of colonel in 1734, and distinguished himself greatly in Italy, especially at the battles of Parma and Guastalla, and in burning in the presence of the French army the bridge which the Marshal de Noailles had thrown over the Adige. He was made general in 1736; and in the following year, by an excellent manœuvre, he secured the retreat of the army, after the unhappy battle of Banjaluca, and saved the baggage.

In 1739 the emperor Charles VI. made him field-marshallieutenant, and counsellor in the aulic council of war. After the death of that prince, when the king of Prussia entered Silesia, Count Brown with a small body of troops disputed his progress inch by inch. He signalized himself on several occasions; and in 1743 the queen of Hungary made him a privy-counsellor at her coronation in Bohemia. Having passed into Bavaria, where he commanded the vanguard of the Austrian army, he seized Deckendorf, with a great quantity of baggage; and obliged the French to abandon the banks of the Danube, which the Austrians passed in security. In the same year, 1743, he was sent by the queen of Hungary to Worms, as plenipotentiary to the king of Britain, and did his utmost to bring about the treaty of alliance between the courts of Vienna, London, and Turin. In 1744 he followed Prince Lobkowitz into Italy; took Veletri on the 4th of August, in spite of the superior numbers of the enemy; entered their camp, overthrew several regiments, and took many prisoners. The following year he was recalled into Bavaria, where he took the town of Wilshosen by assault. The same year he was made general of artillery; and in January 1746 he marched for Italy at the head of 18,000 men, drove the Spaniards out of the Milanese; and having joined the forces under Prince de Lichtenstein, he commanded the left wing of the Austrian army at the battle of Placentia, June 15, 1746, and defeated the right wing of the enemy's forces commanded by Marshal de Maillebois. As commander-in-chief of the army against the Genoese, he seized the pass of Bocchetta, though defended by above four thousand men, and took Genoa. Count Brown at length joined the king of Sardinia's troops, and, in conjuction with them, took Mont-Alban and the county of Nice. On the 30th of November he passed the Var in spite of the French troops, entered Provence, and had taken the isles of St Margaret and St Honorat, when the revolution which happened in Genoa, and the advance of Marshal Belleisle obliged him to execute that masterly retreat which has elicited so much admiration. He employed the remainder of 1747 in defending the states of the house of Austria in Italy; and after the peace in 1748 he was sent to Nice, to regulate there, in conjunction with the Duke of Belleisle and the Marquis de la Minas, the differences that had arisen with respect to the execution of some of the articles of the definitive treaty of Aix-la-Chapelle.

The empress queen, to reward his services, made him governor of Transylvania, where he was generally esteemed for his probity and disinterestedness. In 1752 he obtained the government of Prague, with the chief command of the troops in that kingdom; in 1753 the king of Poland, elector of Saxony, honoured him with the collar of the order of the White Eagle; and the next year he was declared field-

When the king of Prussia, in 1756 entered Saxony, and attacked Bohemia, Count Brown encountered and repulsed him at the battle of Lowositz, October 1, with only 27,000 men, while the Prussians numbered at least 40,000. Seven days after this battle he undertook the famous march into Brown. Saxony, to deliver the Saxon troops shut up between Pirna and Konigstein. He at length obliged the Prussians to retire from Bohemia, for which service he was made a knight of the Golden Fleece. Soon afterwards Count Brown hastily assembled an army in Bohemia to oppose the king of Prussia; and on the 6th of May was fought the famous battle of Prague, in which, while employed in giving his orders for maintaining the advantages he had gained, he received a deadly wound. To be disabled at such a crisis was doubly unfortunate, as he had broken the Prussians, and the Count Schwerin, one of their greatest generals, was slain. Count Brown was carried to Prague, where he died of his wounds June 26, 1757, aged fifty-two.

Brown, William, an English poet, descended of a good family, and born at Tavistock in Devonshire, in 1590. Having passed through the grammar-school of his native place, he was sent to Exeter College, Oxford, and became tutor to Robert Dormer, afterwards Earl of Caernarvon. On leaving college, he was taken into the family of William Earl of Pembroke; and he improved his fortune so much that he purchased an estate. His poetical works which procured him a very great reputation, are entitled Britannia's Pastorals; The Shepherd's Pipe; An Elegy on the death of Prince Henry, eldest son of James I. The date of his death is uncertain. (Wood's Athen. Oxon.)

Brown, William Laurence, born at Utrecht, January 7, 1755, was the son of the Rev. William Brown, minister of the English church in that city. The father, having been appointed professor of ecclesiastical history at St Andrews, returned to Scotland in 1757; and his son was in due time sent to the grammar-school of that city. At the early age of twelve he became a student in the university, and obtained a greater number of prizes than fell to the share of any other competitor. After completing the preliminary curriculum, he became a student of divinity; and in 1774 he removed to the university of Utrecht, where he combined with the study of theology that of the civil law; and from this study he frequently declared that he had derived essential benefit.

In 1777, on the death of his uncle, Dr Robert Brown, who had succeeded as minister of the English church at Utrecht, the magistrates of that city offered the vacant charge to his young relation, an invitation which he finally accepted. He was licensed and ordained by the presbytery of St Andrews, and admitted minister of the English church at Utrecht in March 1778. His congregation, though respectable, was far from being numerous, seldom exceeding forty persons; yet his preparation for the pulpit was not less assiduous than at Aberdeen, where he had to address a larger audience. He increased his income by receiving pupils into his house; and he gradually extended his acquaintance among individuals distinguished by their talents and learning, as well as by their station and influence; while he enlarged his sphere of observation by various excursions in France, Germany, and Switzerland.

The curators of the Stolpian Legacy at Leyden having in 1783 proposed "The Origin of Evil," as the subject of their annual prize, Mr Brown obtained the second honour, namely, that of publication at the expense of the trust. His dissertation was accordingly printed, under the title of Disputatio de Fabrica Mundi, in quo Mala insunt, Naturæ Dei perfectissimæ haud repugnante. In 1784 the university of St Andrews created him D.D. On three different occasions he obtained the medals awarded by the Teylerian Society at Haarlem for the best compositions on certain prescribed subjects. These were, a dissertation On the Immortality of the Soul, which was never printed; An Essay on the Folly of Scepticism, &c., Lond. 1788, 8vo; An Essay on the natural Equality of Men, Edinb. 1793, 8vo. The latter work was the most successful of all his publications.

Before this period he had been appointed to a professor-

Browne. ship in the university of Utrecht. He had for some time been placed in a position of some difficulty, in consequence of the civil commotions, and his attachment to the Orange party. But when the armed interposition of the Prussians occasioned a sudden change in the government of Holland, and the friends of Dr Brown had regained their ascendency, the states and the magistrates of Utrecht jointly instituted a professorship of moral philosophy and ecclesiastical history, and appointed him to this new office.

On entering upon his duties, he pronounced an inaugural oration, which was published under the title of Oratio de Religionis et Philosophiæ Societate et Concordia maxime salutari. Traj. ad Rhen. 1788, 4to. Two years afterwards he was nominated rector of the university; and on resigning his temporary dignity, he pronounced an Oratio de Imaginatione, in Vitæ Institutione, regunda. Traj. ad Rhen. 1790, 4to. During this interval he had been offered the Greek professorship at St Andrews; but this honour he was induced to decline. To his other offices was now added the professorship of the law of nature; a branch of study intimately connected with ethics, and which, indeed, was at one period regularly discussed by the professors of moral philosophy in the Scottish universities, particularly by Dr Hutcheson, and his predecessor Mr Carmichael, as an essential part of their course.

The war which followed the French revolution finally drove Dr Brown from the place of his nativity. In the course of a very severe winter, he embarked in January 1795, with his wife, five children, and some other relations, in an open boat, and landed in England after a stormy passage. In London he experienced such a reception as was due to his literary talents and moral worth: and in 1795 the magistrates of Aberdeen appointed him to the chair of divinity on the retirement of Dr Campbell, and soon afterwards he was made principal of Marischal College.

Dr Brown soon became a very conspicuous member of the church, and some of his appearances in the General Assembly produced a powerful effect. His speech on the case of Dr Arnot was printed under the title of "Substance of a Speech delivered in the General Assembly of the Church of Scotland, on Wednesday the 28th of May 1800, on the Question respecting the Settlement, at Kingsbarns, of the Rev. Dr Robert Arnot, Professor of Divinity in St Mary's College, St Andrews." Edinb. 1800, 8vo.

His essay "On the Existence of a Supreme Creator" obtained Burnet's first prize, amounting to L.1250. The second prize, amounting to L.400, was awarded to Dr Sumner, afterwards archbishop of Canterbury. Dr Brown's work was published at Aberdeen, 1816, 2 vols. 8vo. His last considerable work was "A comparative View of Christianity, and of the other Forms of Religion which have existed, and still exist, in the World, particularly with regard to their Moral Tendency." Edinb. 1826, 2 vols. 8vo.

In the year 1800 Dr Brown had been appointed chaplain in ordinary to the king, and in 1804 dean of the chapel royal, and of the most ancient and most noble order of the Thistle. He was last of all appointed to read the Gordon lecture in Marischal College, and he delivered his inaugural discourse in November 1825. This was published in 1826, 8vo. His other publications were, a poem entitled "An Essay on Sensibility;" Sermons, Edinb. 1803, 8vo; "Philemon, a Poem," Edinb. 1809, 2 vols. 8vo; several detached sermons, and various tracts. He died on the 11th of May 1830, in the seventy-sixth year of his age.

BROWNE, EDWARD, eldest son of Sir Thomas Browne, was physician to Charles II. and president of the Royal College of Physicians of London. He was born in 1644; and studied at Cambridge, and afterwards at Merton College, Oxford. He published a brief account of his travels in Hungary, Servia, Bulgaria, Macedonia, Thessaly, Austria, Styria, Carinthia, Carniola, and Friuli; and likewise an account of several journeys through a great part of Germany. Browne. He also contributed some translations to an edition of Plutarch's Lives. He was acquainted with Hebrew, was a good Greek scholar, and no man of his age wrote better Latin. High Dutch, Italian, French, and other modern languages, were as familiar to him as his mother tongue. Charles II. said of him, "that he was as learned as any of the college, and as well bred as any at court." He died in 1708.

Browne, Isaac Hawkins, an ingenious English poet, born in 1705 at Burton-upon-Trent, Staffordshire, of which place his father was minister. He received his grammatical instruction first at Lichfield, and then at Westminster; whence, at sixteen years of age, he was removed to Trinity College, Cambridge, of which his father had been fellow. After taking his master's degree, he removed to Lincoln's Inn, where he applied closely to the study of the law. Not long after the commencement of his professional studies, he wrote a poem on Design and Beauty, which he addressed to his friend Highmore the painter. Here also he wrote his most popular poem, entitled *The Pipe of Tobacco*, in which he has given imitations of Cibber, Ambrose Philips, Thomson, Young, Pope, and Swift, who were then all living. In 1744 he married the daughter of Dr Trimnell, archdeacon of Leicester. He was elected in 1744 and again in 1748 to serve in parliament for the borough of Wenlock in Shropshire, near which place he possessed a considerable estate, left to him by his maternal grandfather. In 1754 he published his poem De Animi Immortalitate, in which, besides a judicious choice of matter and arrangement, he is thought to have shown himself a happy imitator of Lucretius and Virgil. The universal popularity of this poem produced several English translations of it; the best of which is given by Soame Jenyns, in his Miscellanies. The author intended to have added a third book, but of this he had left only a fragment. This amiable and gifted writer died, after a lingering illness, in 1760. In 1768 his son published an elegant edition of his father's poems, in large octavo.

Browne, James, LL.D., a learned and indefatigable man of letters, and for many years sub-editor of the seventh edition of the Encyclopædia Britannica, was born at Coupar-Angus in 1793. He was educated at Edinburgh, and afterwards removed to St Andrews, where he studied for the church. He wrote "The History of Edinburgh" for Ewbank's Picturesque Views of that city, 2 vols. 1823-25; in 1826, became a member of the faculty of advocates, and obtained the degree of LL.D. from King's College, Aberdeen; and in this same year he published a "Critical Examination of Macculloch's work on the Highlands and Islands of Scotland." In 1827 he published at Paris his Aperçu sur les Hieroglyphes d'Egypte; and in the following year there appeared his "Vindication of the Scottish Bar from the attacks of Mr Brougham." He was now appointed editor of the Caledonian Mercury; and two years later he became sub-editor of the Encyclopædia Britannica, to which he contributed a large number of valuable articles. He also published in 1838 a "History of the Highlands and Highland Clans," 4 vols. 8vo, of which various editions have since appeared. His mental activity was remarkable, and frequently urged him to exertions beyond his strength. His unremitting labours at last brought on a stroke of apoplexy, which terminated his existence in 1841.

Browne, Sir Thomas, an eminent physician and celebrated writer, descended of an ancient family in Cheshire, was born at London, October 19, 1605. After studying at Winchester School, and at Pembroke College, Oxford, he travelled through France and Italy; and returning through Holland, he took his degree of M.D. at Leyden. He began to practise at Shipden-hall near Halifax; but removed in 1636 to Norwich, where he was extensively employed in his profession. In the following year he was incorporated as a doctor of medicine at Oxford; and in 1641 he mar-

Browne. ried a lady of a good family in Norfolk. His famous work, entitled Religio Medici, first appeared in 1642. It was translated into Latin, and immediately procured for the author a European reputation. It was afterwards translated into almost every language in Europe. This singular work has been censured by some as inclining to infidelity, and even to atheism; while others, with better judgment, have applauded its religious tendency, as well as the ability and learning of the author. His well-known Treatise on Vulgar Errors, entitled Pseudodoxia Epidemica, was first published in 1646, and was received with equal applause. He also wrote a work called Hydriotaphia, or a Discourse of Sepulchral Urns found in Norfolk, which appeared in 1658. Browne's reputation as a physician, also, was very high. In 1664 he was elected an honorary member of the Royal College of Physicians; and in 1671 he was knighted at Norwich by Charles II. He died at Norwich, on the anniversary of his birthday, in 1682, and left a considerable number of MSS., which were published under the title of "The Posthumous Works of the learned Sir Thomas Browne, Knt., M.D."

Browne's style has been characterized as vigorous but rugged, learned but pedantic. " It is not on the praises of others," Dr Johnson remarks, "but on his own writings, that he is to depend for the esteem of posterity. of which he will not easily be deprived while learning shall have any reverence among men; for there is no science in which he does not discover some skill, and scarce any kind of knowledge, sacred or profane, abstruse or elegant, which he does not appear to have cultivated with success. His exuberance of knowledge and plenitude of ideas sometimes obstruct the tendency of his reasoning and the clearness of his decisions; on whatever subject he employed his mind, there started up immediately so many images before him, that he lost one by grasping another. His memory supplied him with so many illustrations, parallel or dependent notions, that he was always starting into collateral considerations; but the spirit and vigour of his pursuit always gives delight; and the reader follows him without reluctance through his mazes, in themselves flowery and pleasing, and ending at the point originally in view."

Browne's entire works were published at London in 1836, by Simon Wilkins, in 4 vols. 8vo.

Browne, Sir William, an eminent but very eccentric physician and multifarious writer, born in Norfolk in 1692. He settled originally at Lynn in Norfolk, where he published a translation of Dr Gregory's Catoptricæ et Dioptricæ Sphæricæ Elementa; to which he added some papers on the Foci of Specula, &c. Having acquired a competence by his profession, he removed to Queen's Square, London, where he resided till his death. A great number of lively essays, both in prose and verse, the production of his pen, were printed and circulated among his friends. The active part taken by Sir William in the contest with the licentiates, 1768, occasioned his being introduced by Foote in his Devil upon Two Sticks. Upon Foote's exact representation of him, with his identical wig and coat, tall figure, and glass stiffly applied to his eye, Brown sent him a card complimenting him on having so happily represented him; but as he had forgotten his muff, he sent him his own. This goodnatured man used to frequent the annual ball at the ladies' boarding-school, Queen Square, being fond of the company of sprightly young people. A dignitary of the church, finding, on one of these occasions, this upright figure stationed there, told him he believed he was Hermippus redivivus, who lived anhelitu puellarum. He survived his wife ten years, and died in 1774, at the age of eighty-two. By his will, which was written in Greek, Latin, and English, he made a provision for awarding three gold medals as yearly prizes to three undergraduates of Cambridge, for the best Greek and Latin poems, in imitation of Sappho, Horace, and Martial.

Browne, William George, an eminent traveller, born at Browne Great-Tower-Hill, London, July 25, 1768, was the son of a wine-merchant, descended from a good family in Cumberland. His constitution being weak, he was educated privately under Dr Whalley, the editor of Ben Jonson's works. At seventeen he was sent to Oriel College, Oxford; and he there went through an extensive course of classical reading. Having been left a moderate competence by his father, on leaving the university he applied himself entirely to literary pursuits. He embarked deeply in political questions, embracing with ardour the popular cause. He republished some political tracts, among which was part of Buchanan's De Jure Regni apud Scotos, and formed the plan of reprinting a regular series of such writings. But the fame of Bruce's travels, and of the first discoveries made by the African Association, determined him to become an explorer of Central Africa.

Accordingly, he left England at the close of 1791, and arrived at Alexandria in January 1792. He spent a few months in visiting Siwah, the supposed site of the temple of Jupiter Ammon; and employed the remainder of the year in examining the whole of Egypt. In the spring of 1793 he visited Suez and Sinai, and in May set out for Darfûr. This was his most important journey, in which he acquired a great variety of original information. He endured much hardship, and was unable to effect his purpose of returning by Abyssinia. He did not reach Egypt till 1796; after which he spent a year in Syria, and did not arrive in London till September 1798. In 1800 he published his travels in Africa, Egypt, and Syria, from the year 1792 to 1798, in one volume 4to. The work was highly esteemed. and is classed by Major Rennell among the first performances of the kind; but, from the abruptness and dryness of the style, it never became very popular. In 1800 Mr Brown again left England, and spent three years in visiting Greece, some parts of Asia Minor, and Sicily. He had made some progress in preparing for the press an account of this journey, but gave up his intention, for some reason unknown, and spent some years in retirement, employed in oriental studies. Tired, however, of this inactivity, in 1812 he set out on a more extensive journey, proposing to penetrate to Samarcand, and survey the most interesting regions of Central Asia. He spent the winter in Smyrna; and in the spring of 1813 proceeded through Asia Minor and Armenia, made a short stay at Erzerum, and arrived on the first of June at Tabriz, where he met Sir Gore Ouseley. About the end of the summer of 1813 he left Tabriz for Tehrân, intending to proceed thence into Tartary; but unhappily he never reached that destination. Near the banks of the Kizil-Ozan his party were attacked by banditti, and, according to the report of the survivors, Mr Browne was plundered and murdered. Suspicion attached to his companions, and even to the Persian government, but nothing occurred to confirm these surmises. Some bones, believed to be his, were afterwards found and interred near the grave of Thevenot, the celebrated French traveller.

Mr Browne was of a spare frame, rather above the middle size, of a grave and pensive cast of countenance, with an extraordinary predilection for the manners and character of the orientals: like them he was in general society silent and reserved; yet he possessed a friendly and generous disposition, and was distinguished by a strict regard to veracity.

His volume of travels in Africa has already been men-Walpole, in the second volume of his Memoirs relating to European and Asiatic Turkey (4to, 1820), has published, from papers left by him, the account of his journey in 1802 through Asia Minor to Antioch and Cyprus; also Remarks written at Constantinople. No account is preserved of his last journey, except what is contained in a letter to Mr Smithson Tennant.

BROWNIE, the name of a serviceable kind of sprite,

Brownie.

Brownists. who, according to a superstitious notion formerly prevalent in the Hebrides and Highlands of Scotland (as well as among the country people in England, where he had the name of Robin Goodfellow), was wont to clean the houses, help to churn, thresh the corn, and belabour all who pretended to make a jest of him. He was represented as stout and blooming, had fine long flowing hair, and went about with a wand in his hand. He was the very counterpart of Milton's Lub-

> BROWNISTS, a religious sect, which sprung out of that of the Puritans towards the close of the sixteenth century. Their leader, Robert Brown, who wrote divers books in their behalf, was a man of good parts and some learning. Brown, after suffering a series of persecutions from the bishops, left the kingdom, carrying with him his congregation, and settled at Middleburg in Zealand, where they obtained leave of the states to worship God in their own way, and form a church according to their own model. This handful of men, just delivered from the severities of the bishops, soon began to differ among themselves, and crumble into so many parties, that Brown their pastor grew weary of his office; and, returning to England in 1589, he renounced his principles of separation, was preferred to the rectory of a church in Northamptonshire, and died, after leading a very idle and dissolute life, in 1630. See Brown, Robert.

The revolt of Brown was attended with the dissolution of the church at Middleburg; but the seeds of Brownism which he had sown in England were so far from being destroyed, that Sir Walter Raleigh, in a speech in 1592, computed the number of Brownists at no less than twenty thousand. The occasion of their separation was not any fault they found with the faith, but only with the discipline and form of government of the other churches in England. They charged corruption equally on the Episcopal form and on that of the Presbyterians, by consistories, classes, and synods; nor would they join with any other reformed church, because they were not assured of the sanctity and regeneration of the members who composed it, on account of the toleration of sinners, with whom they maintained it an impiety to communicate. They condemned the solemn celebration of marriages in the church; maintaining that matrimony being a political contract, the confirmation of it ought to come from the civil magistrate. They would not administer baptism to the children of such as were not members of the church, or of such as did not take sufficient care of their children already baptized. They rejected all forms of prayer, and held that the Lord's prayer was not to be recited as a prayer, being only given for a rule or model whereon all our prayers are to be formed. The form of church government which they established was democratical. When a church was to be gathered, such as desired to be members of it made a confession and signed a covenant, by which they obliged themselves to walk together in the order of the gospel. The whole power of admitting and excluding members, with the decision of all controversies, was lodged in the brotherhood. The church officers were chosen from among themselves, for preaching the word and taking care of the poor, and were separated to their several offices by fasting, prayer, and imposition of hands of some of the brethren. But they did not erect the priesthood into a distinct order. As the vote of the brotherhood made a man a minister, and gave him authority to preach the word and administer the sacraments among them, so the same power could discharge him from his office, and reduce him to the condition of a mere layman again. And as they maintained that the bounds of a church were defined by the number of those who could meet together in one place, and join in one communion, so the power of these officers was confined within the same limits. The minister or pastor of one church could not administer the Lord's supper to another, nor baptize the children of any but those of his own society. Any lay brother was allowed the liberty

of prophesying, or of giving a word of exhortation to the Brownrigg people; and it was usual for some of them, after sermon, to ask questions, and reason upon the doctrines which had been preached. In a word, every church on the Brownists' model is a body corporate, having full power to do everything which the good of the society requires, without being accountable to any presbytery, synod, assembly, convocation, or other jurisdiction whatever. Most of their discipline has been adopted by the Independents, a party which afterwards arose from among the Brownists. The laws against the Brownists were executed with great severity; their books were prohibited by Queen Elizabeth, they were themselves often imprisoned, and many of them were hanged. The ecclesiastical commission and the star-chamber, in fine, distressed them to such a degree that they resolved to quit their country. Accordingly, many families retired and settled at Amsterdam, where they formed a church, and chose Mr Johnson for their pastor, and after him Mr Ainsworth, author of the learned commentary on the Pentateuch. Their church flourished during nearly a hundred years.

BROWNRIGG, WILLIAM, a celebrated physician, born in Cumberland, March 24, 1711. He studied medicine at London, and afterwards at Leyden, where he graduated as M.D. in 1737. This university was then in its highest splendour; Albinus taught anatomy, Euler mathematics, and the chair of medicine and chemistry was occupied by the accomplished Boerhaave. After a long and happy residence at Leyden, he returned to his native country, married, and settled in Whitehaven. He published his inaugural dissertation De Praxi medica ineunda, 4to, Lugd. Bat. 1737; and a treatise on the Art of making Common Salt, printed at London in 1748, in 8vo, which procured for him the addition of F.R.S.; also An Enquiry concerning the Mineral Elastic Spirit contained in the Water of Spa in Germany, which obtained the Copley gold medal; and, lastly, a treatise On the Means of Preventing the Communication of Pestilential Contagion, 1771. A few years before his death he retired to his seat at Ormethwaite, near Keswick, where he died, Jan. 6, 1800, at the age of eighty-eight.

BRUAR, FALLS OF. See BLAIR-ATHOLL. BRUCE, JAMES, F.R.S. This enterprising and enlightened traveller was a descendant, by the female side, of the royal house of Bruce, and was born at the family seat, Kinnaird House, Stirlingshire, on the 14th Dec. 1730.

He received the elements of his education at Harrow, where he made considerable progress in his classical studies. Returning to Scotland, he applied to the study of law; but having no relish for this pursuit, he determined to push his fortune in the East Indies, and for that purpose went to London. While in the metropolis, soliciting permission from the directors of the East India Company to go out and settle under their auspices as a free trader, he was introduced to a Miss Allan, whom he married in the beginning of the following year. He now abandoned his East India speculations, and devoted himself to commerce as a wine-merchant. His wife having fallen into a bad state of health, Bruce, in hopes that the genial climate of the south of France would benefit her, proceeded thither. But she died on the journey, within a year after her marriage.

Bruce returned to his business in London, but the bond which had connected him with it was now broken; and giving up the principal management of the concern to his partner, he applied himself to studies calculated to dispet the grief which had settled on his mind. For two years he laboured at the Spanish and Portuguese languages, which he learned to pronounce with great accuracy. He also assiduously practised several styles of drawing. His business having afforded him an opportunity of visiting the Continent, he proceeded thither, and travelled first through Portugal and afterwards through Spain. In the latter country, the traces of oriental manners still visible, the desolate pa-

Bruce.

Bruce. laces of the caliphs, and the tales of chivalry interwoven with the Moorish wars, awakened in his mind that spirit of romantic enterprise which afterwards led him to the fountains of the Nile. At Madrid he proposed to explore the collections of Arabic manuscripts which were buried in the monastery of St Lawrence, and in the library of the Escurial. Disappointed in this expectation by the jealousy of the Spaniards, he proceeded to France, and afterwards to Holland; but on receiving the news of his father's death, he returned to England.

By the demise of his father he succeeded to an inheritance which, though respectable, was inadequate to the wants of his growing ambition. From the period of his return in 1758 to the year 1761, he intently employed himself in the acquisition of the eastern languages. A circumstance had occurred which introduced him to Mr Pitt. While at Ferrol in Galicia, there was a rumour of a war between Great Britain and Spain. It immediately occurred to the fertile mind of Bruce that a descent upon Spain at this point could scarcely fail of being successful. He boldly resolved to submit his project to Mr Pitt, through his friend Mr Wood, under-secretary of state, to whom he fully explained the circumstances on which he had formed his opinion. Mr Bruce was sent for, and, after a conversation upon the subject, at Mr Pitt's suggestion he drew up a memorandum of his project. He was then informed by Mr Wood that Mr Pitt intended to employ him upon a particular service; that he might, however, go down and settle his affairs in his own country, but by all means to be ready when called upon. No time was lost on his part; but just after he received orders to return to London, that minister resigned.

Notwithstanding this disappointment, which he very sensibly felt, his hopes promised to be yet realized. The memorandum which he drew up for Mr Pitt had been laid before the king, and strongly recommended by Lord Halifax. The Earl of Egremont and Mr Greville had several meetings with Mr Bruce upon the subject; but the death of Egremont put an end to his expectations for the present. Lord Halitax, however, had appreciated Bruce's character. He proposed to him a journey to the coast of Barbary, which had as yet been but partially explored by Dr Shaw. The discovery of the source of the Nile also formed a subject of conversation; and it is unnecessary to state that the enterprising mind of Bruce eagerly caught up the idea.

At this very time the consulship of Algiers became vacant, and Mr Bruce was pressed by Lord Halifax to accept it, as it presented a very favourable opportunity for making the proposed expedition.

This event determined him. After providing a large apparatus of instruments, he set out for Italy through France. On his arrival at Rome he was ordered to proceed to Naples, there to await His Majesty's commands. From Naples he again returned to Rome, and from thence proceeded to Leghorn, where he at last embarked for Algiers, and arrived there on the 15th of March 1762.

"After a year spent at Algiers, constant conversation with the natives while abroad, and with my manuscripts within doors, had qualified me to appear in any part of the Continent without the help of an interpreter. Ludolf had assured his readers that the knowledge of any oriental language would soon enable them to acquire the Ethiopic; and I needed only the same number of books to have made my knowledge of that language go hand in hand with my attainments in the Arabic. My immediate project of setting out on my journey to the inland parts of Africa had made me double my diligence; night and day there was no relaxation from these studies, although the acquiring any single language had never been with me either an object of time or difficulty.

At Algiers Mr Bruce was detained longer than he ex-VOL. V.

pected, in consequence of a dispute with the dey concerning Mediterranean passes. This being adjusted, he proceeded to Mahon, and from Mahon to Carthage. He next visited Tunis and Tripoli, and travelled over the interior parts of these states. At Bengazi, a small town on the Mediterranean, he suffered shipwreck, lost all his baggage, and with extreme difficulty saved his life. He afterwards sailed to the isles of Rhodes and Cyprus; and proceeding to Asia Minor, travelled through a considerable part of Syria and Palestine, visiting Hassia, Latakia, Aleppo, and Tripoli, near which last city he was again in imminent danger of perishing in a river. The ruins of Palmyra and Baalbec were next carefully surveyed and sketched by him. His drawings of these places were deposited in the royal library at Kew: "the most magnificent present in that line," to use his own words, "ever made by a subject to his sovereign." Bruce published no particular account of these various journeys; but Dr Murray, in the second edition, introduced from Bruce's MSS. some account of his travels in Tunis.

In these various travels some years were passed; and Bruce now prepared for the grand expedition, the accomplishment of which had ever been nearest his heart,—the discovery of the supposed sources of the Nile. In the prosecution of that dangerous object he left Sidon on the 15th of June 1768, and arrived at Alexandria on the 20th of that month. He proceeded from thence to Cairo, where he remained till the 12th of December following, when he embarked on the Nile, and sailed up the river as far as Syene, visiting in the course of the voyage the ruins of Thebes. Leaving Kennè on the Nile on the 16th February 1769, he crossed the desert of the Thebaid to Cosseir on the Red Sea, and arrived at Jidda on the 3d of May. In Arabia Felix he remained (not without making several excursions) till the 3d of September, when he sailed from Loheia, and arrived on the 19th at Masuah, where he was detained near two months by the treachery and avarice of the navib of that place. It was not till the 15th of November that he was allowed to quit Arkeeko, near Masuah; and he arrived on the 15th of February 1770 at Gondar, the capital of Abyssinia, where he ingratiated himself with the most considerable persons of both sexes belonging to the court. Several months were employed in attendance on the king, and in an unsuccessful expedition round the lake of Dem-Towards the end of October he set out for the sources of the Bahr el Azrek, which he supposed to be the principal branch of the Nile, though it is now generally agreed that this rank ought to be assigned to the Bahr el Abiad. At this long-desired spot he arrived on the 14th of November; and his feelings on the accomplishment of his wishes cannot be better expressed than in his own words:

"It is easier to guess than to describe the situation of my mind at that moment, standing in that spot which had baffled the genius, industry, and inquiry of ancients and moderns for the course of near three thousand years. Kings had attempted this discovery at the head of armies; and each expedition was distinguished from the last only by the difference of the numbers which had perished, and agreed alone in the disappointment which had uniformly and without exception followed them all. Fame, riches, and honour had been held out for a series of ages to every individual of those myriads whom princes commanded, without having produced one man capable of gratifying the curiosity of his sovereign, or wiping off this stain upon the enterprise and abilities of mankind, or adding this desideratum for the encouragement of geography. Though a mere private Briton, I triumphed here in my own mind over kings and their armies; and every comparison was leading nearer and nearer to the presumption, when the place itself where I stood, the object of my vain-glory, suggested what de-

Bruce. pressed my short-lived triumphs. I was but a few minutes arrived at the source of the Nile, through numberless dangers and sufferings, the least of which would have overwhelmed me, but for the continual goodness and protection of Providence; I was, however, but then half through my journey, and all those dangers which I had already passed awaited me again on my return. I found a despondency gaining ground fast upon me, and blasting the crown of laurels I had too rashly woven for myself.

"I was, at that very moment, in possession of what had for many years been the principal object of my ambition and wishes; indifference, which, from the usual infirmity of human nature, follows, at least for a time, complete enjoyment, had taken place of it. The march and the fountains, upon comparison with the rise of many of our rivers, became now a trifling object in my sight. I remembered that magnificent scene in my own native country, where the Tweed, Clyde, and Annan rise in one hill; three rivers, I now thought, not inferior to the Nile in beauty, preferable to it in the cultivation of those countries through which they flow; superior, vastly superior, to it in the virtues and qualities of the inhabitants, and in the beauty of the flocks, crowding its pastures in peace, without fear of violence from man or beast. I had seen the rise of the Rhine and Rhone, and the more magnificent sources of the Saone; I began, in my sorrow, to treat the inquiry about the source of the Nile as a violent effort of a distempered fancy. Grief and despondency now rolling upon me like a torrent, relaxed, not refreshed, by unquiet and imperfect sleep, I started from my bed in the utmost agony. I went to the door of my tent. Every thing was still; the Nile, at whose head I stood, was not capable either to promote or to interrupt my slumbers; but the coolness and serenity of the night braced my nerves, and chased away those phantoms that while in bed had oppressed and tormented me."

The object of his wishes being now gratified, Bruce bent his steps towards his native land. He arrived at Gondar on the 19th November 1770, but found that it was by no means an easy task to obtain permission to quit Abyssinia. A civil war in the mean time breaking out, several engagements took place between the king's forces and the troops of the rebels, particularly three actions at a place called Serbraxos, on the 19th, 20th, and 23d of May 1771. In each of these Mr Bruce acted a considerable part; and for his valiant conduct in the second, received, as a reward from the king, a chain of gold. At Gondar, after these engagements, he again preferred the most earnest entreaties to be allowed to return home; and it was only when his health at last gave way, that the king consented to his departure, but on condition of his engaging to return in the event of his recovery, with as many of his kindred as he could persuade to accompany him.

After a residence of nearly two years in that wretched country, Bruce left Gondar on the 16th of December 1771, taking the dangerous way of the desert of Nubia, instead of the more easy road of Masuah, by which he entered Abyssinia. He was induced to take this route, from his former experience of the cruel and savage temper of the nayib of Masuah. Arriving at Teawa on the 21st March 1772, he had the misfortune to find the sheikh Fidele at Atbara the counterpart of the nayib of Masuah. By his intrepidity and prudence, however, he obtained permission to depart next day, and he arrived at Sennaar on the 29th of the same month.

Mr Bruce was detained upwards of four months at that miserable and inhospitable place. This delay was occasioned by the villany of those who had undertaken to supply him with money; but at last, by disposing of nearly the whole of his gold chain, the well-earned trophy of Serbraxos, he was enabled to proceed on his journey.

He left Sennaar on the 5th of September, and arrived on Bruce, the 3d of October at Chendi, which he quitted on the 20th, and travelled through the desert of Gooz, reaching the village of that name on the 26th of October. On the 9th of November he left Gooz, and entered upon the most dreadful and dangerous part of his journey. All his camels having perished, he was under the necessity of abandoning his baggage in the desert, and with the greatest difficulty reached Assouan upon the Nile on the 29th of November. After some days' rest, having procured fresh camels, he returned into the desert, and recovered his baggage, among which was a quadrant of three feet radius, supplied by Louis XV. from the military academy at Mar-

On the 10th of January 1773, after more than four years' absence, he arrived at Cairo, where, by his manly and generous behaviour, he so won the heart of Mahomet Bey, that he obtained a firman permitting the commanders of English vessels belonging to Bombay and Bengal to bring their ships and merchandise to Suez, a place far preferable in all respects to Jidda, to which they were formerly confined. Such was the conclusion of his laborious and memorable journey through the desert.

At Cairo Mr Bruce's earthly career had nearly been concluded by a disorder in his leg, occasioned by a worm in This accident kept him five weeks in extreme agony, and long continued to affect his health. On his return to Europe he was received with all the admiration due to his enterprising character. After passing a considerable time in France, particularly at Montbard, with his friend the Comte de Buffon, he at last revisited his native country after an absence of more than twelve years.

The publication of his travels was delayed by several circumstances, among which may be mentioned the death of his second wife, his own impaired health, and a series of law-suits which resulted from his long absence from his native country. His long expected work accordingly did not appear till 1790, seventeen years after his return to Europe. It consisted of five large quarto volumes, embellished with plates and charts. It is unnecessary to enter_into any criticism or analysis of this celebrated work. The very singular and extraordinary picture which it gives of Abyssinian manners startled the belief of some. He stated one fact in particular which shipwrecked his reputation; and the world of literature, from Johnson down to the author of Munchausen, ridiculed the statement as unworthy of credit. It was, that the Abyssinians were in the practice of eating raw slices cut out of a living cow. This, though believed in France and other Continental countries, was treated in England as a fable. The shafts of ridicule, envy, and malice, were levelled at his devoted head; and all that he received at the hands of his contemporaries was obloquy and contempt. Posterity, however, has done him justice. Every succeeding traveller who has visited the country bears testimony to his veracity; and his most startling statements have since been fully verified. See Abyssinia. There are indeed a few errors in dates and other circumstances, but they are of trifling importance, and in no degree detract from the general authenticity of his narrative.

The first impression was quickly disposed of, and a second edition was preparing for the press, when death removed the author from this transitory stage. The cause of his death was an accident. While attending some visitors down stairs, his foot slipped, and he fell headlong. He remained in a state of insensibility for eight or nine hours, when he expired on the 27th of April 1794, in the sixty-fifth year of his age. He married, for his second wife, Mary, eldest daughter of Thomas Dundas of Fingask, who predeceased: her husband by ten years. By this marriage Mr Bruce had two sons and one daughter.

The second edition of his travels was published in 1805,

Bruce

Brucker.

Bruce.

in seven vols. 8vo, with a quarto volume of plates, edited by Dr Alexander Murray, who obtained access to all his papers, and illustrated the work with a learning and research which established his fame as an oriental scholar. A third edition appeared in 1813.

There never, perhaps, existed a man better qualified than Bruce for the hazardous enterprise he undertook. height exceeded six feet, and his size as well as his physical strength was proportionally great. He excelled in all personal accomplishments, being a practised and indefatigable swimmer, trained to exercise and fatigue of every kind, while his long residence among the Arabs had given him a more than ordinary facility in managing the horse. In the use of fire-arms he was almost unerring in his aim, and his dexterity in handling the spear and lance on horseback was very great. He was master of many languages, understood Greek perfectly, and was so well skilled in oriental literature that he revised the New Testament in Ethiopic, Samaritan, Hebrew, and Syriac, making many useful notes and remarks on difficult passages. He had applied from early youth to mathematics, drawing, and astronomy, and had acquired some knowledge of physic and surgery. His memory was astonishingly retentive, and his judgment sound and vigorous. He was dexterous in negotiation, a master of public business, animated with the warmest zeal for the glory of his king and country, a physician in the camp or city, a soldier and horseman in the field; whilst, at the same time, his breast was a stranger to fear, though he took every precaution to avoid danger. Such, at least, is his own representation of his character; and though an impartial judge would probably make some abatement for the natural bias of a man drawing his own portrait, yet it cannot be denied that in personal accomplishments Bruce equalled any of his contemporaries; that he was distinguished for vigour of understanding, as well as great literary attainments; and that in active and persevering intrepidity he has never been excelled.

Bruce, Michael, the son of a weaver in a hamlet three miles south of Kinross, was born in 1746. He was destined by his family for the office of pastor in a dissenting chapel, for which purpose his parents sent him to Edinburgh in 1762. His health was never robust; and about 1765, his biographer, Dr Anderson, mentions that he began to exhibit that grave melancholy which tinges the beautiful productions of the muse of this amiable young man. In the autumn of 1766 consumption had evidently begun to mark him for its victim. He lingered through the winter, and perished in the succeeding spring, at the early age of twenty years. His poems were collected and published after his death by Logan, a kindred poetic spirit, for the benefit of Bruce's family. They were immediately brought into notice by the elegant and feeling criticism on them by Lord Craig, in the 36th number of *The Mirror*. Many of them breathe a fine spirit of love for the simple beauties of nature, and a deep pathos; as for example the fine elegiac stanzas on his own approaching dissolution, beginning,

## Now spring returns, but not to me returns The vernal joys my better years have known;

the poem entitled Lochleven; and the lines To the Cuchoo. Bruce, Robert, king of Scotland, was born in the year 1274, and was grandson of that Robert Bruce, lord of Annandale, who was competitor for the crown with John Baliol. In his earlier life he was attached to the interest of Edward I. of England; yet his conduct was cautiously neutral, and he was therefore narrowly watched by that politic monarch. In the year 1299 he was associated with John Comyn, as one of the regents of Scotland; but, from the powerful rivalship that existed between them, the coalition did not last long. We find him shortly afterwards in favour with Edward. At this time he entered into a secret league with Comyn and the bishop of St Andrews

to establish his claim to the throne. Comyn, however, revealed it to Edward; and Bruce having his suspicion excited, fled to Scotland, collected his friends and followers, and proceeded to Scone, where he was solemnly crowned on the 27th of March 1306. He proceeded to expel the English from the kingdom; but was surprised at Methven, near Perth, and completely routed. For two years after this his life may be considered as a romance. He and his band suffered the greatest hardships in sustaining life, and in making head against the numerous foes who on all sides surrounded them. From 1308 to the establishment of his kingdom by the battle which he gained at Bannockburn on 24th June 1314, over the English commanded by Edward II. in person, he and his generals were continually engaged in warfare, making incursions into England, and reducing the strongholds in Scotland which were still garrisoned for the English interest. The consolidation of his kingdom was not allowed to be made in peace; for from the period of that celebrated battle he was constantly engaged in war with England, and with such success, that Edward and his nobles were reduced to the necessity of accepting terms of peace on the condition of renouncing all their pretended superiority over Scotland, of recognising it as a free and independent kingdom, and acknowledging Bruce to be its king. He died at Cardross, on the 7th June 1329, at the age of fifty-five, and was buried at Dunfermline. On his death-bed he expressed a wish that his heart might be conveyed to the Holy Land, whither he had often meditated a pilgrimage to atone for the murder of the Red Comyn. The good Lord James of Douglas undertook to fulfil the dying prayer of his king, but landing in Spain to help the Christians against the Moors, he was slain in battle. The heart of Bruce was brought back to Scotland by the survivors, and buried before the high altar of Melrose Abbey. See Scotland.

BRUCHSAL, a town in the grand duchy of Baden, circle of the middle Rhine, on the Salzbach, 14 miles from Carlsruhe. It was formerly the seat of the bishop of Spires, whose magnificent palace is still extant; and it has a townhouse, gymnasium, hospital, barracks, and a considerable

trade in wine. Pop. 7800.

BRUCK, a circle in the Austrian province of Steyermark, extending over 3696 square miles. It is situated in a mountainous district, with valleys between the ranges, of moderate fertility. Pop. (1851) 187,543. The chief place, of the same name, at the junction of the river Mur with the Mürz, contains about 2000 inhabitants, and has a considerable transit trade.

BRUCKENAU, a town and fashionable watering-place of Bavaria, in the circle of Lower Franconia, on the Sinn, 16 miles N.W. of Kissingen. Pop. 1800. The baths are situated in the pleasant valley of the Sinn, two miles from the town, and are annually frequented by the king of Bavaria.

BRUCKER, James, theologian, historian, philologer, and biographer, was born at Augsburg on the 22d of January 1696. His father, who was a respectable burgher, destined him for the church; and his own inclinations according with his father's wishes, he was sent, at the usual age, to pursue his studies in the university of Jena. Here he took the degree of master of arts in 1718; and in the following year he published his Tentamen Introductionis in Historiam doctrinæ de Ideis, in 4to; a work which he afterwards amplified and completed, and republished under the title of Historia Philosophica doctrinæ de Ideis, at Augsburg in 1723. He returned to his native city in 1720; but here his merit having attracted envy rather than recompense, he was induced to accept of the office of parish mini-ster of Kaufbevern in 1723. In the same year he published a memoir De Vita et Scriptis Cl. Etingeri, Augs. 8vo. His reputation having been at length established by these learned works, in 1731 he was elected a member of the Academy

Brucker. of Sciences at Berlin; and soon afterwards he was invited to Augsburg to fill the honourable situation of pastor and senior minister of the church of St Ulric. He published in the same year three dissertations relating to the history of philosophy, under the title of Otium Vindelicum, sive Meletematum Historico-philosophicorum triga, Augsburg, 1731, 8vo. Besides several smaller dissertations on biography and literary history, printed at different times, and which he afterwards collected in his Miscellanea, he published at Ulm, in 1737, Neue Zusätze verschiedener Vermehrungen, &c., zu den kurtzen Fragen aus der Philosophischen Historie, 7 vols. 12mo. This work, being a history of philosophy in question and answer, contains many details, especially in the department of literary history, which he has chosen to omit in his greater work on the same subject. He was forced by the booksellers, in opposition to his own opinion, to adopt the erotematic method, which at that time had been rendered popular by the writings of Hubner and Rambach.

In 1741, at Leipzig, appeared the first volume of his great work, Historia Critica Philosophiæ, a mundi incunabulis ad nostram usque ætatem deducta. Four other ponderous quartos, completing the first edition of this elaborate history, followed in 1744. Such was the success of this publication, that the first impression, consisting of four thousand copies, was exhausted in twenty-three years, when a new and more perfect edition, the consummation of the labours of half a century devoted to the history of philosophy, was in 1767 given to the world in six volumes quarto. The sixth volume, consisting entirely of supplement and corrections, is applicable to the first as well as to the second edition. Of the merits of this work we shall speak in the sequel.

His attention, however, was not wholly occupied by this stupendous undertaking. The following books would of themselves have been sufficient to exhaust the industry of any ordinary author: - Pinacotheca Scriptorum nostra ætate literis illustrium, &c., Augsburg, 1741-55, folio, in five decads. Ehren Tempel der Deutschen Gelehrsamkeit in welchem die Bildnisse gelehrter Mönner unter den Deutschen aus dem XV. XVI. und XVII. Jahrhundert aufgestellet, und thre Geschichte, &c. entworfen sind, Augsburg, 1747-49, 4to, five decads. Institutiones Historiæ Philosophicæ, Leipzig, 1747, 8vo, a second edition, ibid. 1756; and a third has been published since Brucker's death, with a continuation by Professor Born of Leipzig, in 1790. Miscellanea Historia Philosophica Literaria Critica olim sparsim edita nunc uno fasce collecta, Augsburg, 1748, 8vo. Erste Anfangsgrunde der Philosophischen Geschichte, als ein Auszug seiner grossern Werke, zweyte Ausgabe, Ulm, 1751, 8vo. He likewise superintended and corrected an edition of Luther's translation of the Old and New Testament. with a Commentary extracted from the writings of the English theologians, Leipzig, 1758-70, folio, six parts. His death ensued before the completion of this work, which has since been accomplished by Teller. He died at Augsburg in 1770; and he may be added to the catalogue of Huetius, to prove that literary labour is not incompatible with sound health and longevity. (See Saxii Onomasticon; Biographie Universelle; Gesner's Isagoge.)

It is only by his writings on the history of philosophy that Brucker is now known in the literature of Europe. In this study his great work forms an important era, and even at the present day it is the most extensive and elaborate upon the subject. It is, however, a work of which the defects are great, and its errors have been important in their consequences, in proportion to the authority it has acquired. We shall, therefore, hazard a few general observations on the defects which chiefly detract from the perfection and utility of the Critical History of Philosophy.

If Brucker had carried into this study a penetration equal to his diligence, and had his general comprehension of the scope and nature of the subject corresponded with the ela-

borate minuteness of his details, he would have left us a Brucker. work which might have had some pretensions to be considered as a rational history of human opinion. He lived, however, at a period when these different qualities were only beginning to be conjoined, and when as yet the history of philosophy had been written merely as a chronicle of the passing theories of individuals and sects. To give to the science of history a regular and connected form, and to arrange the narrative of successive events, and still more of successive opinions, according to the relation they bear to principles of established influence, was an attempt of which few in that age had any conception, and of which Brucker certainly had none. In civil history it was then believed that the historian had fulfilled all the duties of his office it he strung together the events which were known or believed to have occurred, in good language, and garnished them occasionally by a few general reflections on the absolute motives of human action. A very different notion is now held of the functions of the historian. He who at present attempts to write the history of any country, must reflect, before he begins, what were the chief occurrences in that history, and what were the revolutions which the manners and constitution of that particular nation have undergone. He must bear with him, from the commencement to the conclusion of his labours, a constant impression that every occurrence should be more or less considered, not only as it took place, and as it bore an influence on contemporary affairs, but as it may have remotely contributed to the events, and the opinions, and the character of succeeding times. But if this be true in regard to the histories of particular nations, it is evident that, by how much the traces of opinions are more light and evanescent than those of events, by how much the speculations of philosophers whose writings have either perished or come down to us mutilated and obscure, are more difficult to be appreciated in their causes, and connections, and consequences, than the actions of warriors and statesmen,—by so much the more is it necessary in philosophical than in civil history to combine reasoning with erudition, and to substitute the researches of the philosopher for the details of the chronicler. History and philosophy are two different things; and he who would write the history of philosophy must excel in both. Bacon had long ago required this union, and had pointed out the manner in which the historian of literature should endeavour to establish those principles of connection which constitute the soul and charm of such a history; how, by detecting the union of effects and causes, he might be enabled to determine the circumstances favourable or adverse to the sciences; and how, in short, by a species of enchantment, he might evoke the literary genius of each different age. The fulfilment of this plan was, however, far beyond the capacity of Brucker, and was an undertaking of which he had even no conception. Better qualified by nature and education for amassing than arranging materials, he devoted his principal attention to a confused compilation of facts, leaving to others their application, the discovery of their mutual connections, and the formation of the scattered fragments into a whole.

The merit of his great work consists entirely in the ample collection of materials. The reader who would extract any rational view of the progress of opinion must peruse it with a perpetual commentary of his own thoughts. He will find no assistance from his author in forming any general views, or in tracing the mutual dependencies of the different parts of the subject. Brucker has discovered the fountains of history, but he has made us drink of them without purifying the draught. Even in this respect his merit has been greatly overrated. Vast as is the body of materials which he has collected, we are always missing those very things which we might reasonably have expected would have been the first objects of a rational inquirer, and we are continually disappointed of the information we are most anxious

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Brucker. to acquire. The idle and slavish attention which he has bestowed on previous compilers, has frequently diverted him from the study of the original authors themselves. Quoting the passages of the ancients from others, or trusting perhaps to the reference of an index, he has frequently overlooked those very testimonies which could have given us the most authentic knowledge of the opinions or characters of ages and individuals. He has often presented the authorities he has adduced, mutilated or misapplied; and this either from not having sufficiently studied these passages in their general connection with the system they illustrate, or from having been unable to withdraw them from the obscurity in which they were involved. He has shown no critical sagacity in distinguishing the spurious from the authentic, or in balancing the comparative weight of his authorities. He has frequently transcribed where he ought to have explained the words of the original authors; and, without taking into account the different value of the same term in different nations and ages, he has left us to apply a doubtful or erroneous meaning to words which might have been easily rendered by other expressions, and to suppose a distinction in the sense where there only existed a difference in the language. The glaring errors, even, which occasionally occur in his expositions of the Grecian philosophy, while they are inconsistent with any critical knowledge of the tongue, would make us suspect that he was in the habit of relying on the treacherous aid of translations. In short, if we knew nothing more of the ancient philosophers than what we acquire from Brucker, we should be often obliged to attribute to them opinions so obscure, or so absurd, that we must either believe ourselves wrong in the interpretation, or be unable to comprehend the cause of all the admiration and reverence they have received.

He has discovered little skill in his analysis of the different systems of philosophy; and the confusion of what is essential and principal with what is accidental and subordinate clearly evinces that these abridgments were thrown together while acquiring, in detail, a knowledge expressly for the purpose, instead of being the consummation of a long and familiar meditation on the subjects in all their modifications and dependencies. He has dwelt with the most irksome minuteness on every unimportant and doubtful circumstance in the lives of the philosophers; but he has too often overlooked the particular and general causes that produced an influence on the destinies of their philosophy. The aphoristic method which he has adopted prevents him from following a consecutive argument throughout its various windings. The most convincing reasoning in his hands loses much of its demonstration and beauty; and every ingenious paradox comes forth from his alembic a mere caput mortuum.—a residue from which every finer principle has been expelled. Where the genius of the philosopher is discovered more in the exposition and defence than in the original selection and intrinsic stability of his tenets, Brucker has not found the art of doing justice both to the philosopher and his opinions, or of conveying to the reader any conception of the general value of the original. This last defect, it must, however, be acknowledged, is more or less inseparable from every abstract of opinions, where it is always necessary to separate in some degree what is essential to the subject from what is peculiar to the man. He has relieved the sterility of his analysis by none of the elegancies of which the subject was susceptible. Without any pretension to purity, his diction is defective even in precision; and his sentences, at all times void of harmony and grace, are abrupt, and often intricate in their structure.

The person, therefore, who would attempt to write a history of philosophy without the imperfections of that of Brucker, must draw from obscurity many important facts hitherto omitted, he must arrange and combine these in a more perspicuous order; and, above all, he must review the

opinions he shall thus relate and methodize with a more accurate criticism. He ought not to write of Peripatetics like a disciple of Aristotle, of Platonists like a pupil of Proclus, nor of the doctrines of the Porch like a follower of Zeno. Still less must be compare the tenets of one sect by the principles of another; or endeavour to estimate doctrines, dubious in themselves, by reference to a standard equally arbitrary and contingent. He must place himself, to use the language of Lucretius, upon the highest pinnacle of the temple of science, from which he may look calmly back, and compare and study the doctrines of all these departed sages, without being himself involved in the partialities of particular sects or opinions,-

> Despicere unde queat alios, passimque videre Errare, atque viam palanteis quærere veri.

He must honour the genius of all alike, and believe that all are deserving of commendation, although all are more or less subject to error. He ought, in short, to be a philosopher superior even to the prejudices of philosophy.

If we take a survey of what has been attempted since the death of Brucker in accomplishing a more perfect history of philosophy, we shall find that more has been done in illustrating the philosophical tenets of particular sects, or the progress of particular portions of science, than in giving a comprehensive view of the general history of thought. In France, in Italy, and in our own country, those who have laboured in this department, far from being able to correct the errors of Brucker, have, in general, through defect of erudition, been wholly indebted to his industry for their materials, and have been content to rely on his accuracy with more than Pythagorean faith. If we except some ingenious speculations, which are more of the nature of philosophical essays on the history of philosophy, and which endeavour rather to illustrate the general spirit than to detail the particular opinions of the philosophers, there is nothing valuable on this subject to be found in the literature of these countries. Among the learned of his own country Brucker has never enjoyed a very distinguished reputation; and the Germans, while they were the most capable of discovering his defects, have had the honour of most sedulously and successfully endeavouring to supply them. We are indebted to them especially for many valuable treatises on the history of particular portions of philosophy, in which we find at length a profound reasoning united to an extensive and original erudition. The works of Meiners, Fulleborn, Tiedmann, and perhaps Buhle, deserve especially to be distinguished. An undertaking, however, which, from the extent of its plan, as well as the ability of its execution, claims particular notice, is the History of Philosophy, by Professor Tenneman of Jena. This work, as far as it is completed, affords us the most accurate, the most minute, and the most rational view we yet possess of the different systems of philosophy, in their intrinsic and relative bearings. The author has not only given us a minute analysis of each system, the result of a profound and familiar study of the original philosopher, but he has also displayed to us his philosophy, divested of its peculiarities, and compared with others by a general and impartial review. The main defect of this work, at least in reference to readers not German, is, that, like Buhle and the other disciples of Kant, he has taken the critical philosophy as the vantage-ground from which to make his survey of all former systems. Thus the continual reference to the peculiar doctrines of the school of Kant, and the adoption of its language, render it frequently impossible for those who have not studied the dark works of this modern Heraclitus to understand the strictures of Tenneman on the systems even of Aristotle or Plato.

BRUGES (in Flemish BRUGGE), a city of Belgium, capital of West Flanders, is situated in the midst of a fertile plain, intersected by the canals of Ghent, Ostend, and Sluys, in Lat. 51. 12. N. and Long. 3. 13. E. It is direct

Bruin

Bruges.

about 7 miles from the sea, 12 miles east of Ostend, 24 N.W. of Ghent, and 60 miles in the same direction from Brussels. The history of Bruges dates from a very remote period. In the seventh century of the Christian era it had emerged into importance; and its corporation of weavers, which in the best days of Bruges numbered 50,000 men, were already highly renowned in the time of Charlemagne. In the ninth century Bruges became subject to the counts of Flanders, who resided there, and made this city one of the most populous and wealthy in Europe by the great advantages and immunities which they offered to merchants and manufacturers. The privileges which the inhabitants sometimes received and sometimes exacted from their rulers, they guarded with the most jealous care, and not unfrequently rose in arms for their defence. Though Bruges, and Ghent, and other Flemish towns, owned a common lord, their interests were never identified, and they seldom let an opportunity pass of doing each other as much injury as possible. The ruinous consequences which this selfish policy entailed upon some of these cities, are admirably unfolded in Henry Taylor's Drama of Philip van Artevelde. From the ninth to the middle of the fourteenth century, Bruges was subject to the counts of Flanders. At that latter date it passed by marriage under the dominion of the dukes of Burgundy, under whom it attained the culminating point of its prosperity. The magnificence of the Flemish court during the entire period of its prosperity was such that no European monarch could equal or approach it. When the wife of Philippe-le-Bel of France visited Bruges at the beginning of the fourteenth century, so greatly was she impressed with the display of wealth and splendour, that she exclaimed, "There are hundreds here who have more the air of queens than myself." To such an extent was this extravagance ultimately carried, that Charles V. was obliged in the sixteenth century to repress it by severe sumptuary laws. In 1430, Philippe-le-Bon, Duke of Burgundy, instituted at Bruges the chivalric order of the Golden Fleece, a compliment to the town, no small portion of whose prosperity arose from its woollen trade. In the fourteenth and fifteenth centuries, Bruges was the chief emporium of the cities of the Hanseatic league. Merchants from every quarter of the world found here a ready market for their goods. The rich argosies of Venice and Genoa came laden with the valuable produce of the East; ships of every nation took in and discharged their cargoes at the quays; the warehouses were filled with bales of wool from England, and silk from Persia. Not the least famous of the manufactures was that of tapestry, in which the people of Bruges acquired great skill a century before the looms of Beauvais or the Gobelins were set up. The prosperity of Bruges was undiminished till it passed under the dominion of the house of Hapsburg. For a violation of some of their prerogatives, the inhabitants imprisoned the Archduke Maximilian. A terrible vengeance was inflicted upon the town for this outrage. Its trade was transferred to Antwerp, and its ruin was ultimately completed by the religious persecutions of the bloody Duke of Alva at the end of the sixteenth century. Such of the inhabitants as escaped with their lives fled to England and introduced into that country many of the arts and manufactures which they and their forefathers had cultivated for many generations with such success. The contrast between the Bruges of the fifteenth century and the Bruges of our own day is as striking as it is painful. The present condition of the town is such as amply to justify the description of Wordsworth:

> "In Bruges town is many a street Whence busy life hath fled, Where, without hurry, noiseless feet The grass-grown pavement tread."

The great circumference of the city, its numerous squares and streets, and the number and magnificence of its public buildings, all

attest its former importance; while its scanty population, the absence of commercial life and enterprise, and the general air of desolation in which everything is enveloped, bear witness to its present insignificance. Its trade has of late years, however, begun to Brumoy. rovive, and its great advantages in canal and railway communication, its spacious docks and excellent quays, and the great fertility of the surrounding country, may once more, perhaps, restore it to its high place among cities. Of the public buildings of Bruges the most remarkable are the Church of Notre Dame, containing a sculpture of the Virgin and Child, said to be by Michael Angelo, effigies in copper of Charles the Bold and Mary of Burgundy, who are buried in the church; the cathedral of St Sauveur, built of brick, but internally the handsomest church in Bruges, with some fine pictures by Hemling and Peter Porbus; the hospital of St John, a charitable institution, where sick persons are attended by the sœurs de la charité; and the Hôtel de Ville, a small but handsome edifice, in the niches of which were statues of the old counts of Flanders, destroyed by the French revolutionists in 1792. The belfry-tower in the great square is the most beautiful structure of the kind in Europe, and its chimes are the best in Belgium, where indeed all the chimes are good. It is still used as a convenient place from which the alarm can be communicated to all parts of the city in the case of fire, which is done during the day by a flag and at night by a lantern. In this same square is a house in which Charles II. resided during his exile from England. There is a convent of Béguins, and another of English Augustin nuns. The town is likewise well provided with the means of education. There is a medical school, to which is attached a museum of natural history and a botanical garden. For the higher departments of school training there is an excellent athenæum, annually subsidized by government. The Academy of Painting is in a very flourishing condition, and offers many advantages to the student, as instruction is given gratis in drawing and architecture. The charitable institutions of Bruges are both numerous and well organized. They are all the more necessary, as the number of persons in the city requiring support amounts to more than 5000. In the poor-house alone there is accommodation for nearly 600 individuals, and it is almost always completely filled. The most important manufacture in Bruges is that of lace, in which nearly one-seventh of the population is engaged. It is now, however, beginning to decline. The other manufactures consist of linens, woollen and cotton goods, soap, leather, and tobacco. There are also some small breweries and distilleries, and some dyeing and bleaching establishments. All these are, however, comparatively unimportant. The exports from Bruges comprise the products of the rich agricultural district that surrounds the town; the imports include metals, dyewoods, wines, cotton, and wool. Despite the number of canals, the inhabitants of Bruges are very ill supplied with water for domestic purposes; every house is accordingly provided with a tank or but to receive the rain that falls. The water collected in the public tanks is distributed through the city in pipes. Of the canals the largest is that to Ostend, wide and deep enough to allow vessels of 500 tons to pass up from the sea. The ramifications of these canals intersect the city in all directions, and are crossed by upwards of fifty bridges, whence the Flemish name of the town is derived. Pop. in 1838, 44,374; in 1846, 49,308; in 1851, 50,698.

BRUIN, or Bruyn, John DE, professor of natural philosophy and mathematics at Utrecht, was born at Gorcum in 1620. His skill in the dissection of animals was remarkable, and he was a skilful experimenter. He also made observations in astronomy. He published dissertations De vi altrice; De corporum gravitate et levitate; De cognitione Dei naturali; De lucis causa et origine, &c. In a dispute with Isaac Vossius, he wrote a letter, printed at Amsterdam in 1693, in which he criticises Vossius's book De Natura et Proprietate Lucis, and strenuously maintains the hypothesis of Descartes. He died in 1675, after he had been professor twenty-three years; and his funeral oration was pronounced by M. Grævis.

BRULLIOT, FRANZ, an engraver, and the author of a laborious work entitled Dictionnaire des Monogrammes, Chiffres, et Lettres Initiales des Graveurs, was born at Dusseldorf in 1780. On being appointed assistant-keeper of the royal collection of prints at Munich, he devoted himself to this valuable work, which appeared at Munich in 1817 in one 4to volume. He died of cholera in 1836.

BRUMOY, PIERRE, a learned Jesuit, born at Rouen in 1668, was early distinguished by his talents for the belleslettres. He was a man of estimable character, and beloved Brunel.

for his integrity and goodness of heart. He wrote many works; but his fame rests at present on his *Théâtre des Grecs*, which is a prose translation of the Greek dramatists, with an analysis of their merits, and dissertations on the Greek stage. He died at Paris in 1742.

BRUN, CHARLES LE. See LEBRUN.

Brun, or Brunn, Malte-Conrad, a celebrated modern geographer, was born at Thisted in Jutland, August 12, 1775. He was originally destined for the church, but his inclination led him strongly to literature and politics. When the French Revolution broke out, he advocated the principles of it so boldly, that he attracted the attention of the Danish government, and was obliged to retire to the island of Huen, which had once been the residence of Tycho Brahe. After an exile of two years he was allowed to return to Copenhagen, where he again signalized himself by the violence of his hostility against the government. Deeming it unsafe to await the vengeance of the authorities, he fled to Hamburg, where he learned that his works had been condemned and himself formally expelled the kingdom. From Hamburg he went to Paris, where he hoped that his political views would gain the favour of the first consul. Disappointed in this expectation, he devoted himself entirely to the study of geography and history. Along with Mentelle, the most popular French geographer of the day, he published the Geographie Mathématique, Physique, et Politique, in 16 vols. 8vo, 1803-5. Of this work, on which his fame partly rests, he contributed one-third. In 1806 he became joint editor of the Journal des Débats, for which he wrote many valuable papers, afterwards collected and republished by Nachet. In 1810 he published the first volume of his Précis de la Geographie Universelle, the last and most valuable volume of which did not appear till 1825. The intensity of his application had, meanwhile, exercised a most injurious influence on his health, which at last rapidly gave way. He died of apoplexy, December 14, 1826. Besides the works already mentioned, he wrote many others, poetical, scientific, and political.

BRUNCK, RICHARD FRANÇOIS PHILIPPE, an eminent French scholar, was born at Strasburg, 20th December 1729. He was educated at the Jesuits' college at Paris, but having early entered the public service, he soon forgot his Latin and Greek. At the age of thirty he returned to his native town and resumed his studies, paying especial attention to Greek. The nature of the office which he held put considerable sums of money at his disposal, which he expended in publishing editions of the Greek classics. The first work which he edited was the Anthologia Græca, in which his innovations on the established mode startled European scholars. For wherever it seemed to him that an obscure or difficult passage might be made intelligible and easy by a change of text, he did not scruple to make the necessary alterations, whether the new reading were supported by manuscript authority or not. With the assistance of Schweighæuser, then an unknown youth, he next brought out editions of the Greek dramatists, characterized by the same peculiarities as the Anthologia, and ultimately the Gnomici Poetæ Græci. In 1781 he published an edition of Virgil, for which he was pensioned by the French king. At the outbreak of the French Revolution, in which he took an active part, he lost his pension and was reduced to such extremities that he was obliged to sell a portion of his library. In 1802 his pension was restored to him, but too late to prevent the sale of the remainder of his books. He had brought out an edition of *Plautus* in 1788, and was in the act of republishing it when he died, June 12, 1803.

BRUNDUSIUM, or Brundisium. See Brindisi.

BRUNEL, SIR MARC ISAMBART, was born in 1769, at Haqueville, in Normandy. His family had for several centuries held a respectable station in the province, living as farmers and small landowners on the estate on which he was

born, and numbering among its members Nicholas Poussin, of whom France is so justly proud. He was educated at the seminary at Rouen, with the intention of his entering holy orders; but his predilection for the physical sciences was so strong, and his genius for mathematics and mechanics so decided, that, on the advice of the Superior of the establishment, he was removed, to follow a more congenial career. His father then destined him for the naval service, which he entered on the appointment of the Mareschal de Castries, the minister of marine, and made several voyages to the West Indies. In this position, although only in his fifteenth year, his mechanical talents developed themselves actively on many occasions, and he surprised his captain by the production of a sextant of his manufacture, with which he took his observations. On his return to France, in 1792, he found the Revolution at its height, and, like all who entertained royalist principles, was compelled to seek safety in emigration, which, with considerable difficulty, he accomplished, and found refuge in the United States of America, where, driven by necessity to the exercise of his talents as a means of support, he followed the bent of his inclination and became a civil engineer and architect. His first engagement was on the survey of a tract of land near Lake Erie; he then became engaged in cutting canals, and was employed to erect an arsenal and cannon foundry at New York, where he applied several new and ingenious machines. His highly ornamental design for the House of Assembly at Washington was rejected, as being inconsistent with the simplicity of a republic: he was, however, engaged to design and superintend the construction of Bowery Theatre, New York, since destroyed by fire; the roof of which was peculiar and original.

The idea of substituting machinery for manual labour in the making of ships' blocks had long occupied his mind; and, in 1799, having matured his plans, finding the United States unable to afford full occupation for his inventive genius, he determined on visiting England. Earl St Vincent was at that time at the head of the Admiralty, and after the usual delays and difficulties, which were ultimately overcome, chiefly through the powerful influence of his steady friend and patron Earl Spencer, and aided by the recommendation of Brigadier-General Sir Samuel Bentham, who at once perceived and appreciated the merit of the machines and the talent of the inventor, the system was adopted, and eventually the beautiful and effective machinery was erected, which has continued to the present time, without alteration, to produce nearly all the blocks used in the royal navy. The construction of these machines was intrusted to the late Mr Henry Maudslay, whom with true discrimination he selected for the purpose, and by whom he was ably assisted. beautiful simplicity of these machines, their perfect adaptation to their various purposes, and, notwithstanding the recent advances in mechanics, their continuing for nearly half a century in active work, without any improvements having ever been suggested, must rank them as among the most complete and ingenious pieces of mechanism ever invented.

A description of these well-known machines would be superfluous here; but it should be remarked, that in them are combined all the motions and functions since so universally applied to machines for working metals, the introduction of which into engine and machine factories has induced the substitution of machinery for manual labour, and has tended so essentially to secure for English machinery the deservedly high reputation which it has acquired.

The block machinery was completed in 1806, and it was estimated that the economy produced by it in the first year was about L.24,000, two-thirds of which sum were awarded to the ingenious inventor, who was soon after engaged by the government to erect extensive saw-mills, on improved principles, at Chatham and Woolwich; when he suggested modifications of the systems of stacking and seasoning tim-

Brunel. ber, which, it is understood, are, after this lapse of years, to be carried into effect. Some time previously, he invented the ingenious little machine for winding cotton-thread into balls, which, simple as it may at first sight appear, has exercised great influence in the extension of the cotton trade.

He found time also to invent an instrument for combining the use of several pens, for producing simultaneously a number of copies of a manuscript; a simple and portable copying machine; a contrivance for making the small boxes used by druggists, which had been previously imported in large quantities from Holland: a nail-making machine also occupied his attention; and he discovered the system of giving the efflorescent appearance to tinfoil, by which it was fitted for ornamental purposes.

Among other more important improvements, must be mentioned that of cutting veneers by circular saws of large diameter; and to that is mainly due the present extensive application of veneers of wood to ornamental furniture.

A short time before the termination of the war, he devised the system of making shoes by machinery; and, under the countenance of the Duke of York, the shoes so manufactured, in consequence of their strength, cheapness, and durability, were introduced for the use of the army; but at the peace in 1815, manual labour becoming cheaper, and the demand for military equipments having ceased, the machines were laid aside.

Steam navigation also attracted his attention, and he became deeply interested in establishing the Ramsgate steam vessels, which were among the first that plied effectively on the river Thames; and on board of them it is believed that the double engines were first used. About this period, after much labour and perseverance, he induced the Admiralty to permit the application of steam for towing vessels to sea, the practicability of which he had strenuously urged. The experiments were tried chiefly at his own expense, a small sum in aid having been promised, but it was eventually withdrawn before the completion of the trials; the Admiralty considering the attempt "too chimerical to be seriously entertained."

He introduced various improvements in the steam-engine, and for nearly ten years persevered in the attempt to use liquefied gases as the source of motive power, in which he was ably assisted by his son. The necessary experiments were most laborious, and needed all the persevering energy and resources of a mind determined not to be foiled: in spite, however, of his efforts, after a great sacrifice of time and money the plan was abandoned.

He furnished designs, also, for some suspension bridges, which, being for peculiar localities, exposed to the violence of hurricanes in the Isle of Bourbon, exhibited, as usual, some original features.

The whole power of his mind, however, was soon to be concentrated on one great object,—the construction of the tunnel for traversing from shore to shore beneath the bed of the river Thames. It is said that the original idea occurred to him, as applied to the Neva at St Petersburg, in order to avoid the inconvenience arising from the floating ice; a plan which he offered to the emperor Alexander, on

the occasion of his visit to this country in 1814.

Undismayed by the previous signal failures in the attempt to tunnel beneath the Thames, Brunel, confident in his own powers, persevered in his efforts, and in 1824, under the auspices of F. M. the Duke of Wellington, who always entertained a favourable view of the practicability of the scheme, a company was formed for its execution; and after numerous accidents, and suspensions of the works, accounts of which were frequently laid by Sir Isambart before the Institution of Civil Engineers, and are recorded in the

Minutes of Proceedings,1 this great and novel undertaking was successfully accomplished, and opened to the public in the year 1843.

Brunel.

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Brunn.

In the prosecution of this work he received great assistance from his son, Mr I. K. Brunel, V. P., and in a scientific point of view, the construction of the tunnel will be regarded as displaying, at the same time, the highest professional ability, an amount of energy and skill rarely exceeded, and a fertility of invention and resources, under what were deemed insurmountable difficulties, which will secure to the memory of Sir Isambart Brunel a high position among the engineers of this country.

He received the order of the Légion d'Honneur in 1829, and the honour of knighthood in 1841. He was a corresponding member of the French Institute, and a fellow of the Royal Society, and joined the Institution of Civil Engineers as a member in the year 1823, constantly attending all the meetings, giving accounts of the progress of his works, bringing forward subjects, taking part in the discussions, serving ca. the council for some years, and aiding in the advancement of the society by every means in his power.

He was unaffected and simple in his habits, and possessed indomitable courage, perseverance and industry; whilst his general benevolence of disposition constantly prompted him to the kindest acts, as it did to the forgiveness of in-jury or slight offered to him. His labours had so seriously impaired his health, that for some years after the completion of the tunnel he was unable to mix in active life, and he expired on the 12th of December 1849, in his 81st year, after a long illness, as much regretted as he had been loved and respected by all who knew him.

BRUNELLESCHI, FILIPPO, the restorer of ancient architecture in Italy, was the son of a notary of Florence, where he was born in 1377. He early adopted architecture as a profession, and went to Rome with Donatello to pursue his studies. The splendid edifices with which he adorned his native town gained him much fame throughout Italy; and the pope for the time being, Eugene IV., sent for him to the court to draw up designs and assist him with his advice on professional matters. He was the original architect of the Pitti Palace, and of the still more magnificent palaces of the Strozzi and Riccardi on the opposite bank of the Arno. He died in 1444.

BRUNI, LEONARDO, author of the History of Florence, was an eminent scholar of the fifteenth century. He was born at Arezzo in 1369, and is generally known as L. Aretino. He was secretary to the papal chancery under Innocent VII. and John XXII. His history of Florence comes down to 1404. Bruni died at Florence in 1447, and was buried at the expense of the state in Sta. Croce, where his laurelled statue is still to be seen.

BRUNN, a circle in the Austrian province of Moravia, extending over 4437 square miles, and having in 1851 an estimated population of 874,528. The northern part of the circle is a portion of the Moravian mountain range, which abounds in mineral wealth. Between the mountains the land is highly productive in corn and cattle. It is the chief manufacturing district of the imperial dominions, and produces good woollen, linen, and cotton goods of all descriptions.

Brunn, the capital of the above circle, as well as of the province of Moravia, stands between and on the declivities of two hills at the confluence of the Schwarza and the Zwittawa, 69 miles north of Vienna, and 115 miles W.S.W. of Prague, with both of which it is connected by railway. Lat. 49. 11. 28. N. Long. 16. 36. 35. E. It is surrounded. by walls and trenches, and possesses numerous fine buildings; but the streets are narrow and crooked, though well paved. The citadel of Spielberg, standing on the hill of the

¹ Vide Minutes of Proceedings, Inst. C.E., vol. i. (1837) p. 32; vol. i. (1838) pp. 5, 23, 41, and 46; vol. i. (1839) p. 44; vol. i. (1840). p. 85; and vol. ii. (1843) pp. 29 and 80.

same name west of the town, has been used, since its fortifications were destroyed by the French, as a state prison, and Brunswick here Silvio Pellico was confined for eight years. Among the public buildings are the cathedral, the fine Gothic church of St James, built in 1215, with a tower 276 feet high, the barracks, city-hall, theatre, bishop's palace, governor's house, park, and public gardens. Brunn is the seat of the chief legal and military courts of the province, of a bishop, and a Protestant consistory; and has a philosophical institution, theological seminary, gymnasium, several academies, schools, and learned societies, museum, botanic garden, agricultural society, infirmary, orphan and lunatic asylums, deaf-mute institution, &c. Its manufactures of woollen goods are the most extensive in the Austrian dominions. It has also considerable manufactures of silk and cotton goods, leather, tobacco, &c., and is the centre of a large trade. Pop. 42,000, exclusive of the military, who may amount to 3000.

> BRUNO, the founder of the Carthusian order of monks was born at Cologne about the year 1030. He was educated at Cologne, and afterwards at Rheims, where he became so distinguished by his learning and piety, that he was appointed to superintend the studies in all the chief schools of the diocese. Among his pupils, many afterwards became distinguished, and in the number was Pope Urban II. In 1084, after some disputes with Manasses, the archbishop of Rheims, he retired into the desert of Chartreuse, where, with six companions, he built an oratory, with cells at a little distance from each other. After a residence of six years in this spot, he went to Rome, where his old pupil Urban_II., pressed him to accept the archbishopric of Reggio. He declined this honour, and withdrew into the solitudes of Calabria, where he remained with his disciples till his death in 1101. He wrote treatises on the Psalms and some of the Epistles of St Paul, but none of these works have descended to our times.

Bruno, Giordano, was born at Nola, in the kingdom of Naples. About the year 1582 he began to call in question some of the tenets of the Romish church, which occasioned his retiring to Geneva; but after residing there for two years, his open aversion for Calvinism occasioned his expulsion from that city. Having staid some time at Lyons, Toulouse, and Paris, he came to London, and continued two years in the house of M. Castelnau, the French ambassador. He was well received by Queen Elizabeth and the court, numbering among his friends Sir Philip Sydney and Sir Fulk Greville. With these and some others Bruno had frequent meetings; but as they treated of subjects of a very delicate nature, which could not suit the taste or capacity of everybody, none but select persons were admitted. Bruno's Spaccio della Bestia Trionfante was printed in 8vo, 1584, and dedicated to Sir Philip Sydney. From England he went to Wittemberg, and thence to Prague, where he printed several tracts, in which he openly avowed atheistical principles. After visiting some other towns in Germany, he made a tour to Venice, where he was apprehended by order of the inquisition, sent to Rome, tried, and condemned; and having refused to retract, he was burnt at the stake, Feb. 1600.

BRUNSWICK, DUCHY OF (German Braunschweig), a state of Northern Germany, consisting of three larger and several smaller portions of territory, lying principally between Lat. 51. 38. and 52. 28. N., and Long. 9. 20. and The principal part containing the cities of Brunswick, Wolfenbüttel, Helmstedt, &c., is situated between Hanover and Prussia, to the S.E. of the former. Its surface is diversified with hills and plains, with occasional patches of forest. That part containing Holzminden, Gandersheim, &c., extends eastward from the Weser to Goslar, and is intersected by branches of the Hartz mountains. That containing Blankenburg, &c., lies to the S.E. of the

two former, between Prussia, Anhalt, and Hanover, and is Brunswick. traversed by the Hartz mountain range. Of the smaller portions, some are in Hanover and others in Prussia.

Brunswick has an area of 1524 English square miles, and is divided into 6 circles, comprehending 12 cities, 16 market-towns, and 440 villages. The population, according to government returns, was in 1834, 253,232, and in 1846, 269,228; and according to the Almanach de Gotha, was in December 1852, 270,825. Of these about 265,000 are Protestants, the rest being chiefly Roman Catholics and

Circles.	Extent in square miles.	Population.		
		1834.	1846.	1852.
Brunswick	224	61,232	<b>6</b> 8,888	69,702
Wolfenbüttel	230	50,423	52,768	52,662
Helmstedt	305	41,155	42,931	44,312
Holzminden	316	41,290	40,232	39,400
Gandersheim	276	39,277	42,772	42,257
Blankenburg	173	19,855	21,637	22,492
	1524	253,232	269.228	270.825

Brunswick has also mediatized possessions in Prussian Silesia, viz., the principality of Oels, with the lordship of Medzibor, the territory of Plomnitz in the government of Breslau, and the lordship of Gutentag in the government of Oppeln. The climate resembles that of the neighbouring territories of Hanover, and in the higher parts is rigorous. A portion of the Hartz chain is common to it with Hanover, and hence called the Communion Hartz. The highest point of the Hartz mountains in Brunswick is the Wormberg, 3230 feet in height. The principal rivers by which it is watered are the Ocker, Weser, Aller, and Leine. The lower parts are generally fertile and well cultivated; but the higher are mostly covered with extensive forests of fir, oak, and beech. The following is the proportion per cent. of the various kinds of surface in the duchy, viz., arable, 32.66; garden, 1.88; meadow, 4.52; pasture, 22.82; water, 0.25; wood, 31.82; towns, villages, and roads, 6.05. Agricultural and pastoral pursuits constitute the principal employment of the inhabitants. In 1848 the duchy, with the exception of the towns of Brunswick and Wolfenbüttel, contained 24,676 horses, 68,641 cattle, 365,291 sheep, 47,737 swine, 17,975 goats, and 72,978 geese. The principal products of the country are grain, flax, hops, tobacco, and fruits. Mining is extensively carried on in the Hartz mountains, the products of which are very valuable, consisting of copper, lead, iron, gold, silver, sulphur, coal, salt, and alum. The manufactures, which are very inconsiderable, consist chiefly of linen and woollen goods, leather, beer, paper, and tobacco. An active trade, however, is carried on by means of the railways connecting it with Hanover, Magdeburg, and Neustadt.

The government is an hereditary monarchy, with a legislative chamber consisting of 48 members, of whom 10 are chosen from the nobility, 12 from the towns, 10 from the rural districts, and 16 from the general population. They hold office for six years, one-half going out trienni-The educational institutions are an ecclesiastical seminary, a higher humanity and a mercantile institution, an anatomical and surgical college, 5 gymnasia, a normal seminary, 21 burgher and about 400 village schools.

Brunswick occupies the thirteenth place in the German confederation, has two votes in the plenum assembly, and contributes 2096 men to the federal army. The revenue and expenditure for the triennial financial period 1852-54, were each fixed at 4,052,500 thalers; and the public debt on 1st September 1845, was 6,444,349 thalers. The effective force consists of 2702 men in time of peace, and 5359 during war.

In the earlier part of the middle ages, Brunswick, with Hanover, formed part of the ancient Saxony. The mora

Brunswick immediate ancestor of the house of Brunswick was Henry the Lion, who in the twelfth century held the united duchies of Bavaria and Saxony; but having refused to aid the Emperor Frederic Barbarossa in his wars with the pope, he was by decree of the diet in 1180, deprived of both duchies, and only left the possession of his allodial domains of Brunswick and Lüneburg. These possessions were, on the death of Ernest the Confessor in 1546, divided between his two sons; the elder, or rather his son Augustus, receiving Brunswick-Wolfenbüttel, or Brunswick, and the younger Brunswick-Lüneburg, or Hanover. The ducal residence, which had hitherto been at Wolfenbüttel, was in 1754 removed to Brunswick by Duke Charles. His successor, Duke Charles William Ferdinand, married Augusta, daughter of George III. of England. He commanded the Prussian troops at the battle of Auerstädt in 1806, where he was severely wounded and soon after died. His possessions were immediately seized by the conqueror, and formed part of the kingdom of Westphalia till 1813. After the battle of Leipzig, the duchy was restored to its rightful possessor, Frederic-William, youngest son of the preceding duke. This prince fell at the head of his troops at Quatre Bras, and was succeeded by Charles Frederic, the elder of his two sons, who, being at that time a minor, was placed under the tutelage of George IV. of England, then prince regent. The duke entered on the exercise of his authority in October 1823; but in consequence of a revolution in 1830, was obliged to abdicate in favour of his brother William, the present duke. Treaties of mutual inheritance exist between the houses of Hanover and Brunswick, and should the present duke and his brother-both of whom are still unmarried—die without issue, the duchy will pass to the house of Hanover. See GERMANY and HANOVER.

Brunswick, the capital of the above duchy, is situated on the Ocker, 35 miles E.S.E. of Hanover, and 47 W.N.W. of Magdeburg, with both of which, as well as with Neustadt, it is connected by railways. Lat. 52. 16. N. Long. 10. 32. E. It is said to have been founded about 868 by Bruno, from whom it was called Bruno Vicus. It was afterwards enlarged and adorned by Henry the Lion, and soon became one of the most important cities of Northern Germany. In the thirteenth century it ranked among the first cities of the Hanseatic league. After this, however, it declined in consequence of the many divisions of territory among the branches of the reigning house, the jealousy of the neighbouring states, the thirty years' war, and more recently from the French occupation. The two celebrated fairs held annually in February and August, and which formerly attracted many thousands of strangers, only bring together a few hundreds. It is still, however, a place of considerable importance. The city is of an antiquated appearance, but has several fine new streets, and the old fortifications have been converted into agreeable promenades. Among the fine edifices are the new palace, a handsome Greek structure occupying the site of the former ducal residence, which was burned in 1830; the cathedral of St Blaize, built by Henry the Lion, the town-house, St Andreas church, with a spire 318 feet high, St Catherine's church, the museum, opera-house, mint, &c.; with several fountains and monuments, one of which, in memory of the late duke who was slain at Quatre Bras, is 60 feet high. It has several educational and charitable institutions, and a considerable trade. In December 1852 it had, exclusive of the military, 37,694 persons, 7508 families, and 3194 inhabited houses. Including the military in the garrison, it has a population of about 40,000.

BRUNSWICE, a post-town of Maine, in Cumberland county, United States, on the Androscoggin river. Long. 69. 55. W. Lat. 43.53. N. It is the seat of Bowdoin College and a medical school, and has a considerable trade in timber. Pop. 4976.

There is also a small seaport of this name, capital of the county of Glynn, state of Georgia, on the river Turtle, 168 miles S.E. of Mill Edgeville. Its harbour is spacious and safe, and accessible to vessels drawing not more than 13 feet at low tide.

BRUNTISLAND. See BURNTISLAND. BRUSH, a well-known implement used for various purposes, such as clearing away dust, smoothing or polishing surfaces, &c. Ordinary brushes are made of small bundles of bristles or hairs, secured at one end by a ligature; and this knotted end is set with glue or cement into a wooden stock, which is shaped and pierced with holes for the purpose. A patent was obtained in 1830 for several improvements in the construction of brushes. Of these the chief feature consists in pressing the knotted ends of the bundles into wedge-shaped grooves in the stock; after which they may be further secured by being covered with a ferule of metal or a wooden pallet. Small brushes are generally made by doubling the hair or bristle, and bringing it through the holes in the stock, by means of a thread or wire which is engaged in the fold, and serves to secure it; after which

the bristles are cut even. Brushes vary greatly in their size, form, and materials of construction, according to the several uses to which they are applied. Silversmiths and other artificers use a wirebrush for scrubbing silver, copper, or brass, previous to gilding. In some countries the bamboo or other fibrous plant is converted into a kind of brush, for painting and similar purposes, by fretting the extremity by beating, and then binding it firmly above the part so treated.

Brush, among sportsmen, the tail of a fox.

Brush-Wheels, wheels which act on each other by means of bristles or brushes fixed on their circumference; or simply by the friction of their plane surfaces, in which case the surfaces in contact are usually covered with hempen or leathern belts, and are kept closely pressed together by a spring. Brush-wheels are used only in very light machinery.

BRUSSELS (French, Bruxelles; Flemish, Brussel; German, Brissel,) capital of Belgium and of the province of Brabant, is situated on the small river Senne, about 50 miles from the sea, in Lat. 50. 51. N. Long. 4. 20. E. It lies in the midst of a beautiful and fertile country, and is picturesquely built on the top and sides of a hill, which slope down to the Senne. The general contour of Brussels is triangular, and is well defined by the boulevards, which occupy the site of the old fortifications, and completely encircle the town. The history of Brussels, though it does not date from so remote a period as that of other Flemish cities, can still be clearly traced back to the seventh century. At that time St Géry, bishop of Cambray, built a chapel on one of the small islands in the river, and by his eloquence and piety soon attracted a large congregation. The site being well adapted for building, a hamlet soon sprung up, which speedily became a town, which in the eleventh century was walled in and fortified. Though in commercial importance it did not at this time equal Ghent or Bruges, its traffic in cloth was very considerable, and its workers in iron and steel were not surpassed by any in Europe. In the fourteenth century the various trades were incorporated into guilds, who regulated the taxes and other financial matters of the city, and drew up a code of municipal laws, in which the principle of trial by jury was admitted. These arrangements had scarcely been completed, when a dreadful fire visited the city and nearly burnt it to the ground. At the end of this century a general persecution of the Jews in Europe took place. In Brussels, many of them were put to death, and the value of the confiscated property amounted to upwards of half a million sterling. At the beginning of the fifteenth century, Brussels was again visited by a destructive fire, from the effects of which it speedily recovered by the patriotic exertions of its rulers, and soon became more



Brussels. distinguished than ever as a seat of learning, art, and science. In 1489, and again in 1587, it was visited by the plague, which, on the former of these occasions, carried off many thousands of the inhabitants. Its horrors were further enhanced by the ensuing famine, which lasted for four consecutive years. Brussels was highly favoured by Charles V., who often resided there, and who finally abdicated his royal and imperial throne there in 1555. In 1567, the infamous Duke of Alva, acting under the orders of Philip II., attempted to establish the inquisition in Brussels, and oppressed the inhabitants otherwise so cruelly, that a rebellion ensued in the low countries, which resulted in the independence of the United Province, after much of the best blood of the land had been shed in the struggle. Amongst others who fell in the cause of freedom were the Counts Egmont and Horn. In 1598, Brussels passed into the dominion of the Austrians, and soon began once more to prosper. At the end of the seventeenth century, the French under Marshal Villeroy besieged Brussels, but were obliged to retire after doing much damage to the town; and in 1706 the city opened its gates to Marlborough. In 1746 it was again besieged by the French under Marshal Saxe, and after a siege of three weeks was obliged to surrender. In 1792 it fell into the hands of General Dumouriez, who being soon after defeated at Louvain, evacuated Brussels for a while, but again entered it in 1794. From that year till 1814, it remained in the possession of the French, as capital of the department of the Dyle. On the fall of Napoleon, Belgium and Holland were united into one kingdom under William of Nassau, and Brussels was the seat of government alternately with the Hague. In 1830, however, after a sanguinary conflict of three days, the Belgians declared their independence; and erecting their state into a separate kingdom, offered the crown to Leopold of Saxe-Cobourg, whose long and peaceful reign has greatly contributed to develop the resources of the country.

Brussels may be considered to consist of two parts, each presenting characteristics peculiar to itself. The upper part of the city is dry and healthy, and contains a very large number of handsome buildings, both public and private. The lower part is the more ancient and interesting of the two, but is damp, and in summer unhealthy, from the exhalations of the river, and the numerous canals which receive the sewerage of the town. In the former are situated nearly all the public offices, the royal palace, the chamber of deputies, the residence of the foreign representatives, and the principal hotels. In the latter are the Hôtel de Ville, and some of the best remains of the old Gothic architecture, while nearly all the trade and commerce of the town are carried on there. The facilities for commerce are, indeed, very considerable. Though the Senne is not navigable itself, it supplies water to some of the numerous canals that intersect the lower portion of the city. By these canals Brussels communicates with the great Belgic cities, Mechlin, Ghent, Bruges, and Antwerp, on the north, and with Charleroi on the south. It further enjoys the advantage of railway communication with France and Germany, and the chief towns of the Belgic dominions.

The total number of streets in Brussels is about 250, containing in all nearly 15,000 houses. These are, for the most part, well paved, well lighted, and abundantly supplied with excellent water. There are ten wells in the town, besides innumerable fountains and pumps. Some of the fountains are handsomely ornamented with sculptures in stone and bronze. Of these the best are Les Fontaines des Fleuves in the Hôtel de Ville; La Fontaine de Minerve in one of the great squares, and the Mannekin-pis behind the Hôtel de Ville. The safety of this last fountain is watched over with the most jealous care by the municipality of Brussels. Though gas is abundant and cheap at Brussels, some of the more inaccessible streets are still lighted up with oil-lamps. Some of the

streets are macadamized, but the majority of them are cause- Brussels. wayed, while the trottoirs are either flagged or paved with 'flint-stones. In the new town some of the streets are remarkably handsome; and as there is a considerable number of shops and cafés after the manner of Paris, they form the chief promenades of the inhabitants. In the old town they are for the most part dull and sombre. There are fourteen squares in Brussels, many of which are used as market places. Of these the largest are the Place du Grand Sablon, the Place Royale, and the Grand Place before the Hôtel de Ville. In this latter square the Counts Egmont and Horn were beheaded in 1568, by orders of the Duke of Alva, who surveyed their execution from the windows of the Brood-Huys (bread-house), a remarkable specimen of Gothic architecture still extant. In the Place de la Monnaie are the mint, the exchange, and the great theatre. In the Place des Martyrs, the heroes who fell in the Revolution of 1830 are interred. In the upper town is the parc, a fashionable promenade in summer. It covers an area of about 14 acres, and is beautifully laid out with walks, adorned at moderate distances with groups of sculpture; and as the trees with which it is planted shade it from the sun, the grass is always fresh and green. In the lower town is the Allée Verte, an equally fashionable promenade, parallel with the Mechlin canal, with a triple row of linden trees on either side. the public buildings of Brussels, the most remarkable are the cathedral church of St Michel et Ste Gudule, and the Hôtel de Ville. The cathedral was built in 1010, and in it was held the first chapter of the order of the Golden Fleece in 1535. It contains a remarkable pulpit, and some splendid specimens of stained glass. In one of the chapels are deposited the Miraculous Wafers, which at the beginning of the fifteenth century are said to have been stolen from the altar by the Jews, at that time a numerous and wealthy class in Brussels. Not content with the sacrilege itself, they are said to have perpetrated it on a Good Friday. The stolen wafers were carried to the Jewish synagogue, and there subjected to every possible insult, till at length one Jew, more impious than his fellows, put his knife into the holy bread. Thereupon it is said that jets of blood spouted forth from the wound, and the perpetrators of the sacrilege were at the same time struck down insensible. One of their number, shocked at the incident, informed against the rest, and furnished the government with an admirable excuse for plundering and oppressing the wealthy and hated Israelites. To commemorate the detection and punishment of this sacrilege, an annual solemn procession is held at Brussels, on which occasion the identical wafers in question are exposed to the gaze of the superstitious multitudes. From the towers of the cathedral a fine view of the surrounding country may be obtained. The Hôtel de Ville was built in 1400. It is profusely ornamented, and its tower, which does not rise from the centre of the front, but from a point much nearer the left corner of the edifice, is 360 feet in height, and commands an extensive view of the surrounding country.

The other public buildings of Brussels are for the most part handsome but quite uninteresting edifices. The principal hospitals of the town are those of St Peter and St John, which are both admirably managed, and contain together about 1000 beds. The patients are waited upon by the sisters of charity. As in all the large Belgic towns, there is a convent of Béguins, which formerly numbered 1000 nuns; there are also two other nunneries. As the English residents in Brussels are very numerous, there are several Protestant churches. The mass of the native population are bigoted Catholics, but the king is a Lutheran, and attends divine service in his private chapel. The Jews have a synagogue at Brussels, and hold their grand consistory there. The number of charities in Brussels is very great; of these the most important are the Foundling Hospital, in which there are about 2000 inmates; the Orphan Asylum, in which there are nearly 200; and the Société Philantropique, whose object is to prevent mendicity. There are besides numerous alms-houses, which annually give relief to about 35,000 persons. Some of these establishments are supported entirely by subscripBrute.

tion; others of them are subsidized by government. Great attention is paid to the education of poor children, of whom about 6000 are annually taught at an expense of about L.1500. The total number of scholars in the different schools of Brussels is about 10,000. There are also a Lancasterian school, and many public and private academies. The number of students at the Free University of Brussels now amounts to nearly 400. Of students at the Royal Athenæum the number is 500. There is also a well conducted veterinary and agricultural school, attended by about 250 students. Some of the societies of Brussels are very celebrated. The Royal Society was founded in 1769. The geographical establishment of Vandermaelen, instituted in 1830, is in a flourishing condition. The botanical garden is one of the best in Europe. The Palais des Beaux Arts contains an admirable museum of natural history, and an extensive and valuable collection of books and manuscripts. The number of books is 180,000, of which 2000 belong to the fifteenth century. The number of MSS. is 19,668, many of which are beautifully illuminated. The annual increase of the library is estimated at 3000 The public is admitted to read in the library from 10 A.M. to 3 P.M. daily, except on Sundays and holidays and during the vacation. The number who annually avail themselves of this privilege is 3000. Eminent literary men and others are sometimes allowed to take books home, but the number to whom this privilege is conceded never exceeds 100 annually. There are about 50 printing presses in constant operation in Brussels, a large number of which are engaged in the republication of standard works that ap-Various attempts have been made by the French pear in France. government of late to put down this practice so injurious to the interests of French authors, but no definite arrangement has hitherto been concluded.

The principal manufactures of Brussels are those of lace and tulle, carpets, linen and cotton fabrics, jewellery, and articles of vertu. The most remarkable of these is that of lace. The finer sorts of flax used in the manufacture cost from L.12 to L.16 sterling per lb. An English yard of this lace costs L.8. The persons who spin the thread work in rooms almost completely darkened, and are thus compelled to concentrate their attention; and the thread spun in this way is said to be finer and more delicate than any that has hitherto been produced by other means. Excellent carriages are made in Brussels two-thirds cheaper than those of England, but inferior to them in quality.

In 1837, the population of Brussels was 104,265; in 1846, 123,874; in 1849, 138,189; and in 1850, 142,289.

BRUTE, a general name for all animals except mankind. Among brutes the monkey kind bear the nearest resemblance to man, both in the external shape and internal structure, but more in the former than in the latter. In the monkey kind the highest and the nearest approach to the likeness of man is the orang-outang, or *Homo Sylvestris*. (See Mammalia.) The structure and economy of brutes make the object of what is called Comparative Anatomy. (See Anatomy, Comparative.)

Philosophers have been much puzzled about the essential characteristics of brutes, by which they may be distinguished from man. Some define a brute to be an animal not risible, or a living creature incapable of laughter; others call them *mute animals*. The Peripatetics allowed them a sensitive power, but denied them a rational one. The Platonists allowed them reason and understanding, though in a degree less pure and refined than that of men. Lactantius allows to brutes everything which men possess, except a sense of religion; and even this has been ascribed to them by some sceptics. Descartes maintained that brutes are mere animate machines, absolutely destitute not only of reason, but of all thought and perception, and that all their actions are only consequences of the exquisite mechanism of their bodies. This system, however, is much older than Descartes: it was borrowed by him from Gomez Pereira, a Spanish physician, who employed thirty years in composing a treatise which he entitled Antoniana Margarita, from the Christian names of his father and mother. It was published in 1554; but as his opinion had not the honour of gaining partizans, nor even of being refuted, it died with him. Even Pereira seems not to have been the inventor of this notion, something like it having been held by several of the ancients, as we find from Plutarch and St Augustin. Others, who rejected the Cartesian hypothesis, have maintained that brutes are endowed with a soul essentially inferior to that of men; and to this soul some have allowed immortality, others not.

And, lastly, in a treatise published by Bougeant, a French Jesuit, entitled Amusement Philosophique sur le Langage des Bêtes, he affirms that they are animated by evil spirits or devils.

The opinion of Descartes was probably invented, or at least adopted, by him, to refute two great objections: one against the immortality of the souls of brutes, if they were allowed to have any; the other against the goodness of God, in suffering creatures who had never sinned to be subjected to so many miseries. The arguments in favour of it may be stated as follow: 1. It is certain that a number of human actions are merely mechanical, because they are done imperceptibly to the agent, and without any direction from the will, which are to be ascribed to the impression of objects and the primordial disposition of the machine, wherein the influence of the soul has no share; of which number are all habits of the body acquired from the reiteration of certain actions. In all such circumstances human beings are no better than automata. 2. There are some natural movements so involuntary that we cannot restrain them; for example, that admirable mechanism ever on the watch to preserve an equilibrium when we stoop, bend, or incline, our bodies in any way, and when we walk upon a narrow plank. 3. The natural liking for, and antipathy against, certain objects, which in children precede the power of knowing and discriminating them, and which sometimes in grown persons trumph over all the efforts of reason, are all phenomena to be accounted for from the wonderful mechanism of the body, and are so many cogent proofs of that irresistible influence which objects have on the human frame. 4. Every one knows how much our passions depend on the degree of motion into which the blood is put, and the reciprocal impressions caused by the animal spirits between the heart and brain, which are so closely connected by their nerves; and if such effects may be produced by such simple mechanical means as the mere increase of motion in the blood, without any direction of the will, we are not to wonder at the actions of brutes being the effects only of a refined mechanism, without thought or perception. 5. A further proof will arise from a consideration of the many wonderful effects which even the ingenuity of men has contrived to bring about by mechanical means. Now it is not to be questioned but that the mechanism of the body of the meanest animal infinitely surpasses that of any machine; and what can be the consequence of this, but that the actions of that animal must be proportionably more surprising than those of the finest automaton. (See Androides and AUTOMATON.)

The above is a short abstract of all the arguments that are brought in favour of the Cartesian system; but they are evidently very far from being conclusive. They are deficient, in the first place, because, though we allow them in the utmost extent the Cartesians themselves can desire, they prove only the possibility of brutes being inanimate, and that the power of God actually could produce such and such actions from inanimate machines; but that he has actually done so, they have not the least tendency to prove. In the second place, the Cartesian argument is insufficient, because it has no limits, and knows not where to stop. By the same method of arguing every man might prove his neighbour to be an inanimate machine; for though every individual be conscious of his own thoughts, he is not of those of his neighbours; and it no more exceeds the power of God to cause an inanimate machine to perform the actions of a man than those of a beast. Neither are the two objections which the hypothesis is calculated to answer to be at all admitted as arguments in its favour. They are, 1. That if we allow brutes to have souls, they must be immaterial, and consequently immortal; and, 2. It seems a contradiction to the goodness of God to think

quences to us, though it should be granted; and if it is supposed that the brute creatures are really immortal, the

As to a positive proof on the other side, namely, that brutes are really endowed with sensation and consciousness, there is undoubtedly the same evidence for the sensibility of brutes that there is for that of mankind. We see brutes avoid pain as much as we do; and we likewise see them seek for pleasure, and express their happiness in the enjoyment of certain things by signs not at all equivocal. Therefore, though we grant the possibility of all this being the effect of mere mechanism, yet, as we are conscious that in ourselves similar effects are produced by a sentient principle, we have all the reason in the world to conclude that in brutes they are likewise derived from a prinsee that a mechanism of this kind does take place in some part of nature, we have no reason to suppose it in any. As to those actions of the human body in which it seems to move spontaneously, like an automaton, without the direction of the mind or will, it is almost superfluous to observe, that they were not performed in this manner originally, but required very great exertions of the will and perform them easily; so that from these nothing can be inferred. Add to this, that divine revelation sets forth to us in many places the brute creation as objects of mercy, which could not be done without the highest absurdity, if as well as we.

sation as well as we, though of an inferior nature to ours. Great disputes, however, have arisen on this subject, some maintaining that the soul of brutes is merely sensitive, wherefore. In numberless instances, needless to be mentioned here, but which will readily occur to every reader, capable of education in the same degree that men are, neither are the rational exertions of beasts at all to be remarkable instance of this is in the use of the element of fire. The most savage nations have known how to make this element subservient to their purposes; or if some have been found who have been entirely ignorant of its existence, they have quickly learned its uses on seeing it employed by others; but though many of the brute creatures are delighted with warmth, and have opportunities every day of seeing how fire is supplied with fuel, and thereby preserved, it never was known that one of them attempted to preserve a fire by this means. This shows a strange defect of rationality, unaccountable upon any other tion is still, with regard to them, the primary effect of the

Brute. that he should subject innocent creatures to such a mul- supposition than that the soul or sentient principle of brutes Brute. titude of evils as we see the brute creation endure in this is somehow or other inferior in its nature to that of man; world. The first of these is productive of no bad conse- but still it is a sentient principle, capable of perceptions as quick as our own, and in many instances much more so.

Father Bougeant supports his opinion of the spirits of second objection vanishes, because, in the enjoyment of brute creatures being devils in the following manner:endless felicity, all temporary afflictions, how severe soever, must be swallowed up as though they had never been. Having proved at large that beasts naturally have understanding, he says, "Reason naturally inclines us to believe that beasts have a spiritual soul; and the only thing that opposes this sentiment is the consequences that might be inferred from it. If brutes have a soul, that soul must be either matter or spirit; it must be one of the two, and yet you dare affirm neither. You dare not say it is matter, because you must then necessarily suppose matter to be capable of thinking; nor will you say that it is spirit, this opinion bringing with it consequences contrary to the principles of religion; and this, among others, that man would differ from beasts only by the degrees of plus and minus, which would demolish the very foundation of all religion. Therefore, if I can elude all these conseciple of sensation, especially seeing we know of no kind quences; if I can assign to beasts a spiritual soul without of mechanism in any other part of nature which produces striking at the doctrines of religion, it is evident that my any thing like the effects just mentioned; and until we system, being moreover the most agreeable to reason, is the only warrantable hypothesis. Now I shall, and can do it, with the greatest ease imaginable. I even have means, by the same method, to explain many very obscure passages in the holy Scripture, and to resolve some very great difficulties which are not well confuted. This we shall unfold in a more particular manner.

"Religion teaches us that the devils, from the very intellectual faculty before the body could be brought to moment they had sinned, were reprobate, and that they were doomed to burn for ever in hell; but the church has not yet determined whether they do actually endure the torments to which they are condemned. It may then be thought that they do not yet suffer them, and that the exethey were not really capable of feeling pleasure and pain cution of the verdict brought against them is reserved for the day of the final judgment. Now, what I pretend to infer The most rational opposers of the Cartesian scheme from hence is, that, till doomsday comes, God, in order maintain that brutes are endowed with a principle of sen- not to suffer so many legions of reprobate spirits to be of no use, has distributed them through the several spaces of the world, to serve the designs of his providence, and make his omnipotence to appear. Some continuing in and that they are altogether destitute of reflection and their natural state, busy themselves in tempting men, in understanding; others, that they not only reason, but seducing and tormenting them, either immediately, as make a better use of it than men do. That the brutes Job's devil, and those that lay hold of human bodies, or are endowed only with sensation, and totally destitute of by the ministry of sorcerers or phantoms. These wicked all power of reflection, or even reasoning, is what can by spirits are those whom the Scripture calls the powers of no means be maintained on good grounds; neither can it darkness, or the powers of the air. God, with the others, be asserted that they act entirely from instinct or a blind makes millions of beasts of all kinds, which serve for the propensity to certain things without knowing why or uses of men, which fill the universe, and cause the wisdom and omnipotence of the Creator to be admired. By that means I can easily conceive, on the one hand, how it is evident that education will get the better of many of the devils can tempt us; and, on the other, how beasts the natural instincts of brutes, which could never be the can think, know, have sentiments, and a spiritual soul, case were they absolutely incapable of reasoning. On the without any way striking at the doctrines of religion. I other hand, it is equally certain that they are by no means am no longer surprised to see them have forecast, memory, and judgment. I should rather have occasion to wonder at their having no more, since their soul very compared even with those of the meanest savages. One likely is more perfect than ours. But I discover the reason of this; it is because, in beasts as well as in ourselves, the operations of the mind are dependent on the material organs of the machine to which it is united; and those organs being grosser and less perfect than in us, it follows that the knowledge, the thoughts, and the other spiritual operations of the beasts, must of course be less perfect than ours; and if these proud spirits know their own dismal state, what a humiliation must it be to them thus to see themselves reduced to the condition of beasts! But whether they know it or not, so shameful a degradaBrute. divine vengeance I just mentioned; it is an anticipated to do evil, to disconcert the general order, to commit Brute. ❤ hell.'

Having mentioned the prejudices against this hypothesis, such particularly as the pleasure which people of sense and religion take in beasts and birds, especially all sorts of domestic animals, he proceeds, "Do we love beasts for their own sakes? No. As they are altogether strangers to human society, they can have no other appointment but that of being useful and amusing. And that amuses us? The thought of it, far from shocking, pleases me mightily. I with gratitude admire the goodserve and amuse me. If I am told that these poor devils are doomed to suffer eternal tortures, I admire God's decrees, but I have no manner of share in that dreadful sentence; I leave the execution of it to the sovereign judge; and, notwithstanding this, I live with my little devils as I has perverted their primitive nature. do with a multitude of people, of whom religion informs me that a great number shall be damned. But the cure done by time and reflection: give me leave, then, lightly to touch upon this difficulty, in order to observe a very

important thing to you.

"Persuaded as we are that beasts have intelligence, have we not all of us a thousand times pitied them for the excessive evils which the majority of them are exposed to, and in reality suffer? How unhappy is the condition of horses! we are apt to say upon seeing a horse whom an unmerciful carman is murdering with blows. How mi-How dismal is the fate of beasts living in woods! they are perpetually exposed to the injuries of the weather; always seized with apprehensions of becoming the prey of hunters, or of some wilder animal; for ever obliged, after long fatigue, to look out for some poor insipid food; often suffering cruel hunger; and subject, moreover, to illness and death! If men are subject to a multitude of miseries that overwhelm them, religion acquaints us with the reason of it, viz. the being born sinners. But what crimes can beasts have committed by birth to be subject to evils so very cruel? What are we, then, to think of the horrible excesses of miseries undergone by beasts? miseries, indeed, far greater than those endured by men. This is, in any other system, an incomprehensible mystery; whereas nothing is more easy to be conceived from the system I propose. The rebellious spirits deserve a punishment still more rigorous, and happy it is for them that their punishment is deferred. In a word, God's goodness is vindicated, man himself is justified; for what right can we have, without necessity, and often in the way of mere diversion, to take away the lives of millions of beasts, if God had not authorized us so to do? And beasts being as sensible as ourselves of pain and death, how could a just and merciful God have given man that privilege, if they were not so many guilty victims of the divine vengeance?

"But hear still something more convincing, and of greater consequence. Beasts by nature are extremely vicious. We know well that they never sin, because they are not free; but this is the only condition wanting to make them sinners. The voracious birds and beasts of prey are cruel. Many insects of one and the same species devour one another. Cats are perfidious and ungrateful, monkeys are mischievous, and dogs envious. All beasts in general are jealous and revengeful to excess, not to mention many other vices we observe in them; and at the same time that they are by nature so very vicious, they have, say we, neither the liberty nor any helps to resist the bias that hurries them into so many bad ac-

whatever is most contrary to the notion we have of natural justice and to the principles of virtue. What monsters are these in a world originally created for order and justice to reign in? This is, in good part, what formerly persuaded the Manicheans that there were of necessity two orders of things, one good and the other bad; and that the beasts were not the work of the good principle: a monstrous error! But how then shall we believe that what care we whether it be a devil or any other creature beasts came out of the hands of their Creator with qualitics so very strange! If man is so very wicked and corrupt, it is because he has himself through sin perverted ness of the Creator, who gave me so many little devils to the happy nature that God had given him at his creation. Of two things then we must say one; either that God has taken delight in making beasts so vicious as they are, and of giving us in them models of what is most shameful in the world; or that they have, like man, original sin, which

"The first of these propositions finds very difficult access to the mind, and is an express contradiction to the of a prejudice is not to be effected in a moment; it is holy Scriptures, which say, that whatever came out of God's hands at the time of the creation of the world was good, yea very good. What good can there be in a monkey's being so very mischievous, a dog so full of envy, a cat so malicious? But then many authors have pretended that beasts, before man's fall, were different from what they are now; and that it was in order to punish man that they became so wicked. But this opinion is a mere supposition, of which there is not the least footstep in holy Scripture. It is a pitiful subterfuge to elude a serable is the dog whom they are breaking for hunting! real difficulty. This at most might be said of the beasts, with whom man has a sort of correspondence; but not at all of the birds, fishes, and insects, which have no manner of relation to him. We must then have recourse to the second proposition, that the nature of beasts has, like that of man, been corrupted by some original sin: another hypothesis, void of foundation, and equally inconsistent with reason and religion, in all the systems which have been hitherto espoused concerning the souls of beasts. What party are we to take? Why, admit of my system, and all is explained. The souls of beasts are refractory spirits, which have made themselves guilty towards God. The sin in beasts is no original sin; it is a personal crime, which has corrupted and perverted their nature in its whole substance; hence all the vices and corruption we observe in them, though they can be no longer criminal, because God, by irrevocably reprobating them, has at the same time divested them of their liberty."

> These quotations contain the strength of Father Bougeant's hypothesis, which also has had its followers; but the reply to it is very obvious. Beasts, though remarkably mischievous, are not completely so; they are in many instances capable of gratitude and love, which devils cannot possibly be. The very same passions which are implanted in the brutes exist in the human nature; and if we choose to argue from the existence of those passions, and the ascendency they at some times have over mankind, we may say with as great justice that the souls of men are devils, as that the souls of brutes are devils. All that can reasonably be inferred from the greater prevalency of the malignant passions among the brutes than among men, is, that the former have less rationality than men; and accordingly it is found that among savages, who exercise their reason less than other men, every species of barbarity is practised without being deemed a crime.

On the present subject there is a very ingenious treatise in German, published by Professor Bergman, under the title of "Researches designed to show what the brute animals certainly are not, and also what they probably tions. They are, according to the schools, necessitated are." That they are not machines, he proves with more

detail than seemed necessary for refuting a hypothesis order to draw away the dogs from her helpless covey. In Brute. certain that the half-reasoning elephant cannot be deemed a machine by us, from any other consideration than that he goes upon four feet, while we go upon two; and

go upon two feet, while he goes upon four.

But if animals are not mere machines, what are they? Manifestly sensitive beings, with an immaterial principle; and thinking or reasoning beings to a certain degree. In certain classes of animals this appears evident to our author, who seems to have observed with great sagacity and attention their various operations and proceedings, their ways and means, &c. He thinks it impossible to deduce this variety of action, in any animals, if we except those of the lowest classes in the gradation of intelligence, from a general and uniform instinct. For they accommodate their operations to times and circumstances. They combine; they choose the favourable moment; they avail themselves of the occasion, and seem to receive instruction by experience. Many of their operations announce reflection: the bird repairs a shattered nest, instead of constructing instinctively a new one; the hen who has been robbed of her eggs changes her place in order to lay the remainder with more security; the cat discovers both care and artifice in concealing her kittens. Again, it is evident that on many occasions animals know their faults and mistakes, and correct them; they sometimes contrive the most ingenious methods of obtaining their ends, and when one method fails have recourse to another; and they have, without doubt, a kind of language for the mutual communication of their ideas. How is all this to be accounted for, says our author, unless we suppose them endowed with the powers of perceiving, thinking, remembering, comparing, and judging? They have these powers, indeed, in a degree inferior to that in which they are possessed by the human species, and form classes below them in the graduated scale of intelligent beings. But still it seems to our author unreasonable to exclude them from the place which the principles of sound philosophy, and facts ascertained by constant observation, assign to them in the great and diversified sphere of life, sensation, and intelligence. He does not, however, consider them as beings whose actions are directed to moral ends, nor consequently as accountable and proper subjects for reward or punishment in a future world.

That brute animals possess reflection and sentiment, and are susceptible of the kindly as well as the irascible passions, independently of sexual attachment and natural affection, is evident from the numerous instances of affection and gratitude daily observable in different animals, particularly the dog. Of these and other sentiments, such as pride, and even a sense of glory, the elephant exhibits

proofs equally surprising and indubitable.

As to the natural affection of brutes, says an ingenious writer, " the more I reflect on it the more I am astonished at its effects. Nor is the violence of this affection more wonderful than the shortness of its duration. Thus every hen is in her turn the virago of the yard, in proportion to the helplessness of her brood; and will fly in the face of a dog or a sow, in defence of those chickens which in a few weeks she will drive before her with relentless cruelty. This affection sublimes the passions, quickens the invention, and sharpens the sagacity of the brute creation. Thus a hen, just become a mother, is no longer that placid bird she used to be; but, with feathers standing on end, wings hovering, and clocking note, she runs about like one possessed. Dams will throw themselves in the way of the greatest danger, in order to avert it from their progeny. Thus a partridge will tumble along before a sportsman, in

which would equally tend to make us all machines. It is the time of nidification the most feeble birds will assault the most rapacious. All the hirundines of a village are up in arms at the sight of a hawk, whom they will persecute till he leaves that district. A very exact observer he might as well take us for mere machines, because we has often remarked, that a pair of ravens nestling in the rock of Gibraltar would suffer no vulture or eagle to rest near their station, but would drive them from the hill with amazing fury; even the blue thrush, at the season of breeding, would dart out from the clefts of the rocks to chase away the kestrel or the sparrow-hawk. If you stand near the nest of a bird that has young, she will not be induced to betray them by an inadvertent fondness, but will wait about at a distance with meat in her mouth for an hour together. The fly-catcher builds every year in the vines that grow on the walls of my house. A pair of these little birds had one year inadvertently placed their nest on a naked bough, perhaps in a shady time, not being aware of the inconvenience that followed; but a hot sunny season coming on before the brood was half fledged, the reflection of the wall became insupportable, and must inevitably have destroyed the tender young, had not affection suggested an expedient, and prompted the parent-birds to hover over the nest all the hotter hours, while with wings expanded and mouths gaping for breath they screened off the heat from their suffering offspring. A further instance I once saw of notable sagacity in a willow-wren, which had built in a bank in my fields. This bird a friend and myself had observed as she sat in her nest; but were particularly careful not to disturb her, though we saw she eyed us with some degree of jealousy. Some days after, as we passed that way, we were desirous of remarking how this brood went on; but no nest could be found, till I happened to take up a large bundle of long green moss, as it were carelessly thrown over the nest in order to dodge the eye of any impertinent intruder." (White's Natural History of Selborne.)

A wonderful spirit of sociality in the brute creation, independent of sexual attachment, has been frequently remarked; nor does this propensity seem to be confined to animals of the same species. Even great disparity of kind and size does not always prevent social advances and mutual fellowship. Of this the following remarkable instance is given in the work above quoted: "A very intelligent and observant person has assured me, that in the former part of his life, keeping but one horse, he happened also on a time to have but one solitary hen. These two incongruous animals spent much of their time together in a lonely orchard, where they saw no creature but each other. By degrees an apparent regard began to take place between these two sequestered individuals. The fowl would approach the quadruped with notes of complacency, rubbing herself gently against his legs; while the horse would look down with satisfaction, and move with the greatest caution and circumspection, lest

he should trample on his diminutive companion.

To such an instance of attachment between incongruous animals, may be added the following instance recounted by Mr White, in the work already quoted. "My friend had a little helpless leveret brought to him, which the servants fed with milk in a spoon; and about the same time his cat kittened, and the young were despatched and buried. The hare was soon lost, and supposed to be gone the way of most foundlings, or to be killed by some dog or cat. However, in about a fortnight, as the master was sitting in his garden in the dusk of the evening, he observed his cat, with tail erect, trotting towards him, and calling with little short in ward notes of complacency, such as they use towards their kittens, and something gambling after, which proved to be the leveret, which the cat had supported with her milk, and continued to support with great affection. Thus was a graBrute.

minivorous animal nurtured by a carnivorous and predaceous one.

"This incident is no bad solution of that strange circumstance which grave historians as well as the poets assert, of exposed children being sometimes nurtured by female wild beasts that probably had lost their young; for it is not one whit more marvellous that Romulus and Remus, in their infant state, should be nursed by a she-wolf, than that a poor little suckling leveret should be fostered and cherished by a

bloody grimalkin."

But besides the different qualities enumerated, besides reflection and sagacity often in an astonishing degree, and besides the sentiments and actions prompted by social or natural attachments, certain brutes seem on many occasions inspired with a superior faculty, a kind of presentiment or second sight as it were, with regard to events and designs altogether unforeseen by the rational beings whom they concern. Of the faculty alluded to, various instances will probably consist with the knowledge or the recollection of most readers: we shall therefore only recite the following, on account of its unquestionable authenticity. At the seat of the Earl of Lichfield, three miles from Blenheim, in the diningroom there is a portrait of Sir Henry Lee, by Johnston, with that of a mastiff-dog which saved his life. It seems a servant had formed the design of assassinating his master and robbing the house; but the night he had fixed on, the dog, which had never been much noticed by Sir Henry, for the first time followed him up stairs, got under his bed, and could not be got from thence by either master or man: in the dead of night the same servant entered the room to execute his horrid design, but was instantly seized by the dog, and being secured, confessed his intentions. Upon what hypothesis can we account for a degree of foresight and penetration such as this? Or will it be suggested as a solution of the difficulty that a dog may possibly become capable in some measure of understanding human discourse, and of reasoning and acting accordingly; and that, in the present instance, the villain had either uttered his design in soliloquy, or imparted it to an accomplice, in the hearing of the animal?

It has been much disputed whether the brutes have any language by which they can express their minds to each other; or whether all the noise they make consists only of cries inarticulate, and unintelligible even to themselves. We are, however, too little acquainted with the intellectual faculties of these creatures to be able to determine this point. Certain it is, that their passions, when excited, are generally productive of some peculiar cry; but whether this be designed as an expression of the passion to others, or only a mechanical motion of the muscles of the larvnx occasioned by the passion, is what we have no means of knowing. We may, indeed, from analogy, conclude with great reason that some of the cries of beasts are really expressions of their sentiments; but whether one beast is capable of forming a design, and communicating that design by any kind of language to others, is what we submit to the judgment of the reader, after giving the following instance, which, with others, is brought as a proof of it by Father Bougeant. "A sparrow finding a nest that a martin had just built standing very conveniently for him, possessed himself of it. The martin, seeing the usurper in her house, called for help to expel him. A thousand martins came full speed, and attacked the sparrow; but the latter being covered on every side, and presenting only his large beak at the entrance of the nest, was invulnerable, and made the boldest of them who durst approach him repent of their temerity. After a nuarter of an hour's combat, all the martins disappeared. The sparrow thought he had got the better, and the spectators judged that the martins had abandoned their undertaking. Not in the least. They immediately returned to the charge; and each of them having procured a little of

that tempered earth with which they make their nests, they all at once fell upon the sparrow, and inclosed him in the nest to perish there, though they could not drive him thence. Can it be imagined that the martins could have been able to hatch and concert this design all of them together without speaking to each other, or without some medium of communication equivalent to language?" We refer those curious in this subject, to a work in two volumes, published at Amsterdam, entitled Histoire critique de l'Ame des Bêtes contenant les sentimens des Philosophes Anciens et ceux des Modernes sur cette matière, par M. Guer, Avocat; and to Lord Brougham's Illustrations of Paley, vol. i.

BRUTON, a market-town of England, in the hundred of the same name, county of Somerset. It is pleasantly situated in the valley of the Brue, 10 miles S.S.W. of Frome, and has a town-hall, hexagonal market-cross, grammar-school with four exhibitions at either of the universities, and some manufactures of silk, woollens, and hosiery. Mar-

ket-day Saturday. Pop. of parish (1851) 2109.

BRUTTII; in Ancient Geography, the most southern portion of the Italian peninsula, stretching towards Sicily; bounded by the sea on every side except on the north, where it is bounded by Lucania. It was inhabited by the Bruttii, for whose country the ancient Romans had no peculiar name, calling both the people and the country indiscriminately Bruttii.

BRUTUS, or BRUTE, according to the fabulous exploded history of this country by Geoffroy of Monmouth, was the first king of Britain. He was born in Italy, and is said to have been the son of Sylvius, who was the son of Ascanius the son of Æneas. Having accidentally killed his father, he fled into Greece, where he took prisoner king Padrosus, who kept the Trojans in slavery; but he released him on the condition of his providing ships for the Trojans to quit the land. Being advised by the oracle to sail west beyond Gaul, after some adventures he landed at Totness in Devonshire. Albion was then inhabited by a remnant of giants, whom Brutus destroyed. He called the island after his own name, Britain; and built a city called New Troy, since London. He reigned there twenty-four years, and at his death parcelled the island among his three sons, giving to Locrine the middle, called Loegria; to Camber, Wales; and to Albanach, Scotland.

Brutus, *Lucius Junius*, the avenger of the rape of Lucretia, and founder of the Roman republic, flourished five hundred years before Christ. See ROMAN HISTORY.

BRUTUS, Marcus, the passionate lover of his country, and chief conspirator against Cæsar. He slew himself on losing the battle of Philippi, B.C. 42. See ROMAN HISTORY.

BRÜX, a city in the circle of Saatz, and Austrian kingdom of Bohemia, is situated on the river Bila. It contains a philosophical institution, eight churches, two monasteries, gymnasium, barracks; and has 3500 inhabitants, engaged in the coal-mines, and in the preparation of salts from

the Seidlitz waters in the vicinity.

BRUYÈRE, Jean de la, the author of the celebrated work entitled Caractères de Théophraste, traduits du Grec, avec les mœurs de ce siècle, which first appeared at Paris in 1687, 12mo. He was born near Dourdan in Normandy, in 1639, or, according to some, in 1644. Few particulars of his life have been preserved. After filling the office of treasurer of France at Caen he removed to Paris, and was appointed teacher of history, under Bossuet, to the Duke de Burgogne, grandson to the great Condé. La Bruyère, with a pension of 1000 crowns, passed the remainder of his life in the service of his pupil, in the capacity of homme de lettres. He was admitted a member of the French Academy in 1693; and he died suddenly of apoplexy at Versailles, May 10, 1696.

"The *Characters* of Bruyère," says Voltaire, "may justly be ranked among the extraordinary productions of the age. Antiquity furnishes no examples of such a work. A style

Bruyn || Bryant. rapid, concise, and nervous; expression animated and picturesque; a use of language altogether new, without offending against its established rules, struck the public at first; and the allusions which are crowded in almost every page completed its success. When La Bruyère showed his work in manuscript to Malézieux, he was told that the book would have many readers, and its author many enemies. It somewhat sunk in the opinion of men, when that whole generation whose follies it attacked were passed away; yet as it contains many things applicable to all times and places, it is more than probable that it will never be forgotten."

This admirable work is highly commended by Locke, and has always been a favourite book with readers of taste and discernment. Bruyère left also an unfinished work, published in 1699 under the title of *Dialogues posthumes du Sieur de La Bruyère sur le Quiétisme*, &c., 12mo, but now forgotten.

Of the numerous editions of the *Characters*, the best is that published in 1827, 2 vols. 8vo, with a life of the author

by M. Sicard, notes, &c.

BRUYN, CORNELIUS, a Dutch traveller and clever artist, author of Travels in the East, was born at the Hague in 1652. His Voyage au Levant was published at Paris in 1714; and his Voyages en Muscovie, Perse, et Les Indes Orientes appeared at Amsterdam in 1718. Both are illustrated with upwards of 500 engravings after his own drawings. These works, as well as his Observations on the Engravings published by former travellers on Persepolis, are curious and instructive, and the fidelity of his descriptions are confirmed by later travellers. He died at Utrecht in 1719.

BRYAN, or BRYANT, SIR FRANCIS, an English poet, warrior, and statesman, was born of a respectable family, and educated at Oxford. In 1522 he attended in a military capacity the Earl of Surrey in his expedition to the coast of Brittany, and commanded the troops in the attack of the town of Morlaix, which he took and burnt. For this service he was knighted on the spot by the earl. In 1529 he was sent ambassador to France, and the following year to Rome, on account of the king's divorce. He was gentleman of the privy chamber to Henry VIII., and to Edward VI., in the beginning of whose reign he marched with the protector against the Scots; and after the battle of Musselburgh, in which he commanded the light horse, he was made banneret. In 1549 he was appointed chief governor of Ireland; and there he married the Countess of Ormond. He died in 1550, and was buried at Waterford. He wrote Songs and Sonnets, some of which were printed with those of Surrey and Wyatt, Lond. 1565; and Letters (MSS.) written from Rome concerning the king's divorce.

Bryant, Jacob, a profound scholar, mythologist, and sacred historian, born at Plymouth in 1715. His father had a place in the customs, and was afterwards stationed in Kent, where his son was first sent to a provincial school, from which he was removed to Eton. Here he appears to have remained till 1736, the date of his election to King's College, Cambridge; where he took his degrees of bachelor and master of arts in 1740 and 1744. He returned to Eton in the capacity of private tutor to the Duke of Marlborough, then Marquis of Blandford; and the good taste which his pupil showed through life, in the protection of the fine arts, and in the pursuit of science, sufficiently demonstrated the beneficial influence of his instructor's example. In 1756 he went to the Continent as private secretary to the Duke of Marlborough, then master-general of the ordnance and commander-in-chief of the forces in Germany; and he was rewarded after his return, for his various services to the family, by a lucrative appointment in the ordnance, which allowed him ample leisure to indulge his literary taste in a variety of refined investigations, and to exercise his zeal for the cause of religion in a multitude of works, calculated for the illustration of the Scriptures, and the demonstration of their authenticity and divine authority.

His first publication was entitled Observations and Inquiries relating to various parts of Ancient History, containing Dissertations on the wind Euroclydon, and on the island Melite, together with an account of Egypt in its most early state, and of the Shepherd Kings, 1767. In this work he attempts to prove that the Melite on which St Paul was wrecked was not Malta, but one of the Illyrian islands in the Adriatic, now called Melede; and he endeavours to illustrate several points in the early history of the

oriental, and especially of the Aramitic nations. But his most elaborate performance was his New System or Analysis of Ancient Mythology, wherein an attempt is made to divest tradition of fable, and to reduce truth to its original purity, 3 vols. 4to, 1774-76. In this attempt the author has equally displayed his deep and extensive learning and his inventive fancy; but it must be confessed that, on a minute examination, the work exhibits much more of a poetical imagination than of a sound judgment; and that, in endeavouring to substitute etymological for historical evidence, he has been completely unsuccessful. Nothing can afford a more satisfactory kind of proof than etymology taken on a large scale, and considered as a mode of tracing the relations of nations to each other, by the affinities of their languages; since the accumulation of a multitude of probabilities, each weak when taken separately, becomes at last equivalent to absolute certainty. But nothing, on the other hand, can be more fallacious, or more liable to controversy, than single etymological inferences, in particular cases, when one of these slight resemblances is magnified into a striking likeness, and even an identity, which is then made the foundation of a magnificent superstructure in mythology or in history. Mr Richardson has shown, in the preface to his Dictionary, how much Mr Bryant was mistaken in some of his reasoning respecting the signification and derivation of particular words; and even if he had been more correct in these instances, the conclusions which he has deduced from his etymologies would by no means have been perfectly legitimate. Jablonsky seems to have exhibited one of the strongest examples of this dangerous abuse of learning; in which he has been followed not only by Bryant, but by several other modern writers equally visionary, who have commonly been very imperfectly acquainted with the languages on which their conjectures depended, and have been still more deficient in that sort of common sense and correct feeling, confirmed by experience, which constitutes the most essential part of the qualifications of a critic, and the want of which can never be compensated by the most unwearied labour of a mere mechanical commentator.

Some remarks which had been made on particular passages of Mr Bryant's work led him to publish A Vindication of the Apamean Medal; of the inscription NΩE; and of another coin, in the Archæologia, vol. iv. art. 21, 22, 23. He deviated somewhat more widely from the usual objects of his research, and apparently without any decided advantage over his adversary, in An Address to Dr Priestley, on the doctrine of philosophical necessity, 8vo, 1780. He also published in the same year Vindiciæ Flavianæ, or a vindication of the testimony given by Josephus concerning our Saviour, 8vo.

Unfortunately for the credit of his critical discrimination in matters of old English literature, Mr Bryant was the author of Observations on the Poems of Thomas Rowley, in which the authenticity of these poems is ascertained, 2 vols. 12mo, 1781. If there could be any excuse for the commission of forgeries like that of Chatterton, it would be found in their serving as a valuable test of the degree of confidence which it is justifiable to place in the decrees of the most powerful critics respecting other questions of a more ambiguous nature.

Mr Bryant contributed to the publication of the Duke of Marlborough's Collection of Gems, the Latin explans-

Bryaxis. tions contained in the first volume, fol. 1783. He inserted in the Archæologia, vii. 387, some Collections on the Zingara or Gipsey Language, which has since been sufficiently proved to be one of the many derivatives of the old Sanscrit. Some time afterwards he published an anonymous Treatise on the Authenticity of the Scriptures, and the truth of the Christian Religion, 1792. This was succeeded by his Observations upon the Plagues inflicted upon the Egyptians, 8vo, 1794.

His opinions respecting the existence of the city of Troy, and the veracity of Homer as a historian, raised up against him a host of powerful adversaries; and in a question of this nature, upon which the decisions of mankind are so manifestly influenced by their sensibility to poetical beauty, and their early habits and attachments, a much more cautious attempt to innovate might easily have been unsuccessful. Whatever learning and talents may have been exhibited in this controversy, it will hardly be believed by an impartial judge, reasoning on the general probabili-ties of the case, that Homer intended the actions of his heroes, any more than their genealogies, to be historically correct; but, at the same time, it will readily be admitted that he was much more likely to take for the scene of his poem a town that had really existed, and for its subject, a traditional report of a war which had actually been carried on, than to have invented a fabulous city and an imaginary warfare, without any historical foundation whatever. Mr Bryant published on this subject Observations on a Treatise entitled Description of the Plain of Troy, by Mr de Chevalier, 4to, 1795: A Dissertation concerning the War of Troy, and the expedition of the Greeks, as described by Homer; showing that no such expedition was ever undertaken, and that no such city in Phrygia existed; 4to, 1796: Observations on the Vindication of Homer, written by J.B.S. Morritt, Esq., 4to, 1799.

He had, in the meantime, not discontinued his theological studies, and had published an Essay on The Sentiments of Philo Judæus concerning the Word of God, 8vo, 1797. His last work was a volume of Dissertations on various Subjects in the Old Testament, which had been nearly completed thirty years before. The subjects which had particularly attracted his attention were the histories of Balaam, Samson, and Jonah; and besides Philo Judæus and Josephus, he had endeavoured to illustrate some controverted passages of Justin Martyr, as well as many other departments of religious and historical discussion.

The habits of Mr Bryant's maturer life were in general completely sedentary; although, in his youth, he had taken his full share in the cultivation of the manly exercises common to Etonians, and had once the good fortune to save, by his proficiency in swimming, the life of Dr Barnard, afterwards provost of Eton. His conversation was elegant and animated, his manners mild but firm; he exerted himself to please others, and was himself easily pleased. He was much courted in society, and his residence at Cypenham, near Windsor, was not unfrequently visited by persons of the highest possible rank. He never married. He died in his eighty-ninth year, the 14th November 1804, from the immediate consequence of an accidental blow. He left his library to King's College, having, however, previously made some valuable presents out of it to the king and to the Duke of Marlborough. He also bequeathed L.2000 to the Society for the Propagation of the Gospel, and L.1000 for the use of the superannuated collegers of Eton school. man's Magazine, lxxiv. p. 1080, 1165; Nichols's Literary Anecdotes, iv. 667, 8vo, Lond. 1812; Aikin's Biographical Dictionary, x.) (T.Y.)

BRYAXIS, a celebrated Athenian statuary. His era is uncertain; but as he executed a statue of Seleucus king of Syria, and contributed, along with Timotheus and other artists, to adorn the Mausoleum, it may be placed in the

latter half of the fourth century B.C. His skill may be in-Bryennius ferred from the fact, that several of his statues were at differ-Bubastis. ent times attributed to Phidias.

BRYENNIUS, MANUEL, a Greek writer on music, who is supposed to have flourished under the emperor Andronicus I., who reigned from 1282 till 1328. He wrote three books of harmonics, the first of which is a kind of commentary on Euclid, while the second and third are illustrative of the theory of Ptolemy. Meibomius had given the public expectations of a translation of this work, but not living to complete his task, Dr Wallis published it in 1680; and it now forms part of the third volume of his works, published at Oxford in 3 vols. fol., 1699. In the Royal Library at Paris there are several fine MSS. of Bryennius's work; which, however, throws no light on the mysterious subject of the structure of ancient Greek melody.

BRYONIA Dioica, bryony—a native plant which was formerly used as a drastic purgative, but is now disused be-cause of its violent effects. The root yields bryonine, an acrid vegetable alkaloid which is very poisonous.

BRYOPHYLLUM, a genus of succulent plants, which have the property of budding from the margin of their leaves. The only known species is B. calycinum, a native of the Moluccas.

BRZESC, a fortified town of Russia, on the right bank of the Bug, in the government of Grodno, 110 miles south of the city of that name. It has a citadel, an old castle, a famous Jewish synagogue, high school, and an active transit trade. In 1794 this was the scene of a battle between the Russians and Poles. Pop. 8000.

BRZEZANY, the capital of a circle of the same name in Austrian Galicia, situated on the Zlotar Lissa, 50 miles S. by E. of Lemberg. It has a castle, gymnasium, and some manufactures of linen. Pop. 7500.

BUA, an island in the Adriatic Sea, belonging to the province of Spalatro, in the Austrian kingdom of Dalmatia. It is situated on the coast, opposite to Trau, with which it is connected by a bridge; is rich in wine, oil, and fruit; and contains about 4000 inhabitants. There is in it a remarkable well of asphaltum.

BUAT-NANCAY, LOUIS-GABRIEL, COUNT DU, a diplomatist and historian, was born of an old family in Normandy, March 2, 1732. At an early age he entered into the order of Malta; and became acquainted with the Chevalier de Folard, author of the Commentaries on Polybius, who received him into his house and superintended his education. Buat, through Folard's influence, was successively minister for France at Ratisbon and Dresden; but becoming disgusted with this career, he retired from public life in 1776. He died at Nançay, in Berry, Sept. 18, 1787.

Buat was a man of some talents and considerable literary attainments, but his want of knowledge of the world seems to have in a great measure disqualified him for public employment. He wrote with great facility; but his style is very unequal. He was the author of several works on politics and history, of which the best are his Tableau du Gouvernement actuel de l'Empire d'Allemagne, translated from the German of Schmauss, with notes historical and critical, Paris, 1755, 12mo. Les Origines, ou l'Ancien Gouvernement de la France, de l'Italie, et de l'Allemagne, Hague, 1757, 4 vols. 12mo. Histoire Ancienne des Peuples de l'Europe, Paris, 1772, 12 vols. 12mo. Besides other works, he contributed various articles to the journals of his time, on history, literature, and political economy; in particular, some excellent observations on the character of Xenophon, inserted in vol. iv. of the Variétés Litteraires. (See Biographie Universelle.)

BUBASTIS, in the Egyptian mythology, one of the mes of Isis or the moon. The Egyptians bestowed difnames of Isis or the moon. ferent names on the sun, either to characterize its effects or its relations with respect to the earth; and they followed Bubons

writer of Egypt, leaves no doubt on this subject. "Every count. Bucaneer, thing which is published of Osiris and Isis, all the sacerdotal is for this reason that the Greeks, who honoured the moon and tallow they should procure by hunting. by the name of Artemis (Diana), bestowed it also on this power to Artemis (Diana). Among the numerous Egyptian antiquities in the British Museum there are several to be Paset.

BUBONA, among the Romans, the name of the god- free prey or booty of whatever came in their way. dess who presided over cows and oxen. Small statues of

BUBULCUS, the name of a family of the Junian gens. The only member of this family who particularly distinguished himself was C. Junius Bubulcus Brutus, who held all the highest offices of state in the republican times of anthe loss of 20,000 men near Bovianum. For this victory he was honoured with a triumph.

BUC, SIR GEORGE, a learned English antiquary, dethe Third Universitie of England. He died in 1623.

BUCANEER (from the French boucaner), in its pri-

the same method respecting the moon. Chæremon, a sacred niards of America. Of both these we shall give an ac-Bucaneer.

I. The Bucaneers of St Domingo.—The Spaniards had fables, allude only to the phases of the moon and the course not long been in possession of the West Indies and of of the sun." Bubastis was one of the principal attributes of the continent of America, when other nations, especially Isis. Theology first personified her, and then raised her to the English and French, began to seek establishments the rank of divinity, in whose honour a city of that name there. But though the Spaniards were unable to people was built, as described by Herodotus (ii. 137, 138), and such extensive countries themselves, they were resolved where the people, to the number of 700,000, collected an- that no others should do it for them, and therefore waged nually from all parts of Egypt to celebrate her festival a cruel war on all those of any other nation who attempted The symbol of this deity was a cat, which the priests fed to settle in any of the Antilles or Caribbee Islands. The with sacred food; and when it died, its body was embalmed French, however, were at last lucky enough to acquire and carried in pomp to the tomb prepared for its reception. some footing in the island of St Christophers; but by the The ancients have explained this worship variously. The time they began to subside into a regular form of govern-Greeks maintained that when Typhon declared war against ment, the Spaniards found means to dislodge them. Upon the gods, Apollo transformed himself into a vulture, Mer- this the wretched fugitives, considering at how great a cury into an ibis, and Bubastis into a cat, and that the ve- distance they were from their mother country, and how neration of the people for the latter animal took its rise near to the island of Hispaniola or St Domingo, the northfrom that fable; but they ascribed their own ideas to the ern parts of which were then uninhabited, and full of Egyptians, who thought very differently. However that swine and black cattle, immediately resolved to take posmay be, the cat was greatly honoured in Egypt; and on one session of that country, in conjunction with several other occasion when a Roman soldier imprudently killed one, he adventurers of their own and the English nation; espewas immediately put to death by the populace. In the lan- cially as the Dutch, who now began to appear in these guage of the priests, Bubastis was deemed the daughter of seas, promised to supply them plentifully with all kinds of Isis, and even represented her in certain circumstances. It necessaries they might require, in exchange for the hides

These new settlers obtained the name of bucaneers, from Egyptian divinity. The Egyptians attributed to Bubastis their custom of bucanning their beef and pork in order to the virtue of assisting pregnant women; while the Greeks keep it for sale or for their own consumption. But some of and Latins, disciples of the Egyptians, ascribed the same them soon grew tired of this new way of life, and took to planting; whilst many more chose to turn pirates, trusting to find among those who remained on shore a quick sale statues of Bubastis, whose hieroglyphic name is now known for all the plunder they could make at sea. This new body of adventurers were called freebooters, from their making

The colony now began to thrive at a great rate, by the this divinity were generally placed in the niches of byres cheap and easy manner in which the freebooters acquired and stables; or a likeness of the goddess was painted over the greatest riches, and the profusion with which they distributed them amongst their old companions, the bucaneers and planters, for the merest trifles. This brought numbers of settlers from France in quality of indentured servants, though they toiled rather like slaves than servants during the three years for which they generally bound cient Rome, was three times consul, and in B. C. 302 was themselves. One of these men presuming to represent to appointed dictator. He rendered important service to the his master, who always fixed upon a Sunday for sending state in its war with the Samnites, whom he defeated with him with skins to the port, that God had forbidden such a practice when he had declared that "six days shalt thou abour, and on the seventh day shalt thou rest," the brutish bucaneer replied, " And I say to thee, six days shalt scended of an ancient family in Lincolnshire, and born to- thou kill bulls, and strip them of their skins, and on the wards the close of the 16th century. In the reign of James seventh day shalt thou carry their hides to the sea shores;" I he was made one of the gentlemen of his Majesty's privy and this command was followed by blows. Thus the chamber, and knighted; and was also constituted master of colony consisted of four classes; bucaneers, freebooters, the revels. His greatest claim to distinction is his History planters, and indentured servants who generally remain-of the Reign of Richard III.; in which (as if in anticipa- ed with the bucaneers or planters. And these four orders tion of Horace Walpole) he endeavours to wipe off the composed what they now began to call the body of advenbloody stains which have tarnished the character of that turers, who lived together in perfect harmony, under a kind prince, and represents his person and actions in a much less of democracy; every freeman having a despotic authority odious light than any other historian has done. He also over his own family, and every captain being sovereign in wrote a Treatise of the Art of Revels; and a work entitled his ship, though liable to be discarded at the discretion of the crew.

The planters had settled chiefly in the little island of mary sense, denotes one who dries and smokes flesh or fish Tortuga, on the northern coast of Hispaniola; but soon after the manner of the Indians. The name was particularly afterwards some of them having gone to the great island given to the first French settlers in the island of St Do- to hunt with the bucaneers, the rest were surprised by the mingo or Hayti, whose principal employment consisted in Spaniards; and all, even those who had surrendered at hunting bulls or wild boars, in order to sell their hides discretion in hopes of mercy, were put to the sword or and flesh. The name has also been applied to those hanged. The next care of the Spaniards was to rid the famous piratical adventurers, chiefly English and French, great island of the bucaneers; and for this purpose they who joined together to commit depredations on the Spa- assembled a body of five hundred lance-men, who, by Bucaneer, their seldom going fewer than fifty in a company, obtained any brim, except a little flap in the front; and shoes of Bucaneer, from their enemies the name of the Fifties. But before hogskin, all of a piece. Their guns were four feet and a

people whom it was proposed to extirpate.

The bucaneers lived in little huts built on some spots of cleared ground, just large enough to dry their skins on, and contain their bucanning houses. These spots they called boucans, and the huts they dwelt in ajoupas, a word which they borrowed from the Spaniards, and the Spaniards from the natives. Though these ajoupas lay open on all sides, they were very agreeable to the hardy inhabitants in a climate where a free circulation of air is so desirable. As the bucaneers had neither wives nor children, they associated by pairs, and mutually rendered each other all the services a master could reasonably expect from a servant, living together in so perfect a community, that the survivor always succeeded his deceased partner. This kind of union or fellowship they called s'emateloter (insailoring), and each other matelot (sailor), whence is derived the custom of giving, at least in some parts of the French Antilles, the name matelotage (sailorage) to any kind of society formed by private persons for their mutual advantage. They behaved to each other with the greatest justice and openness of heart; it was considered as a crime to keep any thing under lock and key; but, on the other hand, the least pilfering was unpardonable, and punished with expulsion from the community. And, indeed, there could be no great temptation to steal, seeing it was reckoned a point of honour never to refuse a neighbour what he wanted; and where there was so little property, it was impossible there should be many disputes. If any such happened, the common friends of the parties at variance interposed, and soon put an end to the difference.

As to laws, the bucaneers acknowledged none but an odd jumble of conventions made between themselves, which, however, they regarded as the sovereign rule. They silenced all objections by coolly answering, that it was not the custom of the coast; and grounded their right of acting in this manner on their baptism under the tropic, which freed them, in their opinion, from all obligations antecedent to that marine ceremony. The governor of Tortuga, when that island was again settled, though appointed by the French court, had very little authority over them; and they contented themselves with rendering him from time to time some slight homage. They had in a manner entirely shaken off the yoke of religion, and thought they did a great deal in not wholly forgetting the God of their fathers. We are surprised to meet with nations among whom it is a difficult matter to discover any trace of a religious worship; and yet it is certain, that had the bucaneers of St Domingo been perpetuated on the same footing on which they subsisted at the time we are speaking of, the third or fourth generation of them would have possessed as little religion as the Caffres and Hottentots of Africa, or the Cannibals of the South Sea Islands.

They even laid aside their surnames, and assumed nicknames or martial names, most of which afterwards continued in their families. Many, however, on their marrying, which seldom happened till they turned planters, took care to have their real surnames inserted in the French contract; and this practice gave occasion to a proverb, which long remained current in the French Antilles, that a man is not to be known till he takes a wife.

Their dress consisted of a filthy greasy shirt, dyed with the blood of the animals they killed; a pair of trousers still more nasty; a thong of leather by way of belt, to which they hung a case containing some Dutch knives, and a kind of short sabre called manchette; a hat without

detailing the particulars of this attack we shall endeavour half in the barrel, and of a calibre sufficient to admit balls to give some account of the manners and customs of the of an ounce. Every man had his contract servants, more or fewer according to his abilities; besides a pack of twenty or thirty dogs, among which there was always a couple of beagles. Their chief employment at first was ox-hunting; and if at any time they chased a wild hog, it was rather for pastime, or to make provision for a feast, than for any other advantage. But in process of time some of them betook themselves entirely to the hunting of hogs, whose flesh they bucanned in the following manner: first, they cut the flesh into long pieces, an inch and a half thick, and sprinkled them with salt, which they rubbed off after twenty-four hours; then they dried these pieces in stoves, over a fire made of the skin and bones of the beast. till they grew as hard as a board, and assumed a deep brown colour. Pork prepared in this manner might be kept in casks a twelvemonth and longer; and when steeped a little while in lukewarm water, it became plump and rosy, yielding, either broiled, boiled, or otherwise dressed, a grateful smell, sufficient to tempt the most languid appetite and please the most delicate palate.

In hunting, they set out at day-break, preceded by the beagles, and followed by their servants with the rest of the dogs; and as they made it a point never to baulk their beagles, they were often led by them over the most frightful precipices, and through places which any other mortal would have deemed absolutely impassable. As soon as the beagles had roused the game, the rest of the dogs struck up and surrounded the beast, stopping it, and keeping a constant barking till the bucaneer could get near enough to shoot it, in doing which he commonly aimed at the pit of the breast; and when the beast fell he hamstrung it, to prevent its rising again. But it has sometimes happened that the creature, not wounded enough to tumble to the ground, has run furiously at his pursuer, and ripped him open. In general, however, the bucaneer seldom missed his aim; and when he did, he was nimble enough to get up the tree behind which he usually had the precaution to place himself; whilst some of them have been seen to overtake the beast in chase, and hamstring it with-

out any further ceremony.

As soon as the prey was half skinned, the master cut out a large bone, and sucked the marrow for breakfast; leaving the rest to his servants, one of whom always remained behind to finish the skinning, and bring the skin, with a choice piece of meat for the huntsman's dinner. They then continued the chase till they had killed as many beasts as there were heads in the company. The master was the last to return to the boucan, loaded like the rest with a skin and a piece of meat. Here the bucaneers found their tables ready; for every one had his separate table, which was the first thing, any way fit for the purpose, that came in their way, a stone, the trunk of a tree, and the like. No table-cloth, no napkin, no bread or wine, graced their board; not even potatoes, or bananas, unless they found them ready to their hand. When this did not happen, the fat and lean of the game, taken alternately, served to supply the place. A little pimento, and the juice of an orange, formed their only sauce; contentment, peace of mind, a good appetite, and abundance of mirth, made. every thing agreeable. Thus they lived and spent their. time, till they had completed the number of hides for which they had agreed with the merchants; which done. they carried them to Tortuga, or some port of the great island.

As the bucaneers used much exercise, and fed only on: flesh, they generally enjoyed a good state of health. They were indeed subject to fevers; but these were either such

Bucaneer, as lasted only a day, and left no sensible impression the day gular a life, entered among the freebooters, who there- Bucaneer. of following, or slight slow fevers, which did not hinder them by became a very powerful body. France, which had was usual with the patient, when asked how he did, to answer, "Very well; nothing ails me but the fever." It was impossible, however, that they should not suffer considerably by such fatigues, under a climate to the heat of which few of them had been early enough inured. Hence the most considerate among them, after they had got money enough for that purpose, turned planters;—the rest soon spent the fruits of their labour in taverns and tippling-houses; and many had so habituated themselves to this kind of life, as to become incapable of any other. Nay, there have been instances of young men, who having early embarked through necessity in this painful and dangerous profession, persisted in it afterwards, merely through a principle of libertinism, rather than return to France and take possession of the most plentiful fortunes.

Such were the bucaneers of St Domingo, and such was their situation when the Spaniards undertook to extirpate them. And at first the assailants met with great success; for as the bucaneers hunted separately, every one attended by his servants, they were easily surprised. Hence the Spaniards killed numbers, and took many more, whom they condemned to a most cruel slavery. But whenever the bucaneers had time to put themselves into a state of defence, they fought like lions, to avoid falling into the hands of a nation from whom they were sure to receive no quarter; and by this means they often escaped; nay, there are many instances of single men fighting their way through numbers. These dangers, however, and the success of the Spaniards in discovering their boucans, where they used to surprise and cut the throats of the bucaneers and their servants in their sleep, engaged them to cohabit in greater numbers, and even to act offensively, in hopes that by so doing they might at last induce the Spaniards to let them live in peace. But the fury with which they behaved whenever they met any Spaniards served only to make their enemies more intent on their destruction; and assistance coming to both parties, the whole island was turned into a slaughter-house, and so much blood spilt on both sides, that many places, on account of the carnage of which they had been the scenes, were described as the hill of the massacre, the plain of the massacre, the valley of the massacre, and so forth.

At length the Spaniards grew tired of this mode of proceeding, and had recourse to their old method of surprise, which, against enemies of more courage than vigilance, was likely to succeed better. This placed the bucaneers under a necessity of never hunting except in large parties, and fixing their boucans in the little islands on the coast, where they retired every evening; an expedient which succeeded very well, and the boucans, by being more fixed, soon acquired the air and consistency of little towns. When the bucaneers had once established themselves, as here related, each boucan sent out scouts every morning to the highest part of the island, in order to reconnoitre the coast, and see if any Spanish parties were abroad. If no enemy appeared, they appointed a place and hour of rendezvous in the evening, and were never absent if not killed or made prisoners. When, therefore, any one of the company was missing, it was not lawful for the rest to hunt again till they had got intelligence of him if taken, or avenged his death if killed. Things continued in this situation for a long time, till the Spaniards made a general hunt over the whole island, and, by destroying the game, forced the bucaneers to betake themselves to another course of life. Some of them turned planters, and thus increased the French settlements on the coast, or formed others; whilst the rest, not relishing so confined and re-

from action, and were of course so little regarded, that it hitherto disclaimed for her subjects these ruffians, whose successes were only temporary, acknowledged them, however, as soon as they formed themselves into settlements, and took proper measures for their government and de-

II. Bucaneers, the Pirates.—Before the English had effected any settlement in Jamaica, and the French in St Domingo, some pirates of both nations, who were afterwards so much distinguished by the name of Bucaneers, had driven the Spaniards out of the small island of Tortuga; and, fortifying themselves there, had with an amazing intrepidity made excursions against the common enemy. They formed themselves into small companies consisting of fifty, a hundred, or a hundred and fifty men each. A boat, of greater or smaller size, was their only armament. Here they were exposed night and day to all the inclemencies of the weather, having scarce room enough to lie down. A love of absolute independence rendered them averse from those mutual restraints which the members of society impose upon themselves for the common good; and as the authority they had conferred on their captain was confined to his giving orders in battle, they lived in the greatest confusion. Like the savages, having no apprehension of want, nor any care to preserve the necessaries of life, they were constantly exposed to the severest extremities of hunger and thirst; but deriving from their very distresses a courage superior to every danger, the sight of a ship transported them to a degree bordering on frenzy. They never deliberated on the attack, but it was their custom to board the ship as soon as possible. The smallness of their vessels, and the skill they showed in the management of them, screened them from the fire of the larger class of ships; and they presented only the fore part of their little vessels filled with fusileers, who fired at the port-holes with so much exactness that it entirely confounded the most experienced gunners. As soon as they threw out the grappling, the largest vessels seldom escaped them.

In cases of extreme necessity they attacked the people of every nation, but fell upon the Spaniards at all times. They thought that the cruelties which the latter had exercised on the inhabitants of the new world justified the implacable aversion they had sworn against them. But this was heightened by the mortification they felt in seeing themselves debarred from the privileges of hunting and fishing, which they considered as natural rights. Their principles of justice and religion in no degree interfered with their predatory habits; for whenever they embarked on any expedition, they used to pray to heaven for the success of it; and they never came back from plundering, without returning thanks to God for their victory.

The ships which sailed from Europe to America seldom tempted their avidity, since the merchandise which these contained could not have been easily sold, nor indeed very profitable to those barbarians. They always waited for them on their return, when they were certain they were laden with gold, silver, jewels, and all the valuable productions of the new world. If they met with a single ship they never failed to attack her. As to the fleets, they followed them till they sailed out of the Gulf of Bahama; and as soon as any one of the vessels was separated by accident from the rest, it was taken. The Spaniards, who trembled at the approach of the bucaneers, whom they called devils, immediately surrendered. Quarter was granted if the cargo proved to be a rich one; if not, all the prisoners were thrown into the sea.

The bucaneers, when they had got a considerable booty, at first held their rendezvous at the island of Tortuga, in

to St Domingo, and the English to Jamaica. Each person, holding up his hand, solemnly protested that he had secreted nothing of what he had taken. If any one among them was convicted of perjury, a case which seldom happened, he was left, as soon as an opportunity offered, upon some desert island, as a traitor unworthy to live in society. Such of their number as had been maimed in any of their expeditions were first provided for. If they had lost a hand, an arm, a leg, or a foot, they received twenty-six pounds; whilst an eye, a finger, or a toe, lost in fight, was valued only at half this sum. The wounded were allowed half a crown per day for two months, to enable them to have their wounds taken care of; and if they had not money enough to answer these several demands, the whole company were obliged to engage in some fresh expedition, and to continue it till they had acquired a sufficient stock to enable them to satisfy these honourable contracts. The remainder of the booty was then divided into as many shares as there were bucaneers. The commander could only lay claim to a single share; but they complimented him with two or three, in proportion as he had acquitted himself to their satisfaction. Favour never had any influence in the division of the booty, for every share was determined by lot. The most rigid justice was extended even to the dead. His share was given to the man who was known to be his companion when alive, and therefore accounted his heir. If the person who had been killed had no intimate, his portion was sent to his relations when they were known; and if there were no friends or relations, it was distributed in charity to the poor, and to the churches, which consented to offer up prayers for the person in whose name these benefactions were given.

When these duties had been complied with, they then indulged themselves in all kinds of profusion. Unbounded licentiousness in gaming, wine, women, and every kind of debauchery, was carried to the utmost pitch of excess, and was stopt only by the want which such profusion brought on. Those who had been enriched with several millions were in an instant totally ruined, and rendered destitute of clothes and provisions. They returned to sea; and the new supplies which they acquired were soon lavished in the same manner as before.

The Spanish colonies, flattering themselves with the hope of seeing an end to their miseries, and reduced almost to despair at finding themselves a perpetual prey to these ruffians, grew weary of navigation. They gave up all the power, conveniencies, and fortune, which their connections procured them, and formed themselves into so many distinct and separate associations. They were sensible of the great inconvenience arising from such a conduct, and avowed it; but the dread of falling into the hands of rapacious and savage men had greater influence over them than the dictates of honour, interest, and policy. This gave rise to that spirit of inactivity which continues to the present time, notwithstanding the agitating events of which that quarter of the world has since been

The despondency thus produced served only to increase the boldness of the bucaneers. As yet they had only appeared in the Spanish settlements in order to carry off provisions when in want of them. But they no sooner found their captures begin to diminish, than they determined to recover by land what they had lost at sea. The richest and most populous countries of the continent were plundered and laid waste. The culture of lands was as much neglected as navigation; and the Spaniards dared no more appear in their public roads, than sail in the latitudes which belonged to them.

Bucaneer. order to divide the spoil; but afterwards the French went new species of freebooting, Montbar, a gentleman of Lan-Bucaneer. guedoc, particularly distinguished himself. Having by chance, in his infancy, met with a circumstantial account of the cruelties practised in the conquest of the New World. he conceived an aversion, which he carried to a degree of frenzy, against that nation which had committed such enormities. The enthusiasm which this spirit of humanity worked him up to merged in a ferocity still more cruel than that of the religious fanaticism to which so many victims had been sacrificed. The manes of these unhappy sufferers seemed to rouse him, and call for vengeance. He had heard some account of the bucaneers, who were said to be the most inveterate enemies to the Spanish name; and he therefore embarked, with some others, on board a ship in order to join them.

> In the passage they met with a Spanish vessel, attacked, and, as was usual in those times, immediately boarded it. Montbar, with a sabre in his hand, fell upon the enemy, broke through them, and, hurrying twice from one end of the ship to the other, levelled every thing that opposed him. When he had compelled the enemy to surrender, leaving to his companions the happiness of dividing so rich a booty, he contented himself with the savage pleasure of contemplating the dead bodies of the Spaniards, against whom he had sworn a constant and deadly hatred.

> Fresh opportunities soon occurred which enabled him to exercise this spirit of revenge without extinguishing it. The ship which conveyed him arrived on the coast of St Domingo, where the bucaneers on land immediately applied to barter provisions for brandy. As the articles they offered were of little value, they alleged in excuse that their enemies had overrun the country, laid waste their settlements, and carried off all their property. "Why," replied Mont-bar, "do you tamely suffer such insults?" "Neither do we," answered they; "the Spaniards have experienced what kind of men we are, and have therefore taken advantage of the time when we were engaged in hunting; but we are going to join some of our companions who have been still worse treated than we, and then we shall have warm work." "If you approve of it," answered Montbar, "I will head you, not as your commander, but as the foremost to expose myself to danger." The bucaneers perceiving from his appearance that he was the very man they wanted, cheerfully accepted his offer; and the same day they overtook the enemy, when Montbar attacked them with an impetuosity that astonished the bravest, and scarce one Spaniard escaped the effects of his fury. The remaining part of his life was equally distinguished as this day. The Spaniards suffered so much from him, both by sea and land, that he acquired the name of the Exterminator.

His savage disposition, as well as that of the other bucaneers who attended him, having obliged the Spaniards to confine themselves within their settlements, the freebooters resolved to attack them there. This new method of carrying on the war required superior forces; and their associations in consequence became more numerous. The first considerable one was that formed by L'Olonois, who derived his name from the sands of Olones, the place of his birth. From the abject state of a bondsman, he had gradually raised himself to the command of two canoes, with twenty-two men; and with these he was so successful as to take a Spanish frigate on the coast of Cuba. He then repaired to Port-au-Prince, in which were four ships. fitted out purposely to sail in pursuit of him; but he took them, and threw all the crews into the sea except one man, whom he saved in order to send him with a letter to the governor of the Havannah, acquainting him with what he had done, and assuring him that he would treat in the same manner all the Spaniards who should fall into his Among the bucaneers who signalized themselves in this hands, not excepting the governor himself if he were for I his canoes and prize ships aground, and sailed with his the object of their wishes. frigate only to the island of Tortuga.

of Porto Bello, a Spanish ship, estimated at L.218,500, and by other actions equally brave and daring. These two gave out that they were going to embark together on an expedition equally glorious and profitable; and in consequence they soon collected together four hundred and forty men. This body of men, the most numerous which the bucaneers had yet been able to muster, sailed to the the entrance for its defence was taken; the cannon were spiked; and the whole garrison, consisting of two hundred and fifty men, were put to death. They then re-embarked and came to Maracaybo, built on the western coast of the lake of the same name, at the distance of ten leagues from its mouth. This city, which had become flourishing and rich by its trade in skins, tobacco, and cocoa, was desertother side of the bay. If the bucaneers had not lost a fortnight in riot and debauchery, they would have found at Gibraltar, near the extremity of the lake, every thing which the inhabitants had secreted, to secure it from being plundered. On the contrary they met with fortifications making themselves masters of at the expense of a great asperated at this disappointment, they set fire to Gibraltar; and Maracaybo would have shared the same fate had it not been ransomed. Besides the sum which they received for its ransom, they also carried off all the crosses, pictures, and bells of the churches; intending, as they said, to build a chapel in the island of Tortuga, and to consecrate this part of their spoils to sacred purposes. make no other offering to heaven than that which arose from their robberies and plunder.

they had made on the coast of Venezuela, Morgan, the most renowned of the English bucaneers, sailed from Jaopposition. The conquest of Panama was an object of much greater importance. To secure this Morgan thought it necessary to sail in the latitudes of Costa-Rica, in order to procure some guides in the island of St Catharines, where the Spaniards confined their malefactors. This place was so strongly fortified that it might to have held out for ten years against a considerable army. But notwithstanding this, the governor, on the first appearance of the pirates, sent privately to concert measures how he might surrender himself without incurring the imputation of cowardice; and the result of this consultation was, that Morgan in the night-time was to attack a fort at some distance, while the governor was to sally out of the citadel to defend a post of so much consequence, and that the assailants should then attack him in the rear, and take him prisoner, which would occasion an immediate surrender of the place. It was agreed that a smart firing should be kept up on both sides, without doing mischief to either. This farce was admirably carried on. The Spaniards, without being exposed to any danger, appeared to have done their duty; and the bucaneers, after having totally demolished the fortifications, and put on board their vessels a prodigious quantity of warlike ammunition, which they found at St Catharines, steered their course towards the river Chagre, the only

Bucaneer. tunate enough to take him. After this expedition he ran channel whereby they could arrive at the place which was Bucaneer.

At the entrance of this considerable river a fort had At Tortuga he met with Michael de Basco, who had been built upon a steep rock, which the waves of the sea distinguished himself by taking, even under the cannon constantly beat against. This bulwark, naturally difficult of access, was defended by an officer whose extraordinary abilities were equal to his courage, and by a garrison which was in all respects worthy of such a commander. Here the bucaneers, for the first time, met with a resistance which could only be equalled by their perseverance; and it was a doubtful point whether they should succeed or be obliged to raise the siege, when a lucky accident happened which Bay of Venezuela, which runs up into the country for the proved favourable to their glory and their fortune. The space of about fifty leagues. The fort which was built at commander was killed, and the fort accidentally took fire; upon which the besiegers, taking advantage of this double calamity, made themselves masters of the place.

Morgan left his vessels at anchor, with a sufficient number of men to guard them, and sailed up the river in his sloops for thirty-three miles, till he came to Cruces, where it ceases to be navigable; and he then proceeded by land to Panama, which was only five leagues distant. Upon a ed; and the inhabitants had retired with their effects to the large and extensive plain which stretched out before the city, he met with a considerable body of troops, whom he put to flight with the greatest ease, and entered the city, which was now abandoned. Here were found prodigious treasures concealed in the wells and caves; some valuable commodities were also taken in the boats which were left aground lately erected, which they had the bootless satisfaction of at low water; and in the neighbouring forests were likewise found several rich deposits. Having burnt the city, deal of blood; for the inhabitants had already removed to they set sail with a great number of prisoners, who were a distance the most valuable part of their property. Ex- ransomed a few days afterwards, and arrived at the mouth of the Chagre with a prodigious booty.

In 1603 an expedition of the greatest consequence was formed by Van Horn, a native of Ostend, but who had served all his life among the French. His own intrepidity prevented his tolerating the least signs of cowardice amongst those who associated with him. In the heat of an engagement he went about his ship, observed his men Such was the religion of these barbarous people, who could in succession, and immediately killed those who shrunk at the sudden report of a pistol, gun, or cannon. This extraordinary discipline rendered him the terror of the But while they were idly dissipating the spoils which coward and the idol of the brave. In other respects he readily shared with the men of spirit and bravery the immense riches which were acquired in the course of his maica to attack Porto Bello. His plan of operations was so marauding expeditions. When he went upon such expewell contrived that he surprised and took the city without ditions, he generally sailed in his frigate, which was his own property. But his designs requiring greater numbers to carry them into execution, he called to his assistance Grammont, Godfrey, and Jonqué, three Frenchmen distinguished by their exploits, and Lawrence de Graff, a Dutchman, who had signalized himself still more than they Twelve hundred bucaneers joined themselves to these commanders, and sailed in six vessels for Vera Cruz.

> The darkness of the night favoured their landing, which was effected about three leagues from the place, where they arrived without being discovered. The governor, the fort, the barracks, and the posts of the greatest consequence, every thing, in short, which could occasion any resistance, were taken by the break of day. All the citizens, men, women, and children, were shut up in the churches, whither they had fled for shelter. At the door of each church were placed barrels of gunpowder to blow up the building. and a bucaneer, with a lighted match, was to set fire to it upon the least appearance of an insurrection.

> While the city was kept in this state of terror, it was easily pillaged; and after the bucaneers had carried off whatever was most valuable, they made a proposal to the citizens who were kept prisoners in the churches to ransom their lives and liberties by a contribution of L.437,500. This unfortunate people, who had neither eaten nor drunken fo

Bucaneer. three days, cheerfully accepted the terms which were offered them. Half of the money was paid the same day, and the other part was expected from the interior of the country, when there appeared on an eminence a considerable body of troops advancing, and near the port a fleet of seventeen ships from Europe. At the sight of this armament, the bucaneers, without any marks of surprise, retired quietly, with fifteen hundred slaves they had seized, as a trifling indemnification for the rest of the money they expected, the settling of which they referred to a more favourable opportunity. Their retreat was equally daring. They boldly sailed through the midst of the Spanish fleet, which let them pass without firing a single gun, and, in fact, seemed afraid of being attacked and beaten. Spaniards would not probably have escaped so easily, if the vessels of the pirates had not been laden with silver, or if the Spanish fleet had been freighted with any other effects but such merchandise as was little valued by these daring freebooters.

> A year had scarcely elapsed since their return from Mexico, when, on a sudden, they were all seized with a passion for going to plunder Peru. It is probable that the hopes of finding greater treasures upon a sea little frequented, than on one long exposed to piracies of this kind, was the cause of this expedition; but it is somewhat remarkable, that both the English and French, and the associations of these two nations, had projected this plan at the same time, without any communication, intercourse, or design of acting in concert with each other. About four thousand men were employed in this expedition. Some of them proceeded by Terra Firma, others by the Straits of Magelhaens, to the place which formed the object of their wishes; and if the intrepidity of these barbarians had been directed, under the influence of a skilful commander, to a single end, it is certain that they would have deprived the Spaniards of this important colony. But their natural character presented an invincible obstacle to so rare a union; for they always formed themselves into several distinct bodies, sometimes even so few in number as ten or twelve, who acted together, or separated, as whim or caprice dictated. Grognier, Lecuyer, Picard, and Le Sage, were the most distinguished officers among the French; David Samms, Peter Wilner, and Towley, among the English. :

> Such of these adventurers as had got into the South Sea by the Straits of Darien seized upon the first vessel which they found upon the coast; and their associates, who had sailed in their own vessels, were not much better provided. Weak, however, as they were, they several times beat the squadrons which were fitted out against them. But these victories were prejudicial to them, by interrupting their navigation; and when there were no more ships to be taken, they were continually obliged to make descents upon the coasts to get provisions, or to go by land in order to plunder those cities where the booty had been secured. They successively attacked Seppa, Puebla-Nuevo, Leon, Realejo, Puebla-Viejo, Chiriquita, Lesparso, Granada, Villia, Nicoy, Tecoanteca, Mucmeluna, Chiloteca, New Segovia, and Guayaquil, the most considerable of all these places.

Many of these places were taken by surprise, and most of them deserted by their inhabitants, who fled at the sight of the enemy. As soon as the bucaneers took a town, it was directly set on fire, unless a sum proportioned to its value was paid to save it. The prisoners taken in battle were massacred without mercy if they were not ransomed by the governor or some of the inhabitants; while gold, pearls, or precious stones, were the only things accepted of for the payment of their ransom. Silver being too common and too weighty for its current value, would have been troublesome to them. The chances of fortune, which neers.

seldom leave guilt unpunished, or adversity without a com- Bucaneer pensation for its suffering, atoned for the crimes committed in the conquest of the New World; and the Indians were amply avenged on the Spaniards.

While such piracies were being committed on the Southern Ocean, the Northern was threatened with the same by Grammont. He was a native of Paris, by birth a gentleman, and had distinguished himself in a military capacity in Europe; but his passion for wine, gaming, and women, had obliged him to join the pirates. Nevertheless he was affable, polite, generous, and eloquent; endued with a sound judgment, and a person of approved valour; qualities which soon made him be considered as the chief of the French bucaneers. As soon as it was known that he had taken up arms, he was immediately joined by a number of brave men. The governor of St Domingo, who had at length prevailed upon his master to approve of the project, equally wise and just, of fixing the pirates in some place, and inducing them to become cultivators, was desirous of preventing the concerted expedition, and forbade it in the king's name. But Grammont, who had a greater share of sense than his associates, was not on that account inclined to comply, and sternly replied, " How can Louis disapprove of a design he is unacquainted with, and which has been planned only a few days ago?" This answer highly pleased all the bucaneers, who directly embarked in 1685 to attack Campeachy.

They landed without opposition. But at some distance from the coast they were attacked by eight hundred Spaniards, who were beaten and pursued to the town, which both parties entered pell-mell together. The cannon they found there were immediately levelled against the citadel; but as these had very little effect, they were contriving some stratagem to enable them to become masters of the place, when intelligence was brought that it had been abandoned. There remained in it only a gunner, an Englishman, and an officer of signal courage, who chose rather to expose himself to the greatest extremities than basely to fly from the place with the rest. The commander of the bucaneers received him with marks of distinction, generously released him, gave him up all his effects, and, besides, complimented him with some valuable presents; such influence have courage and fidelity even on the minds of those who systematically violate all the rights of society.

The conquerors of Campeachy spent two months in searching the environs of the city to the extent of twelve or fifteen leagues, and in carrying off every thing which the inhabitants in their flight thought they had preserved. When all the treasure they had collected from every quarter was deposited in the ships, a proposal was made to the governor of the province, who still kept the field with nine hundred men, to ransom his capital city. His refusal determined them to burn it, and demolish the citadel. The French, on the festival of St Louis, were celebrating the anniversary of their king; and in the transports of their patriotism, intoxication, and national love of their prince, they burnt to the value of a million of logwood; a part, and a very considerable one too, of the spoil which they had made. After this singular and extravagant instance of folly, of which Frenchmen only would boast, they returned to St Domingo.

In 1697 twelve hundred bucaneers were induced to join a squadron of seven ships which sailed from Europe under the command of one Pointis, to attack the famous city of Carthagena. This was the most difficult enterprise which could be attempted in the New World. The situation of the port, the strength of the place, and the badness of the climate, were so many obstacles which would have seemed insurmountable to any but such men as the buca-But every obstacle yielded to their valour and Bucceilarii.

Buccari good fortune; the city was taken, and booty gained to the amount of L.1,750,000. Their rapacious commander, however, deprived them of the advantages resulting from their success. He scrupled not, as soon as they set sail, to offer L.5250 for the share of those who had been the chief instruments in procuring him so considerable a spoil.

The bucaneers, exasperated at this treatment, resolved immediately to board the vessel called the Sceptre, where Pointis himself was, and were with great difficulty prevented from assassinating him. They then set sail for Carthagena, where they amply repaid themselves for the losses they had sustained through the avarice of their late commander.

At length, after amassing all they could, these adventurers set sail, when unfortunately they met with a fleet of Dutch and English ships, then in alliance with Spain. Several of the pirates were either taken or sunk, with the cargoes they had on board; and the rest escaped to St Domingo.

Such was the last memorable event in the history of the The separation of the English and French, bucaneers. when the war on account of the Prince of Orange divided the two nations; the success of the means employed to promote the cultivation of land among their colonies, by the assistance of these enterprising men; the prudence evinced in selecting the most distinguished among them, and intrusting them with civil and military employments; and the protection afforded to the Spanish settlements, which till then had been a general object of plunder; all these circumstances, and various others, besides the impossibility of supplying the place of these remarkable men, who were continually dropping off, concurred to put an end to a society as extraordinary as any that ever existed. Without any regular system, without laws, without subordination, and even without any fixed revenue, they became the astonishment of the age in which they lived, as they will be also of pos-

BUCCARI, a free royal city in the Austrian province of Trieste, 5 miles E.S.E. of Fiume. It has considerable traffic in wine, wood, and charcoal, and a tunny fishery. Pop. about 2000. Long. 14. 32. E., Lat. 45. 18. N.

BUCCELLARII, an order of soldiery under the Greek emperors, appointed to guard and distribute the ammunition bread; though authors are somewhat divided as to their office and quality.

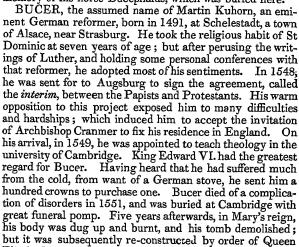
BUCCINA, an ancient kind of trumpet, originally formed of a spiral shell. It is very difficult to distinguish it from the cornu or horn, unless it was somewhat smaller, and not quite so curved; yet it certainly was of a different species, since we never read of the cornu in use with the watch, but only the buccina. In Scripture, a similar instrument, used both in war and in the temple, was called rams-horn, kiren jobel, and sepheroth hagijobelim. It was used among the Jews to proclaim their feast-days, new moons, jubilees, sabbatical years, and the like. At Lacedæmon, notice was given by the buccina when it was supper time; and at Rome it was used to proclaim the watches of the day and night; also at funerals, and at the commencement and at the conclusion of a festive entertainment. The sound of the buccina was called *buccinus*, or *bucinus*; and the musician who played on it buccinator. (See Blanchini, De Mus. Instrum. Veterum.

BUCCINO, a city in the province Principato-Citeriore of the kingdom of Naples. It stands on the river Botta, at its junction with the Negro, over which is an antique Roman bridge. Pop. 5320.

BUCENTAUR (βους and κένταυρος), the state galley of the Venetian doge, which was gilded from the prow to the stern, adorned with pillars, and covered overhead with an awning of purple silk. In this galley it was the custom annually on ascension-day for the doge, accompanied by the ambassadors and senators, to sail over a portion of the Adriatic, and dropping a ring into the sea, to espouse it in the name

of the republic, using the words Desponsamus te, mare, in signum veri perpetuique dominii.

BUCEPHALA, or BUCEPHALOS, a town built by Alexander the Great on the western side of the Hydaspis, in memory of his horse Bucephalus, which was buried here.



Elizabeth.

BUCH, LEOPOLD VON, an eminent German geologist and geographer, was born at Stolpe in Uckermark, April 25, 1774. In 1790 he studied at the mining school of Freiberg under the celebrated Werner. One of his fellow students at this school was the illustrious Alexander Von Humboldt. At the age of twenty-three he published his Attempt at a Mineralogical Description of Landeck, and another Attempt at a Geognostic Description of Silesia. He was at this time a zealous upholder of the Neptunian theory of his illustrious master. In 1797 he met his old school-fellow Von Humboldt at Salzbourg, and with him explored the geological formations of Styria and the adjoining Alps. In the spring of the following year, Von Buch extended his excursions into Italy, where his faith in the Neptunian theory was for the first time shaken. In his previous works he had advocated the aqueous origin of basaltic and other formations; he was now not less clearly convinced that these owed their existence to volcanic action. In 1799 he paid his first visit to Vesuvius, which he did not again see till 1805. when he was accompanied by Humboldt and Gay-Lussac. They had the good fortune to witness a remarkable eruption, which supplied Buch with data for refuting many erroneous ideas then entertained regarding the activity of volcanoes. Three years before, he had explored the south of France, and directed special attention to the extinct volcanoes of Auvergne. The aspect of the Puy de Dome, with its cone of trachyte and its strata of basaltic lava, induced him to abandon as untenable the doctrines of his master on the formation of these rocks. The scientific results of his investigations he embodied in his Geognostical Observations during Travels through Germany and Italy, Berlin, 1802-9, 2 vols. 8vo. From the south of Europe Von Buch now repaired to the north, and spent two years among the Scandinavian islands, making many important observations on the geography of plants, on climatology, and on geology. He also established the fact that the whole of Sweden is slowly but continuously rising above the level of the sea from Frederickshall to Abo. The details of these discoveries are given in his Travels through Norway and Lapland. Berlin, 1810. In 1815, he visited the Canary Islands in company with Christian Smith, the Norwegian botanist. His observations here convinced him that these and the other islands of the ocean owed their existence to volcanic action of the most intense kind, and that the groups of islands in the South Sea are the remains of a pre-existing continent. The physical

Buccina

Buchan Buchanan.

description of the Canary islands was published at Berlin in 1825. After leaving the Canaries, Von Buch proceeded to visit the Hebrides and the coast of Scotland and Ireland. His geological excursions even into countries already repeatedly visited were continued without interruption till his 78th year. Eight months before his death, he visited the mountains of Auvergne; and on returning home he read a paper on the Jurassic Formation before the Academy of Berlin. The manner of Von Buch's life was singularly favourable to scientific pursuits. He inherited from his father a fortune more than sufficient for all his wants. He was never married, and was completely unembarrassed by family ties. His excursions he always undertook on foot, with a staff in his hand, and the large pockets of his over-coat filled with papers and geological instruments. Under this guise, the passer-by would not easily have recognised the man whom Humboldt has pronounced the greatest geologist of our era. He died at Berlin on the 4th of March 1853.

In addition to the works already mentioned, Von Buch published others, of which we may specify the magnificent Geological Map of Germany, in 42 sheets. Berlin, 1832.

BUCHAN, a district of Scotland. See ABERDEENSHIRE. BUCHANAN, GEORGE, one of the most illustrious characters of the sixteenth century, was born about the beginning of February in the year 1506. His father was Thomas, the second son of Thomas Buchanan of Drummikill; his mother Agnes Heriot, of the family of Trabroun. The house from which he descended he has himself characterized as more remarkable for its antiquity than for its opulence. Thomas Buchanan the younger obtained from his father a grant of the farm of Mid-Leowen, or, as it is more commonly called, the Moss, situated in the parish of Killearn and county of Stirling. He died of the stone at a premature age; and, about the same period, the poet's grandfather found himself in a state of insolvency. The family, which had never been opulent, was thus reduced to extreme poverty: but his mother struggled hard with the misery of her condition; and all her children, five sons and three daughters, arrived at the age of maturity. In the year 1531, a lease of two farms near Cardross was granted by Robert Erskine, commendator of Dryburgh and Inchmahome, to her and three of her sons, Patrick, Alexander, and George. One of her daughters appears to have married a person of the name of Morison; for Alexander Morison, the son of Buchanan's sister, published an edition of his uncle's paraphrase of the Psalms. Her third son, whose extraordinary attainments have rendered the family illustrious, is reported by oral tradition to have been indebted for the rudiments of learning to Killearn school, which long continued to maintain a considerable reputation. Mid-Leowen, which stands on the banks of the Blane, is situated at the distance of about two miles from the village; and it may be conjectured that the future poet and statesman daily walked to school, and carried along with him his homely repast. Dr Mackenzie, whose authority is extremely slender, asserts that he was partly educated at the school of Dunbarton. His very promising talents recommended him to the favour and protection of his maternal uncle, James Heriot, who, apparently in the year 1520, sent him to prosecute his studies in the university of Paris. It was here that he began to cultivate his poetical talents; partly impelled, as he informs us, by the natural temperament of his mind, partly by the necessity of performing the usual exercises prescribed to younger students. Some of the French writers most capable of estimating his attainments, have not neglected to record his obligations to their country: Vavasseur has remarked that, although a Scottishman by birth, he might well pass for a French poet, since all that he knew of polite literature, and particularly of poetry,

he had acquired in France. Buchanan did not profess to Buchanan be one of those bright geniuses who can master a new language every six weeks; he incidentally states that his knowledge of Latin was the result of much youthful labour. The Greek tongue, in which he likewise attained to proficiency, he acquired without the aid of a preceptor. The current speech of his native district at that period may be supposed to have been Gaelic. Of this language it is at least certain that he possessed some knowledge; and an anecdote has been related which at once confirms this supposition, and illustrates his peculiar vein of humour. When in France, having met with a woman who was said to be possessed with the devil, and who professed to speak all languages, he accosted her in Gaelic: as neither she nor her familiar returned any answer, he took a protest that the devil was ignorant of that

Within the space of two years after his arrival in Paris, his uncle died, and left him exposed to want in a foreign country: his misery was increased by a violent distemper, which had perhaps been occasioned by poverty and mortification; and in this state of hopeless languor he returned to Scotland at the critical age of sixteen. Having devoted the best part of a year to the recovery of his health, he next assumed the character of a soldier, and served along with the auxiliaries whom the duke of Albany had conducted from France. The Scottish forces, commanded by the regent in person, marched towards the borders of England, and, about the end of October 1523, laid siege to the castle of Werk. The auxiliaries carried the exterior wall by assault, but could not long occupy the station which they had gained. The large area between the two ramparts, intended as a receptacle, during the time of war, for the cattle and stores of the neighbouring peasantry, was at this crisis replenished with materials of a combustible nature; and when the garrison found themselves repulsed by the French soldiers, they set fire to the straw, and speedily expelled their enemies by the flames and smoke. During the two following days, the assailants persisted in battering the inner wall: when they had effected a sufficient breach, the French soldiers again rushed to the attack, and surmounted the ruins; but they were so fiercely assaulted by missile weapons from the inner tower, which was yet entire, that after having sustained some loss, they were compelled to retreat, and repassed the Tweed. The duke, finding his native troops disaffected, and the army on the English frontier too formidable from its numbers, removed his camp on the 11th of November; and as he marched towards Lauder after midnight, his army was terribly annoyed by a sudden storm of snow.

Buchanan, who belonged to a fierce and warlike nation, seems to have caught some portion of the military ardour. It was his youthful curiosity respecting the profession of arms which had thus prompted him to mingle in danger; and he was persuaded that there is a very close affinity between the studies of literature and of war. In his history of Scotland, written at an advanced age, he often describes feats of chivalry with great animation. But his experience in the course of this inglorious campaign did not render him more enamoured of a military life: the hardships which he had undergone reduced him to his former state of languor; and during the rest of the winter he was confined to bed. In the beginning of the ensuing spring, when he had completed the eighteenth year of his age, he was sent to the university of St Andrews, where he and his brother Patrick were at the same time matriculated in what was then called the Pedagogy, and afterwards St Mary's College. On the 3d of October 1525 George Buchanan took the degree of A. B.; and it

Buchanan appears from the faculty register that he was then a Buchanan entered upon his new charge; for in the course Buchanan taught by John Mair, a celebrated doctor of the Sorbonne. Buchanan informs us that it was to hear his prelections that he had been sent to St Andrews, and that he afterwards followed Mair to France. It has been very confidently stated, that he was now a dependent on the bounty of this venerable commentator on Peter of Lombardy; and if the fact could be established by any competent evidence, the character of Buchanan must be subjected to severe reprehension; for he mentions his supposed benefactor in terms which convey no suggestion of gratitude. Of this generous patronage, however, there is not even the faintest shadow of evidence; and such a tale manifestly originated from the misinterpretation of a very

unequivocal passage in Buchanan's account of his own life.

Upon his return to France, he became a student in the Scottish College of Paris. On the 10th of October 1527, he was incorporated as A.B., and he took the degree of A. M. next March. During the year 1529, he was a candidate for the office of procurator of the German nation; but his purblind countryman Robert Wauchope, who was afterwards titular archbishop of Armagh, and who sat in the council of Trent, was then elected for the ninth time. Buchanan was thus repulsed on the fifth of May, but on the third of June 1530 he was more successful. Before this period, the tenets of Luther had begun to be widely disseminated, and Buchanan was now added to the number of his converts. Having for the space of two years continued to struggle with the iniquity of fortune, he was appointed a regent or professor in the College of St Barbe, where he taught grammar for about three years. His eminent qualifications for such an employment will not be questioned, but his services do not seem to have procured him any splendid remuneration: in an elegy, apparently composed about this period of his life, he exhibits a dismal picture of the miseries to which the Parisian professors of humanity were then exposed. His appointment seems to have taken place in the year 1529. Gilbert Kennedy, earl of Cassillis, who was residing near this college, having become acquainted with Buchanan, admired his literary talents, and was delighted with his conversation: he was therefore solicitous to retain so accomplished a preceptor; and their closer connexion probably commenced in the year 1532. The first work that Buchanan committed to the press was a translation of the famous Thomas Linacre's rudiments of Latin grammar; which he inscribed to Lord Cassillis, "a youth of the most promising talents, and of an excellent disposition." This Latin version was printed at Paris in 1533.

After he had resided with his pupil for five years, they both returned to Scotland. At this period the earl had reached the age of majority; and Buchanan might only embrace a favourable opportunity of revisiting his relations Their connexion however was not immeand friends. diately dissolved. While he was residing at the earl's seat in Ayrshire, he composed a little poem which rendered him extremely obnoxious to the ecclesiastics. In this poem, which bears the title of Somnium, and is a happy imitation of Dunbar, he expresses his own abhorrence of a monastic life, and stigmatizes the impudence and hyprocrisy of the Franciscan friars. It was his original intention to resume his former occupations in France, but James the Fifth retained him in the capacity of preceptor to one of his natural sons. This son was not, as has generally been supposed, the celebrated James Stewart, who afterwards became regent of the kingdom, but another who bore the same baptismal name. His mother was Elizabeth Shaw, of the family of Sauchie; and he died in the year 1548. It was perhaps in the year 1537 that

pauper or exhibitioner. In this college logic was then of that year the king made an arrangement with respect to his four sons. The abbacies of Melrose and Kelso were secured in the name of Buchanan's pupil, who was the eldest. The preferment of a profane scoffer at priests must have augmented the spleen of the clergy; and the Franciscan friars, still smarting from his Somnium, found means of representing him to the king as a man of depraved morals and of dubious faith. But James had formerly begun to discover their real character; and the part which he supposed them to have acted in a late conspiracy against his own life, had not contributed to diminish his antipathy. Instead of consigning the poet to disgrace or punishment, the king, who was aware that private resentment would improve the edge of his satire, enjoined him in the presence of many courtiers to renew his well-directed attack on the same pious fathers. He accordingly applied himself to the composition of the poem afterwards published under the title of Franciscanus; and, to satisfy the king's impatience, soon presented him with a specimen. This production, as it now appears in its finished state, may be pronounced one of the most pungent satires which any language can exhibit. No class of men was ever more completely exposed to ridicule and infamy; nor is it astonishing that the popish clergy afterwards regarded the author with implacable hatred

But the church being infallible, he speedily recognized the danger of accosting its retainers by their proper names. At the beginning of the year 1539, many individuals suspected of Lutheranism were involved in the horrors of persecution. Towards the close of February, five were committed to the flames, nine made a formal recantation of their supposed errors, and many were driven into exile. Buchanan had been comprehended in this general arrest; and after he was committed to custody, Cardinal Beaton endeavoured to accelerate his doom by tendering to the king a sum of money as the price of his blood. Of this circumstance Buchanan was apprized by some of his friends at court; and his knowledge of the king's rapacity must have augmented all the terrors of his situation. Stimulated by the thoughts of increasing danger, he made his escape through the window of the apartment in which he was confined; but he had soon to encounter new disasters. When he reached the frontier of the two kingdoms, he was molested by the freebooters, who at that time were its sole inhabitants; and his life was again exposed to jeopardy from the contagion of a pestilential disease, which then raged in the north of England. On his arrival in London, he experienced the friendship of Sir John Rainsford, an English knight, who is mentioned as the only person that protected him against the fury of the papists. He met with no particular inducement to continue his residence in England, which was then governed by an atrocious tyrant. The civilization of France, as well as the particular intimacies which he had formed in that country, led him to adopt the resolution of returning to Paris: but, on his arrival, he found that Cardinal Beaton was residing there in the capacity of an ambassador; and his friend Andrew Govea, a native of Portugal, having invited him to Bordeaux, he did not hesitate to embrace such an opportunity of removing himself beyond the reach of the cardinal's deadly hatred. Of the College of Guienne, lately founded in that city, Govea had been nominated principal; and Buchanan, evidently on his recommendation, was now appointed one of the professors. Here he must have fixed his residence before the close of the year; for to Charles the Fifth, who made his solemn entry into Bordeaux on the first of December 1539, he presented a poem in the name of the college.

The task assigned him at Bordeaux was that of teach-

Buchanan ing the Latin language. For an occupation of this kind he seems to have entertained no particular affection; but although sufficiently laborious, it never impaired the native elevation of his mind. His poetical studies he now prosecuted with great ardour; during the three years of his residence at Bordeaux, he completed four tragedies, together with various other poems. The earliest of his dramatic compositions bears the title of Baptistes. He had applied himself to the study of the Greek language without the aid of a preceptor, and as a useful exercise had executed a translation of the Medea of Euripides. This version he now delivered to the academical stage, and afterwards suffered it to be printed. Those two tragedies were performed with a degree of applause which almost exceeded his hopes. He afterwards completed his Jephthes, and translated Alcestis, another drama of his favourite poet. These last productions, as he originally intended them for publication, were elaborated with superior diligence. The tragedy of Jephthes is conformable to the models of the Grecian theatre, and is not destitute of interest. The subject is highly dramatic; it is a subject which his great exemplar Euripides might have been inclined to select. The situation of a father who had unwarily subjected himself to the dreadful necessity of sacrificing a beloved and only child, the repugnant and excruciating sensations of the mother, the daughter's mingled sentiments of heroism and timidity, are delineated with considerable felicity of dramatic conception. The tender or pathetic was not however the peculiar province of Buchanan, whose talents were bold, masculine, and commanding. The Baptistes, although inferior to the other tragedy in dramatic interest, is more strongly impregnated with the author's characteristic sentiments. Its great theme is civil and religious liberty; and against tyranny and priestcraft the poet frequently expresses himself with astonishing boldness. Some of his allusions bear a very easy application to the late conduct of Cardinal Beaton. In the tragedies of the ancient Greek poets, what is termed the prologue is always an essential part of the drama; but the prologue of the Baptistes resembles those of Terence. Buchanan seems to have adopted this model, because it afforded him a better opportunity of preparing his auditors for the bold sentiments which they

> During the term of his residence in the College of Guienne, the satirist of the Scottish clergy did not find himself totally secure from danger. The cardinal, in a letter addressed to the archbishop of Bordeaux, requested him to secure the person of the heretical poet; but as his letter had been entrusted to the care of some individual much interested in the welfare of Buchanan, he was suffered to remain without molestation. Still however he found himself annoyed by the threats of the cardinal and the grey friars; but the death of King James, and the appearance of a dreadful plague in Guienne, alleviated his former apprehensions. Having resided three years at Bordeaux, he returned to Paris. In 1544 he was officiating as a regent in the college of Cardinal le Moine; and he apparently retained the same station till 1547. About this period he was miserably tormented with the gout. The ardour of his fancy was however undiminished: in an interesting elegy, composed in 1544, and addressed to his late colleagues Tastæus and Tevius, he exhibits a dismal picture of his own situation, and gratefully commemorates the assiduous attentions of his present colleagues Turnebus and Gelida. It is remarked by a French historian, that three of the most learned men in the world then taught humanity in the same college. The first class was taught by Turnebus, the second by Buchanan, and the third by Muretus.

were about to hear.

The king of Portugal had recently founded the univer Buchanan, sity of Coimbra; and as his own dominions could not afford a sufficient supply of able professors, he invited Andrew Govea to preside over the new institution, and to conduct from France a considerable number of proficients in philosophy and ancient literature. Govea accordingly returned to his native country in the year 1547, accompanied by Buchanan and other associates. The affairs of Europe presented an alarming aspect; and Portugal seemed to be almost the only corner free from tumults. To the proposals of Govea he had not only lent a willing ear, but was so much satisfied with the character of his associates, that he also persuaded his brother Patrick to join this famous colony. To several of its members he had formerly been attached by the strictest ties of friendship; these were Gruchius, Garentæus, Tevius, and Vinetus, who have all distinguished themselves by the publication of learned works. The other scholars of whom it consisted were Arnoldus Fabricius, John Costa, and Anthony Mendez, who are not known as authors: the first was a native of Bazats, the other two were Portugueze. All these professors except P. Buchanan and Fabricius had taught in the College of Guienne. To this catalogue Dempster has added other two Scottish names, those of John Rutherford and William Ramsay. Govea died in the year 1548; and after Buchanan and his associates were deprived of his protection, the Portugueze began to persecute them with unrelenting bigotry. Three of their number were thrown into the dungeons of the inquisition, and after having been subjected to a tedious imprisonment, were at length arraigned at this direful tribunal. According to the usual practice, they were not confronted with their accusers, of whose very names they were ignorant. As they could not be convicted of any crime, they were overwhelmed with reproaches, and again committed to custody.

Buchanan had attracted an unusual degree of indignation. He was accused of having written an impious poem against the Franciscans, yet with the nature of that poem the inquisitors were totally unacquainted. He was also charged with the heinous crime of eating flesh in Lent, and yet with respect to that very article, not a single individual in Portugal deemed it necessary to practise abstinence. Some of his strictures relative to monks were registered against him, but they were such as monks only could regard as criminal. He was moreover accused of having alleged, in a conversation with some young Portugueze, that with respect to the eucharist, St Augustin appeared to him to be strongly inclined towards the opinion condemned by the church of Rome. Two witnesses, whom he afterwards discovered to be Ferrerius and Talpin, made a formal deposition of their having been assured by several respectable informants that Buchanan was disaffected to the Romish faith. After the inquisitors had harassed him for the space of nearly two years and a half, they confined him to a monastery, for the purpose of receiving edifying lessons from the monks; whom, with due discrimination, he represents as men by no means destitute of humanity, but totally unacquainted with religion. In their custody he continued several months; and it was about this period that he began his version of the Psalms, afterwards brought to so happy a conclusion. That this translation was a penance imposed upon him by his illiterate guardians, is only to be considered as an idle tale: it is much more probable that a large proportion of the good monks were incapable of reading the Psalms in their native language. When he was at length restored to liberty, he solicited the king's permission to return to France: he was however requested to protract his residence in Portugal, and was presented with a small sum of

Buchanan money till he should be promoted to some station worthy she insensible of his powerful claims upon the protection Buchanan beautiful poem, entitled Desiderium Lutetiæ, and apparently composed before his retreat from Portugal, he pahe represents under the allegory of a pastoral mistress. Having embarked in a Candian vessel, which he found in the port of Lisbon, he was safely conveyed to England. Here however he did not long remain, though he might have procured some creditable situation, which he himself Paris, he was appointed a regent in the College of Boncourt; and in the year 1555 he was called from that charge by the celebrated Comte de Brissac, who engaged him as the domestic tutor of his son Timoleon de Cossé

During the five years of his connexion with this illustrious family, he alternately resided in Italy and France. In the mean time several of his poetical works were published at Paris. In 1556 appeared the earliest specimen of his poetical paraphrase of the Psalms; and his version of the Alcestis of Euripides was printed in the course of the subsequent year. This tragedy he dedicated to Margaret, the daughter of Francis the First, a munificent princess, whose favour he seems to have enjoyed. His engagement with the family of Brissac terminated in the year was perhaps the alarming aspect of affairs in France that induced Buchanan to hasten his return to his own country. The precise period of his return has not been ascertained; but it is certain that he was at the Scottish court in January 1562, and that in the month of April he was officiating as classical tutor to the queen, who was then in the twentieth year of her age. Every afternoon she read with Buchanan a portion of Livy. This author is not commonly recommended to very young scholars; and indeed the study of the Latin language is known to have occupied a considerable share of her previous attention.

The era at which Buchanan finally returned to his native country was highly important. After a violent struggle against the ancient superstition, the principles of the reformed faith received the sanction of parliament in the year 1560. For the doctrines of the reformation he had long cherished a secret affection; and he now professed himself a member of the protestant church of Scotland. The earl of Murray, as commendator of the priory of St Andrews, possessed the right of nominating the principal of St Leonard's College; and a vacancy occurring in the year 1566, he conferred the office upon Buchanan. The tenure of his appointment seems to have imposed upon him the task of reading occasional lectures on divinity.

On his return to Scotland, he determined to publish, in a correct manner, the poetical works which he had composed at many different periods of his variegated life. Of his admirable version of the Psalms, the date of the first complete edition is uncertain, for it has been omitted in the book itself; but a second edition appeared in the year 1566. When he consigned his Psalms to the printer, he was probably engaged in superintending the classical studies of Queen Mary; and to that accomplished and hopeful princess he gratefully inscribed a work destined for immortality. His dedication has received, and indeed is entitled to the highest commendation for its terseness, compression, and delicacy. Buchanan had recommended himself to the queen by other poetical tributes: one of his most beautiful productions is the Epithalamium which he composed on her first nuptials; and several of his mis-

of his talents; but his ambition of Portugueze preferment of his country. In the year 1564 she had rewarded his liwas not perhaps very violent, for he still remembered with terary merit by conferring upon him the temporalities of regret the learned and interesting society of Paris. In a Crossragwell Abbey, which amounted in annual valuation to the sum of L.500 in Scottish currency. The abbacy had become vacant by the death of Quintin Kennedy. thetically bewails his absence from that metropolis, which But while he thus enjoyed the favour of the queen, he did not neglect his powerful friend the earl of Murray. To that nobleman he inscribed his Franciscanus during the same year. The date of the earliest edition is uncertain; but the dedication was written at St Andrews on the 5th of June 1564, when he was perhaps residing in the earl's has not particularized. He returned to France about house. He at the same time prepared for the press his the beginning of the year 1553. Soon after his arrival in miscellany entitled Fratres Fraterrimi, a collection of satires, almost exclusively directed against the impurities of the popish church. The absurdity of its doctrines, and the immoral lives of its priests, afforded him an ample field for the exercise of his formidable talents; and he has alternately employed the weapons of sarcastic irony and vehement indignation. His admirable wit and address must have contributed to promote the cause which Luther had so ardently espoused; and Buchanan ought also to be classed with the most illustrious of the reformers. In the year 1567 he published another collection, consisting of *Elegia*, Silva, Hendecasyllabi. To this miscellany was prefixed an epistle to his friend Peter Daniel, a learned man, who is still remembered for his edition of Virgil, with the commentary of Servius. His Miscellanea were 1560, when the civil war had already commenced. It not printed till after the death of the author. Of his short and miscellaneous pieces the subjects are sometimes indeed of a trivial nature; but even those lighter efforts serve to evince the wonderful versatility of his mind. His epigrams, which consist of three books, are not the least remarkable of his compositions; the terseness of the diction, the ingenuity and pungency of the thoughts, have deservedly placed them in a very high class.

Of the general assembly convened at Edinburgh on the 25th of December 1563, Buchanan had sat as a member, and had been appointed one of the commissioners for revising the Book of Discipline. He sat in the June assemblies of 1564 and the three following years, and likewise in that of December 1567. He was a member of various committees, and evidently had no small influence in the affairs of the church. Of the assembly which met at Edinburgh on the 25th of June 1567, he had the honour of being chosen moderator.

The nation was now in a state of anarchy, and the change of affairs drew Buchanan into the vortex of poli-The recent conduct of Queen Mary, whom he once regarded in so favourable a light, had offered such flagrant insults to virtue and decorum, that his attachment was at length converted into the strongest antipathy. The simple and uncontroverted history of her proceedings, from the period of her pretended reconciliation with Darnley to that of her marriage with Bothwell, exhibits such strong moral evidence of her criminality as it seems impossible for an unprejudiced mind to resist. "There are indeed," as Mr Hume has remarked, "three events in our history, which may be regarded as touchstones of party-men. An English Whig, who asserts the reality of the popish plot, an Irish Catholic, who denies the massacre of 1641, and a Scotch Jacobite, who maintains the innocence of Queen Mary, must be considered as men beyond the reach of argument or reason, and must be left to their prejudices." Buchanan accompanied the regent Murray when he visited England for the purpose of appearing before Elizabeth's commissioners. On the 4th of October 1568, the conference was opened at York; but in the course of the ensuing month it was transferred to Westcellaneous poems relate to the same princess. Nor was minster. This singular transaction was managed with

Buchanan great address on both sides: nor was Buchanan the least powerful of Murray's coadjutors; he composed in Latin a detection of Queen Mary's actions, which was produced to the commissioners at Westminster, and was afterwards circulated with great industry by the English court. His engaging in a task of this kind, as well as his mode of executing it, has frequently been urged as a proof of his moral depravity; and, to augment his delinquency, the benefits conferred upon him by the unfortunate queen have been multiplied with considerable ingenuity. It is certain that she granted him the temporalities of Crossragwell Abbey; and beyond this single point the evidence cannot be extended. Nor was this reward bestowed upon a man who had performed no correspondent services. He had officiated as her classical tutor, and had composed various poems for the entertainment of the Scottish court; but the dedication of his Psalms might almost be considered as equivalent to any reward which she conferred. If Buchanan celebrated her in his poetical capacity, and before she ceased to be an object of praise, it certainly was not incumbent upon him to approve the atrocious actions which she afterwards performed. The duty which he owed to his country was a prior consideration, and with that duty his further adherence to the infatuated princess was utterly incompatible.

The earl of Murray and his associates returned to Scotland in the beginning of the ensuing year. Buchanan's Detection, which was not published till 1571, seems to have been entrusted to Dr Wilson, who is supposed by Mr Laing to have added the "Actio contra Mariam Scotorum Reginam," and the Latin translation of Mary's first three letters to the earl of Bothwell. The good regent did not long survive those transactions: on the 23d of January 1570 he was shot in the street of Linlithgow by Hamilton of Bothwellhaugh, whom his clemency had formerly rescued from an ignominious death. The assassin had been confirmed in his enterprise by the approbation of his powerful kinsmen. The indignation of Buchanan was naturally roused against the house of Hamilton; and he had sufficient cause to suspect that their dangerous schemes were not yet completed. Under such impressions as these, he composed "Ane Admonitioun direct to the trew Lordis, Mantenaris of the Kingis Graces Authoritie;" in which he earnestly adjured them to protect the young king, and the children of the late regent, from the perils which seemed to await them. It was apparently in the course of the same year, 1570, that he wrote another Scottish tract, entitled Chamæleon. In this satirical production he very successfully exposes the wavering politics of the famous secretary Maitland. Soon after the assassination of his illustrious friend, Buchanan was removed to a situation of no small importance; he was appointed one of the preceptors of the young king. For this preferment he appears to have been indebted to the privy council, and others of the nobility and gentry, who assembled in consequence of that disastrous event, for the purpose of providing for the public security.

During his infancy, the prince had been committed to the charge of the earl of Mar, a nobleman of the most unblemished integrity. In 1570, when Buchanan entered upon his office, James was only four years of age. The chief superintendence of his education was left to the earl's brother, Alexander Erskine. The preceptors associated with Buchanan, were Peter Young, and the two abbots of Cambuskenneth and Dryburgh, both related to the noble family of Mar. Young, who was respectable for his capacity and learning, was of a disposition naturally mild; and his attention to his future interest rendered him cautious of offending a pupil who was soon to be the dispenser of public favours. But the lofty and independent

spirit of Buchanan was not to be controlled by the mere Buchanan suggestions of cold caution: the honourable task which the voice of his country had assigned to his old age, he discharged with simple integrity, and, so far as he himself was concerned, he was little solicitous what impression the strictness of his discipline might leave on the mind of his royal pupil. James, who was of a timid nature, long remembered the commanding aspect which his illustrious preceptor had assumed. He was accustomed to say of some individual high in office, "that he ever trembled at his approach, it minded him so of his pedagogue." The young monarch's proficiency in letters was such as reflected no discredit on his early instructors. Buchanan made him a scholar, and nature had destined him for a pedant.

Nor was this the only preferment which he now obtained. His first civil appointment, which he seems to have retained but a short time, was that of director of the chancery. The keeper of the privy seal, John, afterwards Lord Maitland of Thirlstane, having been deprived of his office on account of his adherence to the queen, it was conferred upon Buchanan in the year 1570. The earl of Lennox was at that time regent. His situation as lord privy seal was undoubtedly honourable, and probably lucrative. It entitled him to a seat in parliament. This office he retained for several years; for under the date of November 1579, he is enumerated among the ordinary officers of state entitled to a seat in the council. His talents and his station evidently gave him no small share of influence, and he was associated in various commissions

of importance.

Notwithstanding the precarious state of his health, and the number of his avocations, he found leisure to compose a most profound and masterly compendium of political philosophy. It is entitled De Jure Regni apud Scotos, and was first printed at Edinburgh in the year 1579. Although it professedly relates to the rights of the crown of Scotland, it comprehends a subtile and eloquent delineation of the general principles of government. The work is exhibited in the form of a dialogue between the author and Thomas the son of Sir Richard Maitland. Buchanan's dialogue excited a degree of attention which will not appear surprising, when we consider the high reputation of the author, and the boldness of the precepts which he inculcates. In the course of a few years, his tenets were formally attacked by his learned countrymen Blackwood, Winzet, and Barclay, all of whom were zealous Catholics. Some of Barclay's arguments were long afterwards refuted by Locke. Buchanan was also attacked, though in an indirect manner, by Sir Thomas Craig, and by Sir John Wemyss. Craig was a lawyer of much learning and ability, and his treatise on the feudal law still continues to be held in great estimation. Sir George Mackenzie, the servile tool of a most profligate court, undertook to defend against Buchanan the same maxims of polity; and it must be acknowledged that " the right divine of kings to govern wrong," was a very suitable doctrine for the ministers of Charles and James. In the course of the seventeenth century, his leading principles were also oppugned by Sir Lewis Stewart, a lawyer, and by Sir James Turner, a soldier. The former wrote in Latin, the latter in English, but neither of their productions has been printed; and the republic of letters has sustained no detriment by their long suppression. He was incidentally assailed by many foreign authors, who seem in general to have been bewildered by the current doctrine of the divine and indefeasible right of kings, and the passive obedience of subjects. This was indeed the doctrine of Catholics and Protestants, of civilians and divines. Grotius, though born under a free republic, and certainly a man of a great and liberal mind, did not entirely escape the contamination of

Buchanan those slavish maxims which were so prevalent during the may be considered as amply sufficient, to ascertain the Buchanan age in which he lived: the right of resisting any superior power which happens to be established, he has discussed in a manner that could hardly offend the completest despot in Europe. There is perhaps too much justice in the remark of Rousseau, that it is his most common method of reasoning, to establish the right by the fact. It is on passages of scripture which are not didactic or exegetical, but merely historical. This obsolete perversion they seem to have derived from the authority of those early theologians who are commonly styled the fathers of the church; and who, if not always very safe guides in morality and in biblical criticism, are certainly exceptionable guides in political science. The degrading doctrine of passive obedience was inculcated by Salmasius, Bochart, Usher, and indeed by several very able men who approached much nearer to our own times: it was even inculcated by the famous Dr Berkeley, in some metaphysical discourses preached before the university of Dublin in the year 1712. It is however a doctrine which no Briton, capable of reflection, and possessed of ordinary sincerity, will now hesitate a single moment in rejecting with the utmost indignation.

But the full measure of Buchanan's ignominy has not yet been related. In the year 1584 the parliament condemned his dialogue and history as unfit to remain for records of truth to posterity; and, under a penalty of two hundred pounds, commanded every person who possessed copies to surrender them within forty days, in order that they might be purged of "the offensive and extraordinary matters" which they contained. In 1664, the privy council of Scotland issued a proclamation, prohibiting all subjects, of whatever degree, quality, or rank, from transcribing or circulating any copies of a manuscript translation of the dialogue. And in 1683, the loyal and orthodox university of Oxford doomed to the flames the political works of Buchanan, Milton, Languet, and other heretics. This university, says Cunningham, debauched the minds of the youth with its slavish doctrines, and pronounced a severe judgment against Buchanan for vindicating the rights of the kingdom. The Scottish legislature, the English university, and the popish tribunal of the inquisition, seem to have viewed this unfortunate speculator with equal abhorrence. And what are the terrible doctrines that once excited so violent an alarm? Buchanan maintains that all power is derived from the people; that it is more safe to entrust our liberties to the definite protection of the laws, than to the precarious discretion of the king; that the king is bound by those conditions under which the supreme power was originally committed to his hands; that it is lawful to resist, and even to punish tyrants. When he speaks of the people as opposed to the king, he evidently includes every individual of the nation except one. And is a race of intelligent beings to be assimilated to a tract of land, or a litter of pigs; to be considered, absolutely and unconditionally, as the lawful patrimony of a family which either merit, accident, or crime, may originally have elevated to the summit of power? In this country and this age it certainly is not necessary to remark, that man can neither inherit nor possess a right of property in his fellow-creatures. What is termed loyalty, may, according to the circumstances of the case, be either a virtue or a vice. Loyalty to Antoninus and loyalty to Nero must assuredly have flowed from different sources. If the Roman people had endeavoured to compass the death of Nero, would this have been foul and unnatural rebellion? The doctrine of punishing tyrants in their persons, either by a private arm, or by the public forms of

previous right of forcible resistance. It will always be extremely difficult, if not impossible, to find a competent tribunal and impartial judges. But if mankind are at length roused to the redress of enormous wrongs, the prince who has either committed or sanctioned an habitual violation of the best rights of the people, will seldom one general fault of those writers, to found their theories fail to meet with an adequate reward; and in spite of all the slavish theories of his priests and lawyers, mankind will not long be reasoned out of the strongest feelings of their nature. Divine right and passive obedience were never more strenuously inculcated, than in the reign of Charles the First.

> In the seventy-fourth year of his age, Buchanan composed a brief sketch of his own life. The last production which he lived to complete was his history of Scotland, Rerum Scoticarum Historia. In the year 1582, it issued from the press of Alexander Arbuthnot, printer to the king. It bears the royal privilege, and is dedicated to the young monarch. Between the original formation of his plan, and the publication of the history itself, nearly twenty years must have elapsed; but it is to be supposed that he long revolved the subject in his mind, and had proceeded to amass the greater part of his materials, before he applied himself to its composition; and during that interval, his attention had been distracted by various pur-

suits, political as well as literary.

Buchanan has divided his history into twenty books The first three ought rather to have been exhibited in the form of an introductory dissertation, for the historical narrative properly commences with the fourth book. His preliminary enquiries are directed to the geographical situation, the nature of the soil and climate, the ancient names and manners, and the primitive inhabitants, of the British islands. The third book consists of a series of quotations from the Greek and Latin authors. The whole of this introductory part displays his usual erudition and sagacity; and, in the opinion of Archbishop Usher, no writer had investigated the antiquities of his country with superior diligence. In these disquisitions he evinces his knowledge of the Celtic as well as of the classical languages. In the earlier part of his narrative, he has reposed too much confidence on his predecessor Boyce. He appeals to several other Scottish historians; and he unquestionably had access to historical documents which are no longer extant. He has occasionally availed himself of the collateral aid of the English and French writers. Of the earlier reigns his sketch is brief and rapid; nor has he attempted to establish any chronological notation till he descends to the beginning of the fifth century. It must indeed be acknowledged that he has repeated the fabulous line of our ancient kings; but that continued till a much later period to be regarded as an article of national faith. Like most of the classical historians, he is too remiss in marking the chronology of the different facts which he relates. From the reign of the great King Robert, his narrative becomes much more copious and interesting; but the history of his own times, which were pregnant with remarkable events, occupies far the largest proportion of his twenty books. In some of the transactions which he records, his own affections and passions were deeply concerned, and might not unreasonably be expected to impart some tincture to his style. His indignation against the ill-fated queen he shared with a very large proportion of his fellow-subjects; and many of her actions were such as could not fail of exciting the antipathy of every well-regulated mind. The composition of his history betrays no symptoms of the author's old age and infirmities; his style is not merely distinguished by its corlaw, is indeed of a delicate and dangerous nature; and it rectness and elegance, it breathes all the fervent animaBuchanan tion of youthful genius. The noble ideas which so frequently rise in his mind, he always expresses in language of correspondent dignity. His narrative is extremely perspicuous, variegated, and interesting; it is seldom deficient, and never redundant. His moral and political reflections are profound and masterly. He is ready upon all occasions to vindicate the unalienable rights of mankind; and he uniformly delivers his sentiments with a noble freedom and energy. It is with the utmost propriety that the learned Conring has commended him as a man of exquisite judgment. Thuanus remarks that although much of his time had been spent in scholastic occupations, yet his history might be supposed the production of a man whose whole life had been exercised in the political transactions of the state; the felicity of his genius, and the greatness of his mind, having enabled him so completely to remove every impediment incident to an obscure and humble lot. And, in the opinion of Bishop Burnet, "his stile is so natural and nervous, and his reflections on things are so solid, that he is justly reckoned the greatest and best of our modern authors."

The publication of this great work he did not long survive. His usual vein of pleasantry did not entirely desert him on his death-bed. When visited by John Davidson, a distinguished clergyman, he devoutly expressed his reliance on the atoning blood of Christ; but he could not refrain from introducing some facetious reflections on the absurdities of the mass. He expired soon after five o'clock in the morning of Friday the 28th of September 1582, at the age of seventy-six years and nearly eight months. His remains were interred in the cemetery of the Greyfriars: Calderwood informs us that the funeral took place on Saturday, and was attended by "a great company of

the faithful.

Buchanan had experienced many of the vicissitudes of human life, and had been tried by prosperity as well as adversity. His moral and intellectual character procured him the same high respect from the most enlightened of his contemporaries. His stern integrity, his love of his country and of mankind, cannot fail of endearing his memory to those who possess congenial qualities; and such errors as he actually committed, will not perhaps be deemed unpardonable by those who recollect the condition of humanity. He was subject to the nice and irritable feelings which frequently attend exalted genius, enthusiastic in his attachment, and violent in his resentment, equally sincere in his love and in his hatred. His friends, among whom he numbered some of the most distinguished characters of the age, regarded him with a warmth of affection which intellectual eminence cannot alone secure. His conversation was alternately facetious and instructive: his wit and humour are still proverbial among his countrymen. Such of his contemporaries as could best judge of his conduct and character, evidently regarded him as a man of sincere piety.

Nor was the genius of Buchanan less variegated than his life. In his numerous writings he discovers a vigorous and mature combination of talents, which have seldom been found united in equal perfection. To an imagination excursive and brilliant, he unites an undeviating rectitude of judgment. His learning was at once elegant, various, and profound: Turnebus, who was associated with him in the same college, and whose opinion is entitled to the greatest deference, has characterized him as a man of consummate erudition. Most of the ancient writers had limited their aspiring hopes to one department of literature; and even to excel in one, demands the happy perseverance of cultivated genius. Plato despaired of securing a reputation by his poetry; the poetical at-

they are commonly represented, would not have been suf-Buchanan. ficient to transmit an illustrious name to future ages. Buchanan has not only attained to excellence in each species of composition, but in each species has displayed a variety of excellence: in philosophical dialogue and historical narrative, in lyric and didactic poetry, in elegy, epigram, and satire, he has scarcely been surpassed either in ancient or modern times. A few Roman poets of the purest age have excelled him in their several provinces; but none of them has evinced the same capability of universal attainment. Horace and Livy wrote in the language which they had learned from their mothers; but its acquisition was to Buchanan the result of much youthful labour. Yet he writes with the purity, the elegance, and freedom of an ancient Roman. Unfettered by the classical restraints which shrivel the powers of an ordinary mind, he expatiates with all the characteristic energy of strong and original sentiment; he produces new combinations of fancy, and invests them with language equally polished and appropriate. His diction uniformly displays a happy vein of elegant and masculine simplicity, and is distinguished by that propriety and perspicuity which can only be attained by a man perfectly master of his own ideas, and of the language in which he writes. The variety of his poetical measures is immense, and to each species he imparts its peculiar grace and harmony. The style of his prose exhibits correspondent beauties, nor is it chequered by phraseology unsuitable in that mode of composition. His diction, whether in prose or verse, is not a tissue of centos; he imitates the ancients as the ancients imitated each other. No Latin poet of modern times has united the same originality and elegance; no historian has so completely imbibed the spirit of antiquity, without being betrayed into servile and pedantic imitation. But his works may legitimately claim a higher order of merit; they have added no inconsiderable influx to the general stream of human knowledge. The wit, the pungency, the vehemence, of his ecclesiastical satires, must have tended to foment the genial flame of reformation; and his political speculations are evidently those of a man who had nobly soared beyond the narrow limits of his age.

Of the works of Buchanan there are two collective edi tions, the earlier of which was published by Ruddiman Edinb. 1715, 2 tom. fol. The editor's masterly acquaintance with philology, and with the history of his native country, had eminently qualified him for such an undertaking. The accuracy of the text, and the utility of his illustrations, are equally conspicuous. He has prefixed a copious and satisfactory preface, and, among other appendages, has added a curious and critical dissertation De Metris Buchananæis. His annotations on Buchanan's history are particularly elaborate and valuable; but it is to be lamented that his narrow politics should so frequently have diverted him from the more useful tracts of enquiry. Where political prejudices intervene, he is too eager to contradict his author; and he often attempts, by very slender and incompetent proofs, to extenuate the authenticity of his narrative. In illustrating the moral and literary character of Buchanan, he spent many years of his life. With great zeal and success, he afterwards vindicated his paraphrase of the Psalms against the objections of Benson; but his political prejudices seem to have increased with the number of his years. His controversies with Love and Man were conducted with sufficient pertinacity; though it must be acknowledged that the advantage of learning, and even of candour, generally inclines to Ruddiman's side. Another edition of Buchanan's works was published by Burman, a most indefatigable and useful tempts of Cicero though less contemptible perhaps than labourer in the department of philology, and a man of

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Bucharest much more taste and talent than some of our readers may perhaps be inclined to suppose. Lugd. Bat. 1725, 2 tom. 4to. He has reprinted his predecessor's notes, dissertation, and other appendages, and has himself interspersed some critical annotations.

BUCHAREST, BUKHOREST or BUKOREST, the capital of Wallachia, and residence of the waiwode of that province, is situated on the Dumbovicza, a tributary of the Danube, in Lat. 44. 26. N. Long. 26. 8. E., at the distance of about 300 miles from Constantinople. Like the majority of Turkish towns, Bucharest, when seen at a distance, presents a very picturesque appearance, from the number of its gilded cupolas and minarets. On a closer inspection, however, the charm is dissolved. The houses are for the most part little better than huts; the streets, where paved at all, are paved with wood, and are thence called ponti (bridges); sewerage is a thing unknown; and the filth accumulating in vast quantities from year to year generates fevers and the plague. The public buildings, when closely examined, are mean and poor; the palace of the hospodar is a low wooden edifice in the centre of the great square, in which also the metropolitan church is situated. The only buildings that make any pretensions to elegance and comfort are the inns, some of which are magnificent. These, like all the houses in Bucharest, are situated in the midst of large gardens. It is computed that there are in the city 95 churches and upwards of 20 monasteries. It also contains a poorhouse, and several hospitals, one of which, reserved for soldiers, is admirably conducted by German physicians. There is likewise a wooden theatre, where French and Italian operas are sometimes performed. The number of schools is about 70 in all, attended by nearly 1800 pupils: the college, connected with which is a museum containing a public library, annually musters about 500 students. Instruction is communicated at this establishment in the French tongue, though modern Greek and Italian are the languages spoken by the Frank population. The number of carriages in Bucharest is very great, and was estimated by Clarke the traveller in his day at about 4000. The manners of the inhabitants are extremely profligate; gambling, and many other worse forms of vice, are universally practised. As Bucharest is situated in the midst of an extremely fertile district, it has a considerable export trade. Corn, wool, hides, tallow, and honey are transmitted in large quantities to Odessa and Constantinople, while vast herds of swine and cattle are driven into Germany, and sold there. A considerable number of German jewellers have established themselves in Bucharest. The annual tribute which the city pays to its Turkish masters is about L.26,000. Pop. about 65,000.

BUCHOLZ, CHRISTOPH FRIEDRICH, a distinguished German chemist, born at Eisleben in 1770. In his nineteenth year he was appointed to superintend a manufactory at Ochsenfurt in Franconia; from which town at the end of two years he removed to Mulhausen, where he conducted the experiments by which he first became known. In 1808 he graduated as a physician at Rinteln, and in the following year at the university of Erfurt. In 1813 his health gave way from the long imprisonment which he suffered, consequent upon the siege of that town. He then removed to Aix-la-Chapelle, where his eyesight became affected; and when he retired finally to his birth-place, he was nearly blind. He died in 1818. His works are very multifarious, and, besides numerous separate treatises, comprise translations from the English, and contributions to the principal scientific journals of his native country.

BUCK, the male of the fallow deer, the goat, rabbit, &c. BUCKEBURG, a city, the capital of the dominions of the prince of Schaumburg-Lippe. It is pleasantly situated

on the side of a hill, at the foot of which runs the river Aue, about six miles from Minden. It has a castle surrounded by a park, a gymnasium, orphan asylum, and 4000 inhabitants. Long. 9. 3. E. Lat. 52. 15. 47. N.

BUCKIE, a fishing village of Scotland in the county of Banff, 5 miles N.N.W. of Cullen, famous for its haddocks.

Pop. (1851) 2789.

BUCKINGHAM, the chief town of Buckinghamshire, a parliamentary and municipal borough and market-town in the hundred of the same name, 58 miles from London. is situated on the left bank of the river Ouse, which surrounds it on every side but the north, and is crossed by two bridges. The town consists principally of one long street, straggling irregularly over a considerable extent of surface. The houses, which are chiefly brick, are neat and clean, though somewhat humble in character. The only public buildings of importance are the town-hall, which is built of brick, and the church, which is built of freestone, and has a handsome spire 150 feet high. The town is one of great antiquity, and enjoyed various privileges under different English sovereigns. It was the headquarters of Charles I. for a few days during his wars with the parliament. In 1725 a third of the town was burnt to the ground. Besides the church already alluded to, there are two places of worship for Independents, and one for Baptists in the town. An endowed free school for boys, who were clad in green coats, by the will of the founder, Gabriel Newton, is now incorporated with the national school, which is intended to accommodate 300 pupils. The grammar-school of the town was founded by Edward VI. There are no manufactures of any consequence. An attempt was unsuccessfully made to introduce straw-plaiting; but lace-making with bobbins still occupies a small part of the female population. There are some corn and paper mills in the neighbourhood, and a few lime quarries. The borough of Buckingham returns two members to parliament, and is governed by a mayor, four aldermen, and twelve councillors. The revenue of the corporation is between L.700 and L.800 annually. The living, which is in the gift of the Duke of Buckingham, is a vicarage of L.230 value in the diocese of Oxford. Pop. (in 1851) of parliamentary borough 8069; of municipal borough 4020.

BUCKINGHAM, George Villiers, Duke of. See VILLIERS. BUCKINGHAM, John Sheffield, Duke of. See SHEF-

BUCKINGHAMSHIRE, or Bucks, an inland county of England, lying between 51.25. and 52.10. N. Lat. and 0.28. and 1.12. W. Long., is bounded on the N. and N.W. by Northamptonshire, west by Oxfordshire, south by Berkshire, and east by Bedfordshire, Hertfordshire, and Middlesex. It is the thirty-third in size of the English counties, measuring 53 miles at its greatest length and 27 at its greatest breadth, and containing, according to the last ordnance survey, 472,320 acres, or 738 square miles. aspect of the country is agreeably diversified by the distribution of forests, rivers, hills, pasture, and arable land. In the southern portion of the county the forests, consisting chiefly of beeches (from the Saxon name of which, buccen, the county is said to derive its name), were at one time very extensive, but these have of late years been greatly thinned: woods of considerable extent are still to be found in the northern parts. The principal rivers of Buckinghamshire are the Thames, which separates it from Berkshire and Surrey, and receives as tributaries the Colne and the Thame; and the Ouse, with its tributary the Ousel, which belongs to the north of the county. The only hills in Bucks worth mentioning are the Chilterns, which cross it in a north-westerly direction, and rise at two or three points to the height of about 900 feet. Of the roads which pass

Bucking- through the county the most important are, that which connects London with Chester and Holyhead, by which the mails were forwarded to Ireland before the introduction of railways; the great western road connecting the metropolis with Bath and Bristol; and the roads to Oxford and Birmingham. The only canal of any importance is the Grand Junction, from which branches proceed to several of the larger towns. The North-Western railway passes through the east of the county, and a branch line from it terminates at Aylesbury. Another branch intersects the north-western district, and after passing Winslow, divides into two branches, one of which terminates at Banbury and the other at Oxford. The Great Western railway passes through the south. A branch to Windsor quits the trunk line at Slough.

The agricultural capacities of Bucks vary considerably in different parts of its extent. The Vale of Aylesbury, lying between hills on either side, is one of the most fertile and valuable districts in England, and is divided in nearly equal proportions between pasture and tillage. Towards the north of the county, however, the soil greatly degenerates, and sometimes does little more than pay the expenses incurred in its cultivation. These natural defects are enhanced by the extremely backward condition of agriculture in many of the more remote districts. In the north and west of the county, the rent of land ranged in 1850 from ten shillings an acre for the lowest quality of undrained lands under tillage, to fifty shillings for prime old grazing lands. In the southern and eastern districts, which lie chiefly upon clay, the rent varied from fifteen to thirty shillings an acre. The farms are not generally large. The largest do not exceed 500 acres, while there are many of not more than 20 or 30 acres. The average size is about 180 or 200 acres. Leases are sometimes though not generally given, and never for more than 14 years. The quantities of cattle reared and fed in Bucks are very considerable. The number of milk cows is estimated at upwards of 20,000, yielding on an average about 4,000,000 lb. of butter, which is rapidly despatched to London by rail, where it finds a ready market. breeds of oxen are found serviceable, partly for ploughing the soil and partly to be fattened for the London market. Hogs are extensively reared on many farms, and are found to be a source of considerable profit to the farmer. In many parts of the county, especially at Aylesbury, great numbers of ducks are fattened and sold in the early London

Bucks was originally divided into eighteen hundreds: it is now divided into eight. These are Newport, Buckingham, Ashendon, Cottlesloe, Aylesbury, Burnham, Stoke, and Desborough, the last three forming what is well known as "The Chiltern Hundreds." That of Aylesbury, still retains its ancient designation of the "three hundreds of Aylesbury." The number of parishes in the entire county is computed at 202. The market-towns are Amersham. Aylesbury (in all respects the most important town in the county, though Buckingham is the capital), Beaconsfield, Buckingham, Chesham, Great Marlowe, High Wycombe, Ivinghoe, Newport-Pagnell, Olney, Prince's Risborough, S ony Stratford, Wendover, and Winslow. There are many other interesting, though not very important places in Buckinghamshire, of which we may mention Chalfont-Saint Giles—the residence for a time of the poet Milton, and where he completed the Paradise Lost, and began the Paradise Regained; Hampden, the manor-house of which was for many generations the abode of the family of that name, and in the churchyard of which the patriot (who fell at Chalgrave in 1643) is buried; Medmenham, in the old abbey of which a celebrated club of "Franciscans," of which John Wilkes, Bubb Doddington, and other political notorieties of last century were members, held their convivial meetings; Pitstone, in the abbey of which Queen

Elizabeth used frequently to reside in her younger days; Buckler, Stoke Pogeis, celebrated by Grey in his Elegy and Long Story; Slough, for many years the residence of Sir William Herschel, and the place where his great telescope was constructed; not far from Slough Salthill, where the Eton-Montem, recently abolished, used to be held; Olney, familiar to all the readers of Cowper, near which is Weston Underwood, for some years the residence of that poet; and Butler's Court or Gregories, the seat of Edmund Burke. The principal seats in Buckinghamshire, are Stowe, once the residence of the dukes of Buckingham, and celebrated for its grounds, and its collections of pictures and statues, which were sold a few years ago; Bulstrode, once a seat of the dukes of Portland, now the property of the Duke of Somerset; Wootton House, belonging to the Marquis of Chandos; Hampden House to the Earl of Buckinghamshire; Penn House to Earl Howe; Eythorpe to the Earl of Chesterfield; Ashridge to Lord Ellesmere; Dropmore to Lady Grenville; Ashton Clinton to Lord Lake; Morton House to Lord Godolphin; Dilton Park to Lord Montague; Lillies to Lord Nugent. Bucks is in the Norfolk circuit. The quarter-sessions are always held at Aylesbury: the assizes used to be held alternately at that town and Buckingham, but are now held only at Aylesbury. Before the passing of the Reform bill, Bucks returned in all fourteen members to the House of Commons. It now returns eleven, three of whom represent the county and eight the parliamentary boroughs. The result of the county elections is always announced at Aylesbury. Bucks is governed by a lord-lieutenant and custos, 60 deputy-lieutenants, a high sheriff, and about 200 magistrates. It lies in the ecclesiastical province of Canterbury, in the diocese of Oxford, and arch-deaconry of Buckingham, which comprises the deaneries of Bucks, Burnham, Muresley, Newport, Waddesden, Wendover, and Wycombe, in all about 180 benefices. The total number of places of worship in Bucks is 499, of which 266 belong to the Church of England; 56 to the Independents; 72 to the Baptists; 8 to the Society of Friends; 120 to the Wesleyan Methodists; 12 to isolated congregations; 4 to the Roman Catholics; and 1 to the Latter-Day Saints. The entire population of the county in 1851 was 163,554, of whom 80,990 were males, and 82,564 females. The parliamentary boroughs returning each two members to parliament are Aylesbury, pop. 26,794; Buckingham, pop. 8069; Chipping Wycombe, pop. 7179; Great Marlow, pop. 6523. The towns of more than 2000 inhabitants, not corporate towns, nor included in any parliamentary borough, are Amersham, pop. 2093; Chesham, pop. 2496; Newport-Pagnell, pop. 3312. The manufactures of Buckinghamshire are neither very extensive nor very important. The principal are those of lace and straw-plait. The number of persons chiefly engaged in agriculture is about 14 per cent.; in trade and manufactures about 12 per cent. The number of inhabited houses in the county is 33,160; uninhabited, 1206; building, 98.

BUCKLER, a piece of defensive armour, worn on the left arm, and composed of wickers woven together, or wood of the lightest sort, covered with hides, and fortified with plates of brass or other metal. Its figure was round, oval, or almost square. Bucklers were sometimes curiously adorned with figures of birds and beasts, and of the gods, the celestial bodies, and other natural objects; a custom which was derived from the heroic times, and from them communicated to the Grecians, Romans, and barbarians. The scutum, or Roman buckler, was composed of wood or wicker-work, and covered with a bull's hide. In the middle was an iron boss, or a spike, which was sometimes used to press violently upon the enemy. The Greek clipeus was smaller than the scutum, and quite circular. This species of shield belonged properly to other nations, though for some little time it was used by the Romans. Scuta were Buda.

Bucklers of two kinds, the ovata and the imbricata; the former of a plain oval figure; the latter oblong, and shaped like half a cylinder. Polybius (vi. 21) makes the scuta 4 feet by  $2\frac{1}{2}$ , while Plutarch calls them ποδυρεις, reaching down to the feet; and it is probable that they covered almost the whole body, since in Livy soldiers on guard are mentioned as sometimes sleeping with their heads on their shields, while the other extremity of the shield rested on the ground.

> Bucklers, Votive, those consecrated to the gods, and hung up in their temples, in commemoration of some hero, or as a thanksgiving for a victory over an enemy, whose

bucklers, taken in war, were offered as trophies.

BUCKRAM, a sort of coarse linen or cotton cloth stiffened with glue or paste, and used chiefly in the making of women's garments, to keep them in the form intended.

BUCKWHEAT. See AGRICULTURE.

BUCOLIC, (βουκόλος a herdsman, βουκολικός pastoral), in ancient poetry, a kind of poem relating to shepherds and rural affairs. According to the generally received opinion, it was of Sicilian origin. "Bucolics," says Vossius, "have some conformity with comedy. Like it, they are pictures and imitations of ordinary life; with this difference, however, that comedy represents the manners of the inhabitants of cities, and bucolics the occupations of country people." "Sometimes," he continues, "this last kind of poem is in the form of a monologue, and sometimes in that of a dialogue. Sometimes there is action in it, sometimes only narration, and sometimes it is composed both of action and narration." The hexameter verse is the most proper for bucolics in the Greek and Latin tongues. Moschus, Bion, Theocritus, and Virgil, are the most renowned of the ancient bucolic poets.

BUCOVAR, a small circle in the Austrian kingdom of Hungary, surrounding the city of the same name, and extending over two hundred and sixty-six square miles or 170,240 acres. The city stands at the junction of the Buka with the Danube. It contains one Catholic and two Greek churches, seven hundred houses, and 6300 inhabitants, chiefly employed in the cultivation of vines, the rearing of silk-worms, and the spinning of silk. Long. 18. 55. 20. E.

Lat. 45. 21. 9. N.

BUDA, or OFEN, a free city, the capital of the Austrian kingdom of Hungary, on the right bank of the Danube, opposite Pesth, with which it is connected by a bridge of boats, and by a beautiful iron suspension bridge, 1227 feet long and 39 feet wide, opened in 1849. It is the residence of the palatines, and the seat of the boards of the several departments of government and of ecclesiastical affairs. The public buildings worthy of notice are the castle (in which the crown and regalia of Hungary were kept till the last revolution, after which they were removed to Vienna) the townhouse, cathedral, observatory, the orphan asylum, and a number of churches. There are also a gymnasium and several libraries. Pop. 32,000, principally employed in the manufacture of leather, cutlery, silk and woollen goods, and in the cultivation of the vineyards in the vicinity, which yield an excellent red wine. Long. 19. 3. 18. E. Lat. 47. 29. 14. N. The town has been long celebrated for its mineral baths, supplied from the hot sulphureous springs in the neighbourhood. These baths were highly appreciated in the time of the Romans and also by the Turks. Of those constructed by the Romans only a few fragments now remain; but of the Turkish, three remain to this day in so perfect a state as still to be used. The temperature of the water is about 118 Fahr. Buda was in the possession of the Romans till towards the end of the 4th century. About 900, Arpad the Magyar chief, made it his capital, and subsequent monarchs greatly enlarged and improved it. In 1526 it was taken by Solyman the Magnificent, but retaken by Ferdinand I. king of Bohemia, in the following year. It was again captured by Solyman in 1529, and held by the Turks till 1686, when it was recovered by the Austrians under the Prince of Lorraine the Ganesha Upa-Purana, in which the appearance of

after a desperate resistance. In 1849, it was taken by the Budæus

Hungarian army, but soon after abandoned.

Buddha.

BUDÆUS, or BUDÉ, GUILLAUME, descended of an ancient and illustrious family, was born at Paris in 1467. At an early age he was sent to the schools of Paris, which, however, were at that time so ill-managed, that Budæus took a dislike to them, and spent his whole time in idleness, till his parents sent him to the university of Orleans to study law. There he passed three years without adding to his knowledge; so that his parents, on recalling him to Paris, found his ignorance as great as before, and his aversion for study, and love of gaming and pleasure, much greater. Being heir to a large fortune, he was left to follow his own inclinations. He was passionately fond of hunting, and devoted himself to his horses, dogs, and hawks. But when the fire of youth began to cool, he was seized with an irresistible passion for study, and having disposed of his hunting equipage, abandoned business of every description, and applied wholly to literature. Without any assistance, he made a rapid progress, particularly in the Latin and Greek languages. The work which gained him greatest reputation was his treatise De Asse, the first edition of which was published at Paris in 1514, in folio. To the advantages of erudition and high birth he united piety, modesty, gentleness, and goodbreeding. He was greatly esteemed by the French king, Francis I., who often sent for him, and, at his persuasion, and that of Du Bellay, founded the royal college of France, for teaching the languages and sciences. He was sent by the king to Rome in the character of ambassador to Leo X., and in 1552 was made master of requests. The same year he was chosen provost of the merchants. He died at Paris in 1540. His works, extending to four volumes in folio, were printed at Basle in 1557.

BUDDÆUS, JOHN FRANCIS, a celebrated Lutheran divine, and one of the most learned men Germany has produced, was born in 1667, at Anclam, a town of Pomerania, where his father was minister. He studied with great dis tinction at Greifswalde and at Wittenberg; and having attained to eminence in languages, theology, and history, was appointed Greek and Latin professor at Colberg; afterwards professor of ethical science and politics in the university of Halle; and at length, in 1705, professor of divinity at Jena, where, after having acquired a very great

reputation, he died in 1729.

His principal works are,—A large historical German Dictionary, Leipzig, 1709, folio; Historia Ecclesiastica Veteris Testamenti, Halle, 1709, 4 vols. 4to; Elementa Philosophiæ Practica, instrumentalis et theoretica, 3 vols. 8vo, which has passed through a great number of editions; Selecta Juris Natura et Gentium, Halle, 1704, 8vo; Miscellanea Sacra, Jena, 1727, 3 vols. 4to; Isagoge Historico-Theologica ad Theologiam Universam, singulasque ejus partes, 2 vols. 4to, a work much valued by the Lutherans; and a Treatise on Atheism and Superstition.

BUDDHA, or Buddhu, one of the two appearances of Vishnu, assumed for the purpose of deluding the enemies of the gods, and effecting their destruction by leading them to profess heretical opinions, and thus to reject the Hindu religion. In the Bhagawat, a work held in high esteem by the great majority of the Hindus, it is expressly declared, "that, at the commencement of the Kali Yug, Vishnu became incarnate in Kikata, under the name of Buddha, the son of Jina, for the purpose of deluding the enemies of the gods;" that "the Undiscernible Being, having assumed a mortal form, preached heretical doctrines in the three cities founded by Maya, for the purpose of destroying, by deluding, the enemies of the gods, stedfast in the religion prescribed by the Vedas;" that praise is due to "the pure Buddha, the deluder of the Daityas and Danawas;" and that, "by his words, as Buddha, Vishnu deludes the heretics." The same legend is related in a more detailed manner in the Kashi Khand of the Skanda Purana, and also in Buddha. Buddha is described as a manifestation rather than an incarnation of Vishnu; and an account is given of the circumstances under which it is alleged to have been made. According to the Puranas, Divodasa, a king of the solar race, finding Kashi unoccupied, took possession of the place, and there established the religion of Vishnu on so firm a foundation, and rendered his people so virtuous and happy, that the gods having become alarmed lest they should lose their supremacy, which they maintained by the use of very different means, applied to Vishnu and Shiva to relieve them from their anxieties on this head. The two incarnations of the Supreme Being, however, declared at first that it would be unjust to deprive so virtuous a prince of his kingdom; but Divodasa, having obtained as a boon from Brahma that none of the deities should remain in his kingdom, or exercise any power over it, Shiva at length waxed wroth at being so long banished from his favourite residence, and consented to fulfil the malignant wishes of the deities. But how was this to be accomplished? As long as Divodasa and his subjects remained stedfast in their religion, they were secure from injury; it therefore became necessary to lead them into error as a pretext for destroying them; and with this view Devi, the twelve suns, and Ganesha, were employed, but without success. At last, when these minor tempters had failed, Vishnu appeared, as Buddha, and effected their apostasy.

From the tenor of this legend may be divined, a priori, the doctrines which it was necessary for Buddha to propagate, in order to induce Divodasa and his subjects to apostatize from the religion of the Vedas. These in fact were, -that no credit whatever is due to the Vedas or Shastras; that it is vain to worship the images of gods; that sacrifices are cruel and sinful; that there is no such thing as transmigration of souls; that at death the five elements in the body dissolve never to reunite; that pleasure is the grand object of life, and that all acts of abstinence, piety, and charity, are unprofitable; that the body is man's real god, and should alone be worshipped; that pleasant food, fine clothes, and handsome women, form the grand felicity of man; that this world is without beginning, and consequently owes its existence neither to creator nor cause; and that Brahma, Vishnu, Shiva, Budra, and all the other gods, are mere creatures of fancy and fear, and never had a being, except in the imaginations of their worshippers. In short, the ancient Brahminical Buddha, whether a manifestation of Vishnu according to the Shaivas, or an incarnation according to the Vaishnavas, was the propagator of a system of universal scepticism, embracing not only a disbelief of all religion, but also a disregard for all virtue, and indeed for everything except mere sensual gratification. He was a false teacher and impostor, who came to deceive and to mislead, in order to destroy; not a kind and merciful being, adorned with the attributes of wisdom and benevolence, and worthy to receive all praise and worship, as some have erroneously supposed. Moreover, his appearance was for a temporary and local purpose, namely, to render Divodasa the voluntary cause of his own downfal, and thus to gratify the malice of the deities who had conceived an aversion to that virtuous potentate. But the sceptical doctrines which he disseminated in the course of his delusive manifestation became afterwards blended and intermixed with a variety of others of a totally different description; so that, although Buddhism has ever continued more or less distinct from the faith of which originally it formed the negation, it is exceedingly difficult to trace its progress, and by no means easy to ascertain its precise character at any given period of time. The rejection of the Vedas, and of the religion founded upon them, seems, however, to be common to all forms of Buddhism; and although the Brahmins nevertheless recognise Buddha as an object of worship or reverence, it is only as a manifestation of Vishnu, one of the emanations of Brahm, or the Supreme

Being, and not as a false teacher and an impostor, whose ob- bugons. ject was to deceive and delude, that he is acknowledged by the sacred caste of the Hindus. By not perceiving or not attending to this distinction, all the writers on the subject whose works we have consulted have entangled themselves in the mazes of inextricable perplexity and contradiction, and thickened the darkness which they laboured to dispel. M. Guigniaut, indeed, has attempted to cut the knot which he could not unloose. "Bouddha ne jouit d'aucun culte dans l'Inde," says he; "ses temples, ses idoles y sont renversés ou abandonnés; une ténébreuse horreur, une ignorance feinte ou réelle, une haine non moins violente qu'irréfléchie, regnent chez les Brahmanes, sur tout ce qui concerne sa doctrine." But in another part of his work (Religions de l'Antiquité, vol. i. p. 294), the same author admits that Buddha has not ceased to be revered by the Hindu nation; an admission wholly irreconcilable with the statement contained in the passage just quoted. This confusion of ideas, however, proceeds from incorrect notions as to the character of Buddha; for as long as he is considered merely as a manifestation of Vishnu, he is held to be an object of reverence, not as Buddha, but as the divinity who chose to appear in that form. The Hindus have never acknowledged him in any other character; and consequently all that has been written concerning him with reference to the religion of India, is wholly irrelevant, and foreign to the subject.

According to the fable, Buddha, when he had effected the apostasy of Divodasa, was prevailed upon by the Brahmins and holy men to terminate the propagation of heretical doctrines, upon which he disappeared in a deep well at Gaya, leaving neither writings nor disciples behind him; and it is further believed, upon the credit of tradition, that no Buddhists were known in India, until their sect was established by Gautama or Godama, with whom Buddha is frequently confounded. Now, in this mythic account, which is supported by a legend in the Shiva Purana, we have the true genius of Buddhism displayed. Its character throughout is essentially negative. When reduced to its elements or first principles, it consists merely of the rejection of the Vedas and of the religion founded upon them. It is not the Hindu faith; but under this denomination of Buddhism there may be, and in point of fact there has been, included the most various, not to say incongruous, tenets and superstitions which it is possible to imagine; and although its negative character is everywhere the same, its positive character differs in different countries. Hence the Buddhism of China, allied to the institutions, laws, and maxims of Fo and Confucius, is in many respects as different from the Buddhism of the Burman empire as the latter is from the system of religion founded on the Vedas and the Shastras. But. nevertheless, it has some positive general characteristics. The principles of this sect, as established by Gautama, its founder, about five hundred years before Christ, are unknown; but those now ascribed to him, and professed as his alleged revelations, may be very briefly stated. The doctrine and law of Gautama consists chiefly in observing five commandments, and abstaining from ten sins. The five commandments contain prohibitions against killing any animal whatsoever, from the meanest insect up to man; against the commission of theft; against the violation of another man's wife or concubine; against falsehood; and against the use of wine, or any intoxicating liquor or drug, as opium; and an exemption from poverty, misfortune, and calamity is promised to those who keep these commandments during all successive transmigrations. The ten sins consist in the killing of animals, theft, adultery, falsehood, discord, contumelious language, idle and superfluous talk, covetousness, envy or malice, and the following of false gods: and he who abstains from all these sins is said to obtain Sila, while every one who observes Sila, in all successive transmigrations, becomes at last worthy of beholding a god, and of hearing his

Budget

Budweis.

Buägell.

Bude-Light great voice, and is exempted from the four known miseries, namely, weight, old age, disease, and death. There are also certain positive good works which ought to be practised, such as Dana, which consists in giving alms, and Bavana, which consists in repeating solemnly the three words Aneizza, Docha, and Anatta; the first indicating liability to vicissitude, the second exposure to misfortune, and the third the impossibility of obtaining exemption from these evils. From this statement it appears that the two scales of commandments and prohibitions are singularly ill adjusted to each other; inasmuch as the duties enjoined are only half the number of the sins forbidden, and as the regative and

the positive in morals are blended in both.

The worshippers of Buddha contend with the disciples of Brahma for the honour of a high antiquity; and this pretension has been countenanced by some European writers of high reputation. Sir William Jones, for instance, fixes the first appearance of Buddhism about a thousand years before Christ; but his argument rests upon very weak grounds, and, if the Puranas are admitted to be of any authority, it is wholly untenable; for whatever antiquity may be ascribed to Buddha, considered as a manifestation of Vishnu for the purpose of local and temporary delusion, there are clearly no grounds, mythological, traditional, or historical, for placing the origin of this sect higher than the period of Gautama, or about five hundred years before Christ, as already mentioned. What we know with certainty is, that Buddhism, so called doubtless from its peculiar character, once predominated throughout a great part of India; that the doctrines and system of belief adopted by its votaries were in direct opposition to the religion founded on the Vedas; that a deadly hatred arose between the followers of Brahma and the Buddhists, which ended in the expulsion of the latter; that, nevertheless, the Brahmins continued to reverence Buddha as the manifestation of Vishnu, however much they might have detested the sect which called itself by his name; that Buddhism appears to have diffused itself over all the countries from Bengal to China inclusive; that in its character and genius it is extremely flexible and accommodating; and that, in the different countries which it overspread, it appears to have become amalgamated with indigenous local superstitions of almost every description. (See Kennedy's Researches into the Nature and Affinity of Ancient and Hindu Mythology, p. 248, et seq.; Transactions of the Bombay Literary Society, part iii. p. 532; Guigniaut, Religions de l'Antiquité, tom.i. p. 300; Heeren, Ideen über die Politik, &c. vol. viii. p. 127, 4th edit.; Asiatic Researches, vol. viii. p. 474; Hardy, Eastern Monachism; Hardy, Manual of Buddhism.)

BUDE-LIGHT, an ingenious contrivance for increasing the brillancy of any sort of lamp or gas-flame, by introducing a current of pure air, so as to carry off the product of combustion. It is the invention of Mr G. Gurney; and is named from his Cornish residence, where it was first tried.

BUDGELL, EUSTACE, an ingenious writer, was the son of Gilbert Budgell, D.D., and was born at St Thomas, near Exeter, in 1685. He was educated at Christ Church, Oxford, from which he removed to the Inner Temple, London; but instead of studying the law, he devoted his whole attention to polite literature. He contracted a friendship with Addison, who was first cousin to his mother, and who, on being appointed secretary to Lord Wharton, lord-lieutenant of Ireland, took Budgell with him as one of the clerks of his office. Budgell, who was then about twenty years of age, and had read the classics and the works of the best English, French, and Italian authors, now united with Sir Richard Steele and Addison in writing the Tatler. He soon afterwards contributed to the Spectator, where all his papers are marked with an X. To the Guardian, also, he contributed those papers which are marked with an asterisk. He was subsequently made under-secretary to Addison, chief

secretary to the lords justices of Ireland, deputy clerk of the council, and soon afterwards was chosen a member of the Irish parliament. In 1717, when Addison became principal secretary of state in England, he procured for Budgell the place of accountant and comptroller-general of the revenue in Ireland. But the next year, the Duke of Bolton being appointed lord-lieutenant, Budgell wrote a lampoon against Mr Webster, his secretary, in which his Grace himself was not spared. This indiscretion became the primary cause of his ruin; for the Duke of Bolton, in support of his secretary, got Budgell removed from his post of accountantgeneral; upon which he returned to England, and, contrary to the advice of Addison, published his case in a pamphlet. In the year 1720 he lost L.20,000 by the South Sea scheme, and afterwards spent L.5000 more in unsuccessful attempts to get into parliament. This completed his ruin. He at length employed himself in writing pamphlets against the ministry, and published many papers in the Craftsman. In 1733 he began a weekly periodical called the Bee, which he continued for above a hundred numbers, and which is printed in eight volumes 8vo. During the progress of this work occurred the death of Dr Tindal, by whose will Budgell received a legacy of L.2000; and the world being surprised at such a gift from a man entirely unrelated to him, to the exclusion of the next heir, a nephew, and the continuator of Rapin's history of England, immediately imputed it to his having made the will himself. Hence the satirist:

> Let Budgell charge low Grub-street on my quill, And write whate'er he please except my will.

It was thought that he had some hand in publishing Dr Tindal's Christianity as old as the Creation; for he often talked of an additional volume on the subject, but never published it. After the cessation of the Bee, he became so involved in lawsuits that he was reduced to very distressing straits. He was called to the bar, and attended for some time in the courts of law; but being unable to make any progress, and finding his prospects utterly ruined, he determined to put an end to his life. Accordingly, in 1736, he took a boat at Somerset-stairs, after filling his pockets with stones; ordered the waterman to shoot the bridge; and while the boat was passing under it he threw himself into the river. On his bureau was found a slip of paper with these words:

> What Cato did, and Addison approved, Cannot be wrong.

Besides the above works, he wrote a Translation of the Characters of Theophrastus. He never married, but left one natural daughter, who afterwards assumed his name, and became an actress at Drury-lane.

BUDGET, a bag or little sack. This word is used to designate the statement respecting the financial position of the British nation, which the chancellor of the exchequer lays before the House of Commons at the commencement

of each session of parliament.

BUDNÆANS, in *Ecclesiastical History*, so called from their leader, Simon Budnæus, or Budny. They not only denied all kind of religious worship to Jesus Christ, but asserted that he was not conceived by virtue of any divine power. Budnæus was deposed from his ministerial office in 1584, and with his adherents publicly excommunicated; but afterwards renouncing this opinion, he was restored to the communion of the Socinian sect. Crellius ascribes the origin of the above opinion to Adam Neuser.

BUDUN, a Ceylonese deity, supposed to have arrived at supremacy after successive transmigrations from the lowest state of an insect through the various species of animals There have been three successive deities of this name.

BUDWEIS, the capital of a circle of the same name in the Austrian kingdom of Bohemia, is situated on the river Moldau, 75 miles south of Prague. It is an ancient town, well built, and partially fortified. The council house is a

Ayres.

Ayres.

Buenaire handsome building, having in the centre of its large square a fine fountain. It has a cathedral, and several other churches, a gymnasium, philosophical academy, a high and other schools, and manufactures of woollen cloth, muslin, damask, saltpetre, and musical instruments. It is connected by railway with Linz and Gmünden. Pop. 8000.

BUENAIRE, one of the Dutch West India Islands, lying 30 miles east of Curaçoa. It is 50 miles in circumference, is mountainous in its appearance, and has about 2000 inhabitants. It produces only a few cattle, some goats, large quantities of poultry, and of late years a considerable quantity of salt. On the S.W. side there is a good

harbour. Long. 68. 15. W. Lat. 12. 12. N.

BUENOS-ÄYRES, the largest and most important province of the Argentine Confederation, is bounded on the north by the Parana, which separates it from the province of Entre Rios; and by the provinces of Santa Fé, San Luis, and Mendoza; on the east by the Atlantic; on the south by the Rio Negro, which separates it from Patagonia; and on the west by the country of the Indians, which extends west-wards to the Andes. The area of the province is estimated by Sir Woodbine Parish at about 200,000 square miles, being little less than that of France. Its seaboard along the Rio de la Plata and the ocean is upwards of 600 miles in length. Since 1825 no census of the population has been taken. At that date it was found to amount to 183,000. Parish estimates the present population at 320,000, of which number 120,000 belong to the city of Buenos-Ayres. By M'Cann, another authority, the entire population of the province is computed at 200,000. This small increase over the results of the census of 1825 is attributed by him to the civil wars, to the prohibition of the slave-trade, and other causes.

The general aspect of the country, as viewed from the sea, is eminently uninteresting. From the mouth of the Plata to the Bahia Blanca the sea-line presents an unbroken series of sand-dunes, varied here and there with low ridges of rock. From this latter point to the Patagonian frontier the aspect of the coast is less monotonous, though equally destitute of life or interest. Though Buenos-Ayres is the only province of the Argentine Confederation that borders upon the sea, and though all the exports and imports of the country pass through it, it possesses only two harbours, one of which (that of the city Buenos-Ayres) is extremely bad; the other (that of Belgrano, near the southern extremity of the province), though possessing great natural advantages, is by no means adequately appreciated. It might be turned to good account as a starting point for vessels engaged in trade with the South American states that border upon the Pacific, but the difficult and sometimes dangerous navigation of the adjoining seas counterbalances in the meantime the other advantages which it offers. The interior of the country, except where it is intersected by the low mountain ranges of the Ventana and Vaulcan in its southern portions, and the spurs of the Andes in the west, is one vast plain, of which by far the larger part is laid out in estancias, or cattle farms, though the soil is in itself well adapted for producing all the European cerealia. Agricultural pursuits, however, are by no means in favour with the natives, who cannot bring themselves to engage in any pursuit that cannot be prosecuted on horseback. "Every man, woman, and child in the country rides," says Parish. "One might fancy one's self in the land of centaurs, amidst a population half-men half-horses. Even beggars ride on horseback." Some of the cattle-farms are of immense extent: one in particular is mentioned by travellers as comprising more than 300 square miles of land, and yielding an enormous revenue to the proprietor. Some of the largest of them belong to British settlers, and are worked by British servants. The cattle were formerly hunted down and killed merely for the sake of their hides and tongues, while the carcases were abandoned to beasts and birds of prey. They are now slaughtered

in abattoirs, where every part of the animal is made avail-The beef is salted for exportation; the tallow is boiled down, and now forms an important item in the farmer's revenue; and the trade in hides is steadily increasing. Beef and an infusion of the native tea are the staple food of the natives. By the care of a few British colonists, sheep have of late years been extensively reared, and their wool is annually increasing in value. Till recently they were reputed so valueless that their carcases were used as fuel for kilns, &c. A decree of government ordained that no live sheep should be employed for this purpose. The number of cattle in the province is estimated at 12,000,000; of sheep, about the half of that number. The total value of exports from Buenos-Ayres in 1849 was L.2,537,821; in 1850, L.1,983,513; and in 1851, L.2,126,705. In this latter year, the value of the jerked beef exported was L.172,749; of hides, L.1,300,570; of tallow, L.217,690; of wool, L.190,060. The other exports consisted chiefly of hair, horns, bones, skins, and feathers. The value of imports into Buenos-Ayres may be stated approximately for the year 1851, at L.2,110,000; of which Great Britain contributes L.900,000; France, L.500,000; northern Europe, L.170,000; Gibraltar, Spain, and the Mediterranean, L.120,000; United States, L.200,000; Brazil and other countries, L.220,000. Of the cereals grown in Buenos-Ayres, the most important is maize, which is indigenous to the country. Wheat thrives well in the southern parts of the province, but the inhabitants rarely grow more than enough to supply their own necessities. In the event of a surplus, it is commonly exported to Brazil. Flax and hemp are cultivated with success. The vine, fig, orange, and olive, have been introduced from the old world, and are found to suit the climate admirably; but the most valuable of European fruits is the peach. A considerable fruit trade is carried on in coasting vessels, by merchants for the most part Italian or French. The geographical position of Buenos-Ayres is such as to enable it completely to control the foreign commercial relations of the entire confederation of which it forms a part. The exclusive policy which it has always pursued on this point has often involved it in serious quarrels, not only with many of the South American states and the other provinces of the Argentine Confederation, but with England and France. (See Buenos-Ayres, City of, and La Plata.) Since the expulsion of General Rosas, the navigation of the Parana and Uruguay has been thrown open, and other measures have been taken to place both the province and city of Buenos-Ayres on a level with the other provinces of the confederation. Buenos-Ayres has published a protest against any such measure, and the dispute is still unsettled. The only other towns in the province of any importance, besides the capital, are San Nicolas, which is situated on the Parana, about 200 miles N.W. of Buenos-Ayres, and contains a population of about 10,000; San Pedro, also on the Parana, about 150 miles from the capital in the same direction, with a population of 1000; Chascamas, on the shores of a cognominal lake, once a place of considerable importance, but seriously injured by the long continuance of the civil wars; and Belgrano, which from its position bids fair to become the rival of the capital itself.

BUENOS AYRES, the capital of the Argentine Confederation and of the province of Buenos-Ayres, is situated on the right bank of the estuary of the La Plata, in Lat. 34. 39. S. Long. 58. 18. W. The river is at this point so wide, that it is quite impossible with the naked eye to distinguish the opposite bank; and at the same time so shallow, that ships drawing 15 or 16 feet of water must anchor seven or eight miles from the city. Small craft generally anchor in what are called the inner roads, abreast of the city. As the depth of water is never sufficient to admit of their coming to shore, passengers and goods are landed by means of large-wheeled carts, which are either drawn or pushed by

Buenos Ayres. the requisite number of horses. The town of Buenos-Ayres is situated in a vast plain extending westwards to the Andes. The level uniformity of its outline is only broken by the spires of the various churches. The stranger, on landing, is struck with the regularity of the streets, which are quite straight, and intersect each other at distances of 150 yards forming squares like those of a chess-board, with the cleanly appearance of the houses, and the general air of independence that distinguishes the inhabitants. The only public buildings that have any pretensions to architectural beauty are the churches, which were built for the most part by the Jesuits. The houses have never more than two stories, and commonly only one, the rooms of which open into each other, and till lately were chiefly supplied with furniture of a very inferior description from the United States. A chimney was a thing unknown, as the old Spanish brazero alone was employed in heating the damp and white-washed rooms. A great change has, however, taken place in these respects within the last few years. The furniture is now supplied from Europe, the walls are papered, grates and chimneys have come into fashion, and English coal is burned at a lower price than it brings in the London market. These comforts are all the more valuable, as the climate of Buenos-Ayres is one of the most humid and changeable in the world. As the system of police is still somewhat of the rudest, the inhabitants are obliged to guard themselves and their property by means of the iron railings with which they protect the windows of the houses. Even this, however, is not always found to be an efficient safeguard against the dexterity of thieves. Though the city is built within 50 yards of the largest river in the world, the supplies of fresh water are both scanty and expensive. There are no public reservoirs or fountains, and the wells of the city yield only a brackish and disagreeable water. By the wealthier classes tanks are constructed, in which a sufficiency of rain-water for domestic purposes is collected from the roof of the house. The common people are obliged to purchase water from the water-carriers. As it is derived from the river, it is commonly muddy, and must stand for twenty-four hours till the sediment sinks to the bottom. It is then found to be excellent. The streets of the city are now tolerably paved with granite. Many of them, however, are still unpaved; and these in wet weather can hardly be traversed by a mounted horseman, and are utterly impassable by a person on foot. Floriculture is a favourite pursuit; and many English and Scotch gardeners have nurseries in the neighbourhood of the town.

Of the public buildings may be noticed the fortress, which is situated on the beach, and, besides guarding the town, serves as a residence for the president of the confederation; the cathedral, which is surmounted by a handsome dome, and has a large portico with twelve Corinthian pillars; the cabildo or town-house, in which justice is administered and the business of the municipality conducted; the churches of La Merced, San Francisco, and San Domingo; and the custom-house. The Plaza de la Victoria, round which some of these edifices are grouped, is the handsomest square in Buenos-Ayres. In the centre of it is a handsome monument, erected as a memorial of the war of independence. When the number of British residents in the town began rapidly to increase, application was made to General Rosas for a site for a church. This was immediately granted, and the minister for the time being set an example of liberality and toleration to his countrymen by laying the foundation-stone of the edifice, which cost in all about L.4000, half of which was defrayed by the British government. The Scottish residents, who muster about 1000, have recently built a small Presbyterian chapel; and the Roman Catholic portion of the English subjects are allowed the use of one of the national churches, in which a priest performs the service. In 1842 the Methodists erected a meeting-house,

which is used by all denominations of the British Dissenters. The Protestant Germans, who are pretty numerous, have a church in connexion with the Established Church of Prus-To each of these places of worship schools are attached for children of both sexes. The facilities for education are very considerable, and of these the inhabitants avail themselves extensively. Besides the denominational schools already alluded to, there is a university, attended by about 500 students, and possessing a valuable though not very extensive library. The sons of the wealthier families of the city are very frequently sent to Europe to complete their education at some of the great schools and colleges in France and England. The Buenos-Ayreans inherit from their ancestors much of that passion for music which characterizes the Spaniard, and are said to excel in this accomplishment. Poetry also is much cultivated among them; and a collection of lyrical ballads, under the title of Lira Argentina, is said to be well worth the notice of all lovers of Spanish verse. Besides its university, Buenos-Ayres contains many other literary and scientific institutions. Of these, the most important are the academy of medicine, the academy of jurisprudence, a special academy of mathematics and the physical sciences, a normal school, and a society for the promotion of agriculture. The charitable societies, though not very numerous, are rather important. Spanish is the lan guage spoken by the Buenos-Ayrean descendants of the old Spanish settlers, as well as by the native Indians, who constitute the bulk of the lower classes.

Buenos-Ayres was founded in 1535 by a Spanish expedition under Don Jorge de Mendoza, who landing at this place after many hardships, bestowed upon it the name it now bears in commemoration of the fine weather which prevailed at that time. At first he endeavoured to conciliate the native Indians, but hostilities soon broke out, and, despite their utmost efforts, the Spaniards were obliged to abandon the new settlement; and after almost incredible difficulties succeeded in reaching Assumption in Paraguay, with their numbers reduced by three-fourths. In 1580 another expedition under Don Juan de Garay took possession of the site of the old fort and established themselves there, founding cities and establishing settlements in every direction with such success, that in 1620 a new government was erected, under the name of the government of the Rio de la Plata. Buenos-Ayres became the capital, and the seat of a new bishopric created at this time by Pope Paul V., at the request of Philip III. of Spain. After the lapse of a century, Buenos-Ayres began to rise into such importance as to excite the jealousy and alarm of the home government. The insane restrictions imposed upon her foreign and internal commerce led only to continual heart-burnings with the parent country, and Buenos-Ayres soon became a rendezvous for the smugglers of such nations as were strong enough to set Spain at defiance. After numerous modifications of its government, and of its relations to the parent state, the provinces of the Rio de la Plata were in 1776 erected into a vice-royalty, of which Buenos-Ayres continued to be the capital. Two years later the old commercial restrictions were abolished and a new commercial code promulgated, so liberal as to be called the "Free-Trade Regulations." According to the old system the Buenos-Ayreans were only allowed to export merchandise to the Portuguese settlements in Brazil, and the quantity was limited to 2000 fanegas of wheat, 500 quintals of jerked beef, and 500 of tallow. All intercourse with other countries was strictly prohibited. By the new system, nine ports in Spain and twenty-four in the colonies were declared puertos habilitados, or ports of entry. The effects of the new policy were immediately visible. Of hides, for instance, the staple commodity of the country, the exports to Spain before 1778 only amounted to 150,000 annually; after that year they rose to from 700,000 to 800,000. In 1805, and

Buffal.

macco

Buffet.

Buenos-Ayres. though the natives applied for assistance to the home authorities, they were told that they must defend themselves as they best might, as Spain could send them no help. They accordingly rose in arms, and twice expelled the invaders. In the following year they were threatened with invasion by the prince regent of Portugal. The resolution which they displayed on the occasion prevented that prince from insisting upon his claims. In 1810 the circumstances of the country involved the establishment of a provisional junta; a policy which was construed by the Spanish cortes into an act of rebellion. A civil war ensued; and Ferdinand, on his restoration after the expulsion of the French from Spain, instead of trying to conciliate the malcontents by timely concessions, obstinately refused to accede to their lawful demands. The result of this was that, on the 9th of July 1816, deputies from the provinces of the Rio de la Plata assembled in congress at Tucuman, solemnly declared their separation from Spain, and their determination to constitute a free and independent state. Buenos-Ayres continued to be the capital of the new republic, which was governed by authorities constituted in that city. The exclusive policy of the capital soon bred discontent in the provinces, the governors of which began to cry out for a federation in opposition to the central government of Buenos-Ayres. their influence the new constitution, which conferred on a chief magistrate residing in the capital very extensive civil and military powers over the whole republic, was repudiated, and a civil war was the consequence. Various assemblies were held, and attempts were made to establish the constitution on a sufficiently wide basis to reconcile the interests of all parties-but always without success; and from 1827 till the expulsion of Rosas in 1852, no meetings of the constituent assembly took place. After 1827, the Confederation was obliged to delegate to the executive government of Buenos-Ayres the undivided charge of the national business, such as the management of the public debt, the maintenance of relations with foreign powers, the defence of the country in the event of war, &c. While these internal dissensions were going on, war was declared between the young confederation and the empire of Brazil, and Buenos-Ayres was blockaded for a year and a half by a Brazilian fleet. In 1828, however, the siege was raised by the intervention of the English. This foreign war thus ended, the civil war broke out once more, and was only temporarily checked by the accession of General Rosas to power in 1835. Aiming at territorial aggrandizement, Rosas soon became involved in war with the neighbouring states of Paraguay and Uruguay. England, France, and Brazil interfered, with the intention of effecting an amicable arrangement between the helligerents. Rosas rejected their mediation; and the united fleets of England and France took possession of the Buenos-Ayrean fleet which was engaged in the siege of Monte Video, and opened the navigation of the Parana to the merchantmen of all nations. In the subsequent operations Rosas sustained severe losses, yet obstinately refused to yield. In 1848 the English fleet returned home, and was followed by the French in the following year. Brazil was now left to carry on the war alone, but she found ready allies in some of the provinces of the Argentine Confederation, which had long regarded with hatred and aversion the supremacy arrogated by Buenos-Ayres. With the assistance of these and the adjoining states of Uruguay and Paraguay, a large army was raised, which, under the command of General Urquiza, defeated Rosas at the battle of Monte Caseros, February 3, 1852. Rosas after his downfal fled to England. Urquiza was appointed provisional director of the confederation; but the Buenos-Ayreans protested against his policy, which threatened to undermine the prerogatives they had been long struggling to secure. Civil war again broke out; and

again in 1807, the British invaded Buenos-Ayres; and in 1853 Buenos-Ayres was besieged by the forces of the though the natives applied for assistance to the home authorities, they were told that they must defend themselves as siege was raised, and a temporary accommodation effected.

BUFFALMACCO, the designation of a wit and painter who lived at Florence about the end of the thirteenth century. His real name was Buonamico di Cristofano, but his witticisms are recorded under the other name in the Decameron of Boccaccio and the Novelle of Sacchetti. His best pictures have perished, but specimens of his works remain in the Campo Santo of Pisa and at Arezzo. In those his style is mean, and without the grace of Giotto; but there is vigour in some of his conceptions, as in the Crucifixion. Lanzi says he was alive in 1351, though Vasari says he died in poverty in 1340.

BUFFALO, Bubalus. See MAMMALIA.

BUFFALO, a city and port of entry, capital of the county of Erie, in the state of New York, United States, North America, is situated on Buffalo Creek, which forms its harbour at the west extremity of Lake Erie, where it contracts to form the Niagara river. It was founded in 1801, but for some time made so little progress, that when burned by the British in 1814 it did not contain more than 200 houses. Its prosperity dates from the formation of the Erie canal, which establishes a navigable communication between the lake and the Hudson river. Since that period its growth has been so rapid, that in point of population it ranks as the fourth city in the state, and the twelfth in the union; and as a commercial city is surpassed by only three or four. The city is built on a gradual ascent, extending for two miles from the water to an extended plain, and from the higher parts affording fine views of the surrounding scenery. It has three public squares, and the streets are broad and regular, consisting of numerous elegant buildings and extensive warehouses. The public buildings are a courthouse, jail, two markets, the city offices, churches, banks, theatre, &c. Among the benevolent institutions are the orphan asylum, city hospital, hospital of the Sisters of Charity, female orphan asylum, and Association for the Relief of the Poor. There are numerous public schools open to all children, and many academies and private schools. The university of Buffalo was chartered in 1846, and has a medical school. The young men's association has a library of about 7000 volumes, a museum, and a reading-room amply supplied with periodicals and newspapers. The German young men's association is a similar institution, with a library of 2000 volumes. Buffalo has about 40 churches, 10 banks, 1 savings-bank, and, including agencies, upwards of 40 insurance companies.

The harbour is spacious and safe, and has for a mile from its entrance a depth of 13 or 14 feet of water. To obviate the bar at its mouth, a pier 1500 feet in length with a lighthouse at its extremity has been constructed, so that vessels drawing eight feet enter without difficulty. Farther improvements have been proposed. In 1852, 929 vessels of 135,866 tons burden entered, and 1066 vessels of 147,505 tons cleared out in the foreign trade; and 3738 vessels of 1,403,672 tons entered, and 3708 vessels of 1,405,203 tons cleared out in the coasting trade. The shipping belonging to the district at the end of that year was 59 steamers of 30,126 tons, and 134 sailing vessels of 26,397 tons. The Grand Erie canal was commenced in 1817 and completed in 1825. It is 363 miles long and 40 feet wide.

The city is divided into five wards, and is governed by a mayor and common council. Shipbuilding is extensively carried on. Extensive lines of railway connect Buffalo with the eastern and western states and Canada. Pop. (1810) 1508; (1820) 2095; (1830) 8653; (1840) 18,213; (1850) 42,260. Its present population (1854) is estimated at 70,000.

BUFFET (French buffet), was anciently a little apartment for holding china, glass-ware, &c., erected on one side.

Buffier Buffon.

of a room, from which it was separated by slender wooden columns. It is now very generally superseded by the sideboard. In the houses of persons of distinction in France. the buffet was a detached room, decorated with pictures relative to the subject, with fountains, cisterns, vases, &c.

BUFFIER, CLAUDE, a distinguished writer, born in Poland in 1661, of a French family settled at Rouen, in which city he received his earlier education. He became a Jesuit in 1679, and died at Paris in 1737. There are many works by this author, showing deep penetration and accurate judgment. The principal of these is entitled UnCours des Sciences, or a Course of Sciences, upon principles new and simple, in order to form the language, the understanding, and the heart. Paris 1732, in folio. He was the author of several other works, particularly  $Pratique\ de$ la Memoire artificielle, Paris, 1715, 4 vols. 12mo; An Introduction to the History of the Sovereign Houses of Europe; An Abridgment of Spanish History; An Account of the Origin of the Kingdom of Sicily and Naples; and various treatises on religion and piety. In his Cours des Sciences Buffier has anticipated, though he failed to develop and pursue to its consequences, that peculiar system of mental philosophy which resolves all the ultimate principles of belief into the perceptions or suggestions of what is called common sense; and indeed it seems pretty certain that Dr Reid has been indebted to the learned Jesuit for valuable hints on nearly all the purely speculative points

treated of in his Intellectual Philosophy.

BUFFON, GEORGE LOUIS LE CLERC, COMTE DE, a celebrated naturalist, was born at Montbard in Burgundy, on the 7th of September 1707. His father, Benjamin le Clerc, was a counsellor of the parliament of Dijon; and the son was destined to the same office, if science had not drawn him away from the law. He studied at Dijon; and his eager activity, his acuteness, penetration, and robust constitution, fitted him to pursue business and pleasure with equal ardour His early passion was for astronomy; and the young Le Clerc was seldom without Euclid in his pocket. At the age of twenty he travelled in Italy in company with the young Duke of Kingston and his tutor; but he overlooked the choicest remains of art, and amidst the ruins of an elegant and luxurious people he first felt the charms of natural history, of which he afterwards proved the zealous and successful expounder. On his return to France he fought, on some accidental quarrel, with an Englishman, whom he wounded, and in consequence was obliged to retire to Paris, where he translated Newton's Fluxions from the Latin, and Hales's Statics from the English into the French language. He went to England at the age of twenty-five, and remained there about three months. This concluded his travels. Having at the age of twenty-one succeeded to the estate of his mother, which was valued at about 300,000 livres, or L.12,000 sterling, he was enabled to pursue the career of letters without any of the difficulties that often beset literary men. Perhaps this was the period of his retirement to Montbard, where he spent much of his time, and where his leisure was little interrupted; for whilst he resided in the capital, his office of intendant of the king's garden and cabinet engrossed much of his attention. He spent fourteen hours every day in study; yet when we examine the extent of his knowledge and the number of his works, we wonder at his having accomplished so much even in that time. At five in the morning he retired to a pavilion in his vast gardens, and he was then inaccessible. This was, as Prince Henry of Prussia called it, the cradle of natural history; but she was indifferently accommodated. The walls were naked; and an old writing-table, with pen, ink, and paper, and an elbow-chair of black leather, were the only furniture of his study. His manuscripts were in a cabinet in another building, and he went occasionally from one to the other. The eras of Buffon's works are pretty well known. When

each was finished it was put aside, in order that he might Buffoon forget it, and afterwards return to it with the severity of a disinterested critic. He was anxious to render it perspicuous; and if those to whom he read his works hesitated a moment, he changed the passage. The works of others he often read like Magliabechi, confining himself to the titles, the contents, and the most interesting parts; but he perused M. Neckar's Compte Rendu, and the Adminstration of the Finances, from beginning to end, and spoke of them with no little enthusiasm. His favourite authors were Féné-

lon, Montesquieu, and Richardson. M. de Buffon's conversation was unadorned, rarely animated, but sometimes very cheerful. He was exact in his dress, particularly in arranging his hair. He liked to sit long at table; at which time his conversation was unembarrassed, and his guests had frequently occasion to notice some happy turn of phrase, or some deep reflection. His self complaisance was very considerable. He loved praise, and even praised himself; yet it was with such frankness, and with so little contempt of others, that it was seldom disagreeable. Indeed, when we consider the extent of his reputation, the credit of his works, and the attention with which they were always received, we can scarcely be surprised that he was apt to appear conscious of his own value. It may here be proper to observe, that although the works of this philosopher afford grounds for the charge of infidelity brought against him, yet it would appear that he was able to give to the Sorbonne a satisfactory explanation of the offensive passages. At the same time, however, the interests of religion and morality require that the licentiousness of his conduct, and his enmity to the Christian faith, should not be passed over in silence. The longevity of Buffon's family was somewhat remarkable. His father lived to the age of ninety-three; his grandfather to that of eightyseven; and the subject of the present memoir exceeded eighty. In his latter years he suffered severely from the stone, but would never submit to the operation of lithotomy. He died at Paris on the 16th of April 1788. He left one son, who erected in the gardens of Montbard a low column with an inscription to his memory. This son, who was a colonel of cavalry, fell a victim to the tyranny of Robespierre, only fifteen days before the downfal of that monster.

The editions of the several works of Buffon are numerous. An edition of the whole has been published in 35 vols. 4to;

and another in 62 vols. 12mo.

BUFFOON, a droll, or mimic. Ménage, after Salmasius, derives the word from buffo, a name given to those who appeared on the Roman stage with their cheeks blown up; that receiving blows thereon they might make the greater noise, and excite the laughter of the people. Others, as Rhodiginus, make the origin of buffoonery more venerable, deriving it from the feast called buphonia, instituted in Attica by Erechtheus.

Buffoons were variously denominated scurræ, gelasiani, minologi, ministelli, and joculatores, and their exhibitions were chiefly at the tables of the great. Gallienus never sat down to meals without a second table of buffoons by him. Tillemont also renders pantomimes by buffoons; in which sense, he observes, the shows of the buffoons were taken away by Domitian, restored by Nerva, and finally abolished by Trajan.

BUG. See Entomology, and Vermin.

BUGARES (Bulgarii), anciently signified a kind of heretics, otherwise called Paterini, Cathari, and Albi-The word is formed from the French Bougres, and that from Bougria or Bulgaria, the country where they chiefly appeared. Among other errors, they held that men ought to believe no scripture but the New Testament; that baptism was not necessary to infants; that priests who were married could not be saved; and that an oath was unlawful. They were strenuously refuted by Friar Robert, a DominiBugia can, when the can building the can, when the can be can, when the can building the the can buildin

can, who had formerly professed this heresy. They are thus mentioned by Matthew Paris, who lived in the reign of Henry III.: Circa dies autem illos invaluit hæretica pravitas eorum qui vulgariter dicuntur Paterini et Bugares,

de quorum erroribus malo tacere quam loqui.

BUGIA or BOUGIAH, a fortified seaport town of Algeria, in the regency of, and 112 miles east of, the town of Algiers. It has a very picturesque appearance, being built in the form of an amphitheatre on a bay of the Mediterranean, and encircled by a lofty chain of mountains. Its principal exports are wax, oil, and dried fruits. The European population in 1850 was 847. It was taken possession of by the French in 1833.

BUGLE-Horn, a small brass instrument used in the hunting-field, and in cavalry regiments. The compass of the bugle is now extended by finger-keys. See Appendix

to Music.

BUHL, ornamental wood-work inlaid with mother-ofpearl, brass, &c. The name is derived from the inventor.

BUILDER, in the general sense of the term, an undertaker of works of building. With reference to the operations of civil architecture particularly, the builder stands between the proprietor and architect on the one hand, and the artizan, merchant, and manufacturer on the other: he engages to the first to carry a certain proposed work into execution, as he may be directed by the second, and saves to both of them the trouble and responsibility of procuring materials and employing workmen.

The builder's emolument arises from an improved price, or charges bearing an advance on the prime cost, to remunerate him for the use of his capital in materials, workshops, plant, and labour, and his own personal application and risk. A builder has the power also of deriving an advantage from the division of labour, by employing artizans in those operations only which habit enables them to execute with the

greatest facility.

The builder contracts to do certain specified works for a certain total sum of money, the amount of which he de-

termines by a previous estimate; or to do prescribed opera- Building. tions, at so much for a certain fixed quantity of every sort involved, per yard, per rod, per foot, and so on, the amount to be ascertained, when they are completed, by measurement; or he executes works according to instructions or specifications, leaving the charges to be determined according to the usual and accustomed rates, on the quantities ascertained by admeasurement. In the two former cases he is said to work by contract, and in the last by measure and value. For jobbing, in repairs and alterations, a day account is kept; that is, a record of the time workmen are employed, and of the materials used, in performing certain operations. This is made out with an advance of so much per cent. on the prime cost, or wages of the workmen and selling prices of the unwrought materials, for the builder's profit or remuneration, as before stated.

A builder should be theoretically acquainted with the principles of construction, and practically conversant with the details of all the mechanic arts used in building; as well to be enabled to carry on his business with advantage to his own interest, as to the proper execution of the works he may undertake. He should be qualified to ascertain with the utmost minuteness, from the drawings of a design, and the specification of the manner in which, and matter of which, it is to be carried into execution, the quantity of labour, and materials of every kind and description, and the exact value of them all. In this is involved the necessity of being well acquainted with the market prices of raw and manufactured articles to a very great extent, and a matured judgment of the quantity of labour required, or how much time a workman will take to produce a certain result. These things, however, which involve the making of estimates on which to make contracts, in the practice of this country are generally referred to a surveyor or measurer, because of the general ignorance and incompetence of builders, or because of the greater aptitude of the latter, in consequence of their attention being solely occupied by such

things.

## BUILDING.

THE art of building comprises the practice of civil architecture, or the mechanical operations necessary to carry the designs of the architect into effect. It is not unfrequently called practical architecture; but the adoption of this term would have tended only to confuse, by rendering it difficult to make the distinction generally understood between architecture as a fine or liberal art, and architecture as a mechanical art. The execution of works of architecture necessarily includes building; but building is frequently employed when the result is not architectural: a man may be a competent builder without being an architect; but no one can be an accomplished architect unless he be competent to specify and direct all the operations of building. A scientific knowledge of the principles of masonry, carpentry, joinery, &c., and of the qualities, strength, and resistance of materials, though of the utmost importance to an architect, must be attended by a minute acquaintance with a great variety of less ambitious details. Such are those which relate to the arrangement of a plan for the greatest possible degree of convenience on the smallest space, and at the least expense; its transference to the ground; the preparation and formation of foundations; the arrangement and construction of drains, sewers, and ventshafts; the varieties of walling with stone, and of laying bricks in brick-work; the merit of the various modes of bonding and tying walls, both lengthwise and across; the arrangement of gutters on roofs, to get sufficient fall, and to conduct the water to the least inconvenient places

for fixing trunks to lead it down; the arrangement and formation of flues; the protection of walls from damp, ot timber from moisture and stagnant air, and of metals generally from exciting causes; the cost of materials and labour, and the quantity of each required to produce certain results. Together with these, an architect ought to be practically acquainted with all the modes of operation in all the trades or arts employed in building. Everything must be clearly understood, or it will be impossible properly to specify beforehand, in detail, everything and every operation to be done and performed; and minutely to estimate, beforehand also, the absolute cost involved in the execution of a proposed structure. The power to do the latter necessarily involves that of measuring work, and ascertaining quantities after it is done. These things may certainly be referred to the surveyor or measurer, but they are not the less incumbent on the architect, who cannot be said to be thoroughly master of building, or the practice of his profession, unless he be skilled in these operations.

The architect having furnished the specification and working drawings of his design, the first step in the process is to prepare the foundation. (See article Stone-Masoney, sect. 60.) Much in this particular, it is evident, must depend on localities. It is not of so much importance that the ground be hard, or even rocky, as that it be compact, and of similar consistence throughout; that it be so constituted as to resist entirely and throughout, or yield

equally to the superincumbent weight.

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But in the ordinary processes of building, the artificial preparation of foundations hardly need be considered. Common prudence would refer it to professional management, when such is found necessary; and a work of this kind cannot contain sufficient information and instruction to qualify a man to act professionally on any subject, and more particularly on those subjects which demand initiatory practice and experience. We therefore proceed to the ordinary routine of practice.

The artificers whose trades come within the immediate range of the builder's business are the following: Digger or excavator, bricklayer, mason, slater, sawyer, carpenter, joiner, plasterer, modeller, carver and gilder, plumber,

smith, glazier, painter and decorator.

Digger or Excavator.—The digger works with a pickaxe and a spade or shovel. With the pick-axe he breaks down the soil if it be hard or very stiff, and throws it out with the shovel; but compacted sand and alluvial soil is spitted and thrown out with the spade alone, without previous breaking down. When rock occurs in a foundation, the assistance of the quarryman is requisite to cut through or blast it, as the occasion may require. The digger should be required to produce a perfect level in every direction, and especially in trenches for walls; nor may this be done by placing again loose matter, but the level must be produced on the solid or undisturbed bed.

Digger's work is valued by the cubic yard, and is generally made to include, besides excavating, the removal of the soil and rubbish. The price per yard is therefore necessarily contingent on the stiffness of the soil, the depth to which the excavations may reach below the surface, and the distance the stuff is to be removed; so that it is impossible to determine what the cost may be, without reference to each and all of these particulars, most of which must be different in every different place; and all are again affected by the local cost of labour or wages. A good excavator will dig and throw out, of common soil, into a basket or wheelbarrow, eight or ten yards per diem; but of stiff clay or firm gravel, not more than six yards.

Bricklayer .- The manufacture of brick being made the subject of a separate article, we need only refer to that for information on the subject; and in the same manner the components and merits of mortars and cements will be found in sections 20 et seqq. of the article under the head STONE-MASONRY. A few observations on the composition of mortar for bricklaying will nevertheless be necessary here.

Particular attention must be paid to cleansing the sand to be used for mortar of every particle of clay or mud that may adhere to or be mixed up with it. Sea sand is objectionable for two reasons; it cannot be perfectly freed from a saline taint, and the particles are moreover generally rounded by attrition, caused by the action of the sea, which makes it less efficient for mortar than if they retained their natural angular forms. Lime should not be slaked until the moment it is to be mixed up with the sand in mortar, but the sooner that is done after it is burnt the better. The proportion of lime to sand is generally taken at as much as one-fourth of the whole mass; but if both the materials be of good quality, that is, if the lime slake freely, and become a fine pungent impalpable powder, perfectly clear from argillaceous or any other foreign matter, and the sand clean and sharp, and of variously sized particles, one-fifth of lime to sand is quite enough: more is injurious. The ingredients should be well mixed together, and with water, and as little water used as will suffice to make the compound consistent and paste-like. Rain, or any other soft water, should be used for the purpose of making mortar, and not spring or hard water, though any other may be preferred to what is brackish even in the slightest degree. A quick-setting cement, such as that which is most commonly used in building in this country, and known as Parker's or Roman cement, can only be mixed or gauged as it is required for use. A bricklayer will keep a labourer fully em-ployed in gauging cement for him alone. It is mixed with sand in the same manner that lime is in common mortar, in the proportion of about two or three of sand to one of cement, according to the quality of the latter; and the labourer, as he gauges on one board, supplies the mixture to the bricklayer fit for use on another board, a spadeful at a time: it must then be applied within half a minute, or it sets and is spoiled.

The average size of bricks in this country is a fraction under

nine inches long, four and a half wide, and two and a half inches Building. thick; and in consequence of this uniformity of size, a wall of this material is described as of so many bricks in thickness, or of the number of inches which result from multiplying nine inches by any number of bricks; a nine-inch or one-brick wall; a fourteeninch wall, or one brick and a half (131 inches would be more correct, in fact, for although a joint of mortar must occur in this thickness, yet the fraction under the given size of the brick is enough to form it); eighteen-inch or two bricks, and so on.

The great art in bricklaying is to preserve and maintain a bond, to have every course perfectly horizontal, both longitudinally and transversely, and perfectly plumb; which last, however, may not mean upright, though that is the general acceptation of the term, for the plumb-rule may be made to suit any required inclination, as inward against a bank, for instance, or in a tapering tower; and also to make the vertical joints recur perpendicularly over each other: this is vulgarly and technically called keeping the perpends. By bond in brick-work is intended that arrangement which shall make the bricks of every course cover the joints of those in the course below it, and so tend to make the whole mass or combination of bricks act as much together, or dependently one upon another, as possible. The object of this will be understood by reference to the diagram, fig. 1. Here it is evident, from the arrange-Plato ment of the bricks, that any weight placed on a would (supposing, CXLVIL as we are obliged to suppose, that every brick feels equally, throughout its whole length, a stress laid on any part of it) be carried down and borne alike in every course from b to c; in the same manner the brick d is upborne by every brick in the line ef, and so throughout the structure. But this forms a longitudinal bond only, which cannot extend its influence beyond the width of the brick; and a wall of one brick and a half or two bricks thick, built in this manner, would, in effect, consist of three or four half-brick-thick walls. acting independently of each other, as shown in the plan at i, in the diagram, under fig. 1. If the bricks were turned so as to show their short sides or ends in front, instead of their long ones, certainly a compact wall of a whole brick in thickness would be produced; but the longitudinal bond would be shortened one-half, as at g c h, and a wall of any greater thickness, in the same manner, must be composed of so many independent one-brick walls, as at k in the plan before referred to. To obviate this, to produce a transverse, and yet preserve a true longitudinal bond, the bricks are laid in alternate courses of headers and stretchers, or of ends and sides, as shown in fig. 2, thus combining the advantages of the two modes of arrangement a b c and g c h fig. 1, in a b c fig. 2. Each brick in fig. 2 showing its long side in front, or being a stretcher, will have another lying parallel to it, and on the same level, on the other side, to receive the other ends of the bricks showing as headers in front, which in their turn bind, by covering the joint between them, as shown in the end of such a wall at d. Thus a well-bonded nine-inch or one-brick wall is produced. The end elevations of the same wall at e and f show how the process of bonding is pursued in walls of one and a half and two bricks thick, the stretcher being abutted in the same course by a header; thus, in a fourteen-inch wall inverting the appearance on the opposite sides, as seen at e, and producing the same appearance in an eighteen-inch wall, as at In the diagram under fig. 2, at g, is the plan of a fourteen-inch wall, showing the headers on one side, and the stretchers on the other, and at h is the plan of the course immediately above it, in which the headers and stretchers are inverted; at k and i are shown, in the same manner, the plans of two courses of an eighteen-inch wall. This is called English bond. Thicker walls are constructed in the same manner by the extension of the same principle.

But a brick being exactly half its length in breadth, it is impossible, commencing from a vertical end or quoin, to make a bond with whole bricks, as the joints must of necessity fall one over the other. This difficulty is obviated by cutting a brick longitudinally into two equal parts, which are called half headers. One of these is placed next to a whole header, inward from the angle, and forms with it a three-quarter length between the stretchers above and below, thus making a regular overlap, which may then be preserved throughout: half headers so applied are technically termed closers. (See the joints in the heading courses next the upright angle of the wall fig. 2, and the first joints inwards from the square ends by the headers in the plans at g and h.) A three-quarter stretcher is obviously as available for this purpose as a half header, but the latter is preferred, because, by the use of it, uniformity of appearance is preserved, and whole bricks are retained on the returns. In walls of almost all thicknesses above nine inches, to preserve the transverse, and yet not destroy the longitudinal bond, it is frequently necessary to use half bricks; but it becomes a question whether more is not lost in the general firmness and consistence of the wall by that necessity, than is gained in the uniformity of the bond. It may certainly be taken as a general rule, that a brick should never be cut if it can be worked in whole, for a new joint

Building. is thereby created in a construction, the difficulty of which consists in obviating the debility arising from the constant recurrence of joints. Great attention should be paid to this, especially in the quoins of buildings, in which half bricks most readily occur; and there it is not only of consequence to have the greatest degree of consistence, but the quarter bricks used as closers are already admitted, and the weakness consequent on their admission would only be increased by the use of other bats, or fragments of bricks.

Another mode of bonding brick-work, which may be supposed to have arisen from the appearance of the ends of a wall according to the former mode of arrangement (see e and f, fig. 2), instead of placing the bricks in alternate courses of headers and stretchers, places headers and stretchers alternately in the same course, fig. 3. The plans below this at c and d are of two courses of a fourteeninch wall, with their bond, showing in what manner the joints are broken in the wall horizontally as well as vertically on its face. This is called Flemish bond. Closers are necessary to both varieties of bond, in the same manner, and for the same purpose; half bricks also will occur in both, but what has been said with reference to the use of them in the former applies even with more force to the latter, for they are more frequent in Flemish than in English, and its transverse tie is thereby rendered less strong. Their occurrence is a disadvantage which every care should be taken to obviate. The arrangement of the joints, however, in Flemish bond, presenting a neater appearance than that of English bond, it is generally preferred for external walls when their outer faces are not to be covered with stucco, or plaster composition of any kind; but English bond should have the preference when the greatest degree of strength and compactness is considered of the highest importance, because it affords, as we have already noticed, a better transverse tie than the other. It is a curious fact, that what is in England called Flemish bond in brick-work is unknown in Flanders, and, so far as the observation of the present writer has extended, is practised in the British Isles alone. In Flanders, Holland, and Rhenish Germany, which are all brick-laying countries, no kind of bond is found but what is known in England as English bond.

It has been attempted to improve the bond in thick walls by laying raking courses in the core between external stretching courses, and reversing the rake when the course recurs. This obviates whatever necessity may exist of using half bricks in the heading courses, but it leaves triangular interstices to be filled up with bats, as the diagram fig. 4 shows. This represents the plan of a thirty-six inch or three-brick wall with raking courses at a, between external ranges of stretchers, and lying on a complete course of headers, and at b a wall of the same thickness herring-boned; courses of headers would bed and cover this also, and, in the second course above, the raking or herring-boning would be repeated, but the direction of the bricks inverted. It will be seen that the latter demands, in addition to the triangular filling-in bats at the outer ends of the diagonally placed bricks, half bricks to fill up the central line of interstices, rendering herring-boning more objectionable in that particular, though it has some advantages over simply raking, or thorough diagonal courses, in some other points. Neither mode should, however, be recurred to for walls of a less thickness than three bricks, and that indeed is almost too thin to admit of any great advantage from it.

Skilful and ingenious workmen are well aware of the necessity of attending to the bond, and are ready both to suggest and to receive and practise an improvement; but generally the workmen themselves are both ignorant of its importance and careless in preserving it, even according to the common modes. Their work should therefore be strictly supervised as they proceed with it; for many of the failures which are constantly occurring may be referred to their ignorance or carelessness in this particular.

Not second in importance to bonding in brick-work is, that it be perfectly plumb, or vertical, and that every course be perfectly horizontal, or level, both longitudinally and transversely. The lowest course in the footings of a brick wall should be laid with the strictest attention to this latter particular; for the bricks being of equal thickness throughout, the slightest irregularity or incorrectness in that will be carried into the superimposing courses, and can only be rectified by using a greater or less quantity of mortar in one part or another, so that the wall will of course yield unequally to the superincumbent weight, as the work goes on, and perpetuate the infirmity. To save the trouble of keeping the plumb-rule and level constantly in his hands, and yet to insure correct work, the bricklayer, on clearing the footings of a wall, builds up six or eight courses at the external angles (see fig. 5), which he carefully plumbs and levels across, and from one to the other. These form a gauge for the intervening parts of the courses, a line being tightly strained from one end to the other, resting on the upper and outer angles of the gauge bricks of the next course to be laid, as at  $\alpha$  and b, fig. 5, and with this he makes his work range. If, however, the length be great, the line will of course sag; and it must therefore be carefully set and propped at sufficient intervals. Having carried up Building. three or four courses to a level, with the guidance of the line, the work should be proved with the level and plumb-rule, and particularly with the latter at the quoins and reveals, as well as on the face: a smart tap with the end of the handle of the trowel will generally suffice to make a brick yield what little it may be out, while the work is so green, and not injure it. Good workmen, however, take a pride in showing how correctly their work will plumb without tapping. To work which is circular on the plan, both the level and the plumb-rule must be used, together with a gauge-mould or a ranging trammel, to every course, as it must be evident that the line cannot be applied to such in the manner just described. To every wall of more than one brick thick, two men should be employed at the same time, one outside and the other in: one man cannot do justice from one side, even to a fourteen-inch wall. Inferior workmen and apprentices are generally employed as inside men, though the work there is of quite as great importance as exteriorly, except for neatness, and for that only if the brickwork is to show on the outside.

In the operation of bricklaying, the workman holds the trowel in his right hand, and with the left he takes up the bricks from the scaffold, and lays them in their places. Spooning or shovelling up mortar from the board with the trowel, he throws it on the course last laid, and with the point strews it over the surface to form a bed for that which he is about to set; whatever bulges or projects over the outer edge of the work below is struck off, and being caught on the flat face of the trowel, is put against the side or end of the last brick laid in the new course. Then taking up a brick, he presses it down in its place until its upper and outer angle comes exactly to the line; and if this be not readily effected by the hand, a slight drawing blow with the obtuse point of the edge of the trowel does it, or a tap with the end of the handle both draws it and settles it down farther than the hand can press it. The small quantity of mortar that is pressed out in front, by this operation, being struck off, the joints are neatly drawn by compressing the mortar with the point of the trowel, and thus producing a fine smooth surface,that is, if the work is to be seen; for if it is to be plastered, the rough face is left that the plastering may the more readily attach itself, and the joint is not drawn at all, but the workman proceeds in the same manner with the next brick in advance along the course, or to fill in behind the one he has laid in front to meet the work of his mate on the other side of the same wall. This is the common mode of laying bricks. They should not however be merely laid; every brick should be rubbed and pressed down in such a manner as to force the slimy matter of the mortar into the pores of the bricks, and so produce absolute adhesion. Moreover, to make brickwork as good and perfect as it may be, every brick should be made damp, or even wet, before it is laid, otherwise it immediately absorbs the moisture of the mortar, and, its surface being covered with dry dust, and its pores full of air, no adhesion can take place; but if the brick be damp, and the mortar moist, the dust is enveloped in the cementitious matter of the mortar, which also enters the pores of the brick, so that when the water evaporates, their attachment is complete, the retention and access of air being thus altogether precluded. To wet the bricks before they were carried on to the scaffold would, by making them heavier, add materially to the labour of carrying: in dry weather they would, moreover, become dry again before they could be used; and for the bricklayer to wet every brick himself would be an unnecessary waste of his time: boys might therefore be advantageously employed to dip the bricks on the scaffold, and supply them in a damp state to the brick-layer's hand. A watering pot with a fine rose to it should also be used to moisten the upper surface of the last laid course of bricks, preparatory to strewing the mortar over it. In bricklaying with quick-setting cements these things are of even more importance; indeed, unless the bricks are quite wet to be set with cement, it will not attach itself to them at all.

As mortar is a more yielding material, used in brick-work merely for the purpose of making the detached portions of the staple adhere, by filling up their interstices and producing exhaustion, and the object being to produce as unyielding and consistent a mass as possible, as much of it should be used as is sufficient to produce the desired result, and no more. No two bricks should be allowed to touch, because of their inaptitude to adhere to each other; and no space between them should be left unoccupied by mortar which may produce adhesion. When the bricks are a fraction under two-anda-half inches thick, no four courses of bricks and mortar, or brickwork, should exceed eleven inches in height; and if they are fully that thickness, four courses should not reach eleven and a half inches. The result of thick beds of mortar between the bricks is, that the mortar is pressed out after the joint is drawn, on the outside, in front; and being made convex instead of slightly concave, the joints catch every drop of rain that may trickle down the face of the wall, and are thus saturated; the moisture freezes, and in thawing bursts

Building. the mortar, which crumbles away, and creates the necessity which is constantly recurring, of pointing the joints to preserve the wall.

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The diagram shows the section of a nine-inch wall, with the joints on the side a as drawn, and on the side b as bulged, in consequence of the quantity of mortar in them yielding to the weight above. This, too, is in addition to the inconvenient settling, which is the consequence of using too much mortar in the beds.

In practice, bricklayers lay the mortar on the course last finished, and spread it over the surface with the trowel, without considering, or caring for

it, that they have put no mortar between the bricks of that course, except in the external edges of the outside joints; that the mortar is not, or ought not to be, so thin as to fall into the joints by its own weight; and that unless they press it down, half the height of the space between the bricks remains in every case unoccupied, and the wall is consequently hollow, incompact, and necessarily imperfect. To obviate this, it is common to have thick walls grouted in every course; that is, mortar made liquid, and called grout, is poured on and spread over the surface of the work, that it may run in and fill up the joints completely. This, at the best, is but doing with grout what should be done with mortar; and the difference between the two consisting merely in the difference in the quantity of water they contain, mortar must be considered the best; for the tendency of grout is, by hydrostatic pressure, to burst the wall in which it is employed; and, moreover, it must, by taking a much longer time to dry and shrink than the mortar of the beds and external joints, make and keep the whole mass unstable, and tend to injure rather than benefit it. Filling or flushing up every course with mortar is therefore far preferable, and may be done with very little additional exertion on the part of the workman.

It is a very common thing for two sorts of mortar to be used in the same wall, a finer and whiter for the outside, and a coarser for the inside work; the former made of cleaner and finer sand, and a greater quantity of lime, than the latter, with the intention of exposing a better-looking and more durable material to the view and the weather. The sand, we have already shown, ought to be as clean as it can be made for mortar to be used in bricklaying; therefore there should be no possibility of making a difference in that particular; and the addition of a greater quantity of lime than is necessary to make good mortar makes it less durable, and occasions a sacrifice in an important quality for the sake of an unimportant advantage. Moreover the mortar which contains the greater quantity of lime will yield or settle more than that which has the greater proportion of sand.

All the walls of a building that are to sustain the same floors and the same roof should be carried on simultaneously; under no circumstances should more be done in one part than can be reached from the same scaffold, until all the walls are brought up to the same height, and the ends of the part first built should be racked back, as at a b, fig. 2, and not carried up vertically with merely the toothing necessary for the bond, as at a b, fig. 3.

Brick-work should never be carried on in frosty weather, nor even when it is likely that frost will occur before the walls can be covered in or become so dry as not to be affected by frost. Covering an unfinished wall with a thick layer of straw, when frost may supervene, is a very useful precaution; on the straw, weather boarding should be laid, to prevent access of moisture from rain or snow. Merely wet weather may be guarded against by following the directions given above as to flushing every course of the work well up with mortar, so that no interstices be left into which water may insinuate itself, and by covering the walls with boards to act as a coping when the men are not actually at work on them; the joints in the face of a wall that is not to be plastered in any way should be protected in this manner with great care.

In ordinary practice the bricklayer's scaffolds are carried up with the walls, and are made to rest on them. Having built up the walls as high as he can reach from the ground, he plants a row of poles, which vary in height from thirty to forty and even fifty feet, parallel to and at a distance of about four feet six inches from the walls, and from ten to twelve feet apart. To these, which are called standards, are attached by means of cords other poles called ledgers, horizontally and on the inside, with their upper surface on a level with the highest course of the wall yet laid; and on the ledgers and wall short transverse poles called putlogs or putlocks are laid as joists to carry the floor of scaffold boards. These putlocks are placed from four to six feet apart, according to the length and strength of the scaffold boards; and the ends which rest on the walls are carefully laid on the middle of a stretcher, so as to occupy the place of a header brick, which is inserted when the scaffolds are struck after the work is finished. On the floor of the scaffold thus formed the bricklayer stands, and the materials are brought to him by labourers, in hods, from the ground below, or they are hoisted up in baskets and buckets by means of a pulley wheel and fall. The

mortar is placed on ledged boards of about three feet square, placed Building. at convenient distances along the scaffold; and the bricks are strewn on the scaffold between the mortar boards, leaving a clear way against the wall for the bricklayers to move along unobstructedly. The workman then recommences the operation of bricklaying, beginning at the extreme left of his course, and advancing to the right until he reaches the angle or quoin in that direction, or the place where his fellow-workman on the same side may have begun. Thus he goes on with course after course until the wall is as high as he can conveniently reach from that scaffold, when another ledger is tied to the poles, another row of putlocks laid, and the boards are removed up to the new level. The ledger and most of the putlocks, however, remain to give steadiness to the temporary structure, and so on to the full height of the wall, piecing out the poles by additional lengths as may be required. If a scaffold be very much exposed, and run to a great height, it must be braced. This is done by tying poles diagonally across on the outside to the standards and ledgers, and it may be further secured by tying the ends of some of the putlocks to the ledgers; but an outside scaffold should never be attached in any way to the building about which it stands. A scaffold should never be loaded heavily, as well on account of the work as of the scaffold itself; for the putlocks resting, as they do, on single bricks, in a green wall, they exert an injurious influence on it, which every additional pound weight on the scaffold must necessarily increase. A constant and steady supply of bricks and mortar on the part of the labourers, without overloading the scaffold at any one time, should be strictly required.

Arches in brick-work are plain, rough, cut, or gauged. Plain arches are built of uncut bricks, and the bricks being parallelopipedons, an arch built of them must be made out with mortar; that is, the difference between the outer and inner periphery of the arch



requiring the parts of which an arch is made up to be wedge-formed, as ata, which the brick is not, the difference must be made in mor-



tar, as at b, so that the inner or lower angles of bricks used for this purpose should all but touch, and the mortar should be more consistent than that used in ordinary walling; nor should the centre on which an arch of this kind is set or built be struck or removed until the work is thoroughly hard, or rather all such arches should be set in cement which will harden immediately. In consequence of this inherent defect in uncut-brick arches, in extensive continuous works, such as sewers, tunnels, vaults, &c., it is advisable to make them in thin independent rings of half-brick or one brick thick, as the case may be; that is, a nine-inch arch should be in two half-brick arches, as at a, fig. 6, and an eighteen-inch arch in two one-bricks, as at b, each arch in the latter case being bonded in itself as in a common nine-inch wall with headers and stretchers. It is evident that, by this mode of structure, a greater quantity of the solid material comes into the back or outer ring or arch than into the lower one; and if they had been bonded together into one arch, as at c, all that difference must have been made up with mortar. Moreover, whatever pressure comes on the outer ring is carried by it directly to the inner or lower, from whose joints, however, the mortar cannot escape or be pressed out, the inner angles of the bricks, by meeting, preventing it below, and the bricks themselves of the upper arch, which conveys the pressure, are themselves opposed to the back of the same joints, so that its power of resistance is made equal to that of the bricks themselves, except at the ends; which, in such works as we have supposed, are remote, and may be protected by the use of cement in their joints, whilst mortar is used in the rest.

Rough arches are those in which the bricks are roughly cut with an axe to a wedge form, and are used over openings, such as doors and windows, when the work is to be plastered on the outside, or in plain back fronts, outhouses, garden-walls, &c., when, however, they are neatly pointed with what is called a tuck or tucked joint. Semicircular and elliptical arches are generally made plain, or without cutting the bricks; but arches composed of a smaller segment of a circle (vulgarly and technically called scheme arches), if not gauged, are cut or axed. Very flat arches are technically distinguished from the quicker segment, or scheme, by the term camber, from the French word cambrer, to round like an arch. It is arches of this kind which are generally employed over windows and doors in external work, and they too are either cut or gauged.

Gauged arches are composed of bricks which are cut and rubbed to gauges and moulds, so as to form perfectly fitting parts, as in masonry. Gauging is equally applicable to arches and to walling, as it means no more than the bringing every brick exactly to a certain form, by cutting and rubbing, or grinding it to a certain gauge or measure, so that it will exactly fit into its place, as in the finer works of masonry. Gauged brick-work is set in a putty instead of common mortar, but it is seldom used except for arches in the fronts of houses, &c., which are to be neatly finished. These

Building, are for the most part straight, and are generally from eleven to twelve inches in depth, or the height of four courses of brickwork. Their value as arches will be best understood by reference to the diagram, fig. 7, by which it appears that all the material between the soffit of the straight arch or head of the opening b c, and the dotted line b f c, is useless, the intrados or soffit of the really efficient part of the arch being at that dotted line itself. This is the arc of an angle of 60°; its chord, the width of the opening, being the base of an equilateral triangle constructed on it, and the joints are the radii of a circle whose centre is at a. b d and c e, the continuations of the sides of the triangle or radii a b and a c, are technically termed the skew-back of the arch. Sometimes the arc is made under a more acute angle, in which case the skew-back is less, that is, the external angles c b d, and b c e, are less obtuse; a smaller unavailable portion of the arch is thus left between the arc and its chord, but that portion is less securely retained under the flatter segment, because the joints or radii diverge less, or are more nearly parallel. These gauged arches being, as they for the most part are, but a half brick in thickness, and not being tied by a bond to anything behind them-for indeed almost the whole, if not the whole, of their height, is occupied behind by the reveal and the wooden lintel-require to be executed with great care and nicety. It is a common fault with workmen to rub the bricks thinner behind than before, to insure a very fine joint in front. This tends to make the work bow outwards; it should rather be inverted, if it be done at all, though the best work is that in which the bricks are gauged to exactly the same thickness throughout. Fig. 8 is a transverse section of fig. 7, and the gauged arch, lintel, &c., in it showing the total disconnection of the gauged arch with any surrounding brick-work to which it might be bonded. The absurdity of constructing arches circular on the plan, especially in a thin unbonded shell of bricks, is so clear as hardly to require notice.

Gauged facing to a wall is exceedingly objectionable, unless the bricks used for the gauged work be originally a little larger than those which are to be worked in behind, whose size should be their gauge, otherwise no bond can be kept between the bulk of the wall and its face; and the same mortar or putty should be used throughout, of equal consistence, and with joints of equal thickness, or the work cannot be sound and compact.

Everything relating to the construction of niches, groins, domes, &c., may be referred to the articles ARCH, BRIDGE, and STONE. MASONRY; the difference between stone and brick, as far as the principle is concerned, being only in the comparative magnitude of the parts; for to make perfect arches, &c., it is clear that the bricks must be cut to the same forms that are required in stone.

It is generally held that nothing but its own components should be admitted into a brick wall, except what is absolutely necessary for its connection with the other parts of a building, such as wall-plates and wood-bricks (and that these should be avoided as much as possible), templates, lintels, &c. Wall-plates are applied to receive the ends of the joists, and distribute the weight of the floor to which they belong equably along the walls. If the joists tailed singly on the naked bricks, their thin edges would crush those immediately under them, and the rest of the brick-work would escape immediate pressure altogether. Wall-plates may be avoided by the use of framed floors, which are carried by a few large beams, under whose ends stout pieces of timber two or three feet in length are placed. These are intended, like a wall-plate, to distribute the weight over a considerable part of the wall, and prevent the necessity of placing the beam on the naked friable bricks, and are called templates. Lintels are used over squareheaded windows and doors, instead of arches in brick-work. They are useful to preserve the square form and receive the joiner's fittings, but they should always have discharging arches over them, and should not tail into the wall at either end more than a few inches, that the discharging arch be not wider than is absolutely necessary. Fig. 9 indicates the elevation of the inside of part of an external wall with a window in it, and shows the lintel over the opening with a discharging arch over it, and wood bricks under its ends, on the jambs of the opening. Discharging arches should be turned over the ends of beams, and templates also, as in fig. 10. They may generally be quadrants of a circle, or even flatter, and should be turned in two or more half bricks over doors and windows, and other wide openings, but over the ends of beams they need not be in more than one half brick.

Wood bricks are used to prevent the necessity of driving wedges into the joints of brick-work to nail the joiner's work to. pieces of timber generally cut to the size and shape of a brick, and worked in as bricks in the inner face of a wall, where it is known the joiners have occasion for something of the kind. This is principally in the jambs of the windows and doors for their fittings, and along the walls, at proper heights, for the skirtings or wainscotting, as the case may be.

The use of bond timber in brick walls is objectionable, because

of its liability to shrink and swell, to decay, and to be consumed by Building, fire, in any of which cases the structure to which it belongs is either injured, endangered, or absolutely destroyed; and in England the use of timber in walls has, since the extension of the manufacture of iron in these countries, been in a great degree superseded by that metal in the form known as hoop iron. Thin and narrow strips of this metal are laid in the bed joints of mortar, at intervals more or less frequent according to the nature and character of the work, with the best effect in respect of compactness and consequent strength.

It will be generally found that a brick wall built with mortar and faced with ashlar has settled inward to a greater or less extent, as the work has been more or less carefully performed. Indeed in the nature of things it cannot be otherwise, unless the brick backing be worked in some cement which sets and hardens at once; for the outer face is composed of a layer of unyielding material, with few and very thin joints, which perhaps do not occupy a fiftieth part of its height, while the back is built up of an infinity of small parts, with fully one eighth its height of joints, which are composed of material that must both yield to pressure and shrink in drying. Some part of the ill effect attendant on this is obviated by the bondstones, which tail in or run through the wall, and tend to keep the discordant materials together; but still much of it remains: and besides this, the internal or cross walls, which have no stone in them, will either settle down and shrink away from the external walls, or drag them inward, as they happen to be well or ill bonded or tied. For these reasons, brick-work built in this manner with masonry should be executed with exceedingly well-tempered mortar, made with no more lime than is absolutely necessary to cement the particles of sand together, and the sand again to the bricks, worked as stiff as it can be, and laid in as thin courses as may be to answer the purpose required of it. Above all, work of this kind must not be hurried, but allowed time to dry and shrink as it goes on.

Discharging arches over vacuities having been disposed of incidentally, we have now only to speak of them under openings, in which situation their use is to distribute the superincumbent weight equally over the substructure, or along the foundation as the case may be. For this purpose the arch is inverted, as shown in the diagram, fig. 14, and by means of it the weight brought down by Plate the piers is carried along the footings, which are thus equally borne CXLVIII, upon throughout their whole length. Arches of two half bricks are indicated here, that being sufficient for ordinary purposes, and to develop the principle; in large and heavy works, arches of three half bricks, and even greater, may be judged necessary. Any arc between a quadrant and a semicircle may be used with advantage; but an arc of less than 45° cannot be recommended for the inverted discharging arch under piers. If it should so happen that an old well or cess-pool, that cannot without great inconvenience and expense be filled up with sound walling, or in some other efficient manner, the ground being sound on either side of it, a second discharging arch may be formed under the pier and over the unsound part, resting its legs on, or springing from, the inverted arch under the opening, and on the sound ground, as indicated by the dotted arch in the last-quoted diagram, fig. 14. For the most part, however, the bonding of the work may be trusted to carry the weight down to the ground under all but very wide openings very low down in the work. Arches require abutments whether they are erect or inverted, and this is often forgotten when inverted arches are used.

Not the least important part of the bricklayer's art is the formation of chimney and other flues. Great tact is required in gathering over properly above the fire-place, so as to conduct the smoke into the smaller flue, which itself requires to be built with great care and precision, that it be not of various capacity in different parts, in one place contracted to a narrow straight, and in another more widely expanded, and so on. With the present imperfect means of cleaning chimney flues, it is absolutely necessary that they be of a certain magnitude, which should be carefully maintained throughout; but it would be better that they were made oval, or with the angles taken off at least, than parallelograms in plan, as the practice is. Chimney flues are plastered or pargetted with a mortar in which a certain proportion of cow-dung is mixed, which prevents it from cracking and peeling off with the heat to which it is exposed. Experiment has proved that a tapering and nearly cylindrical flue of much smaller bore than is now required is the best for carrying away smoke. But the bore should be regulated by the size of the fire-place, or rather by the quantity of smoke to which it is required to give vent.

Sewers and drains which are not cylindrical should be built with concave bottoms, although the sides be parallel and the covering horizontal. The concave channel keeps the stream more together, and enables it the better to carry its impurities along with it: whereas a flat-bottomed drain offers a large surface for the particles of soil to attach themselves to, and the stream of water, being more scattered, is less efficient in force. All drains in houses and in other places where it may be necessary to open them at any time, should

Building. be of the form of which a, fig. 11, is a section, with a flat covering of stone paving, or large, strong, paving tiles, set and jointed with cement. Gun-barrel drains, as at b, are the best in exposed situations, because they are the strongest; but as there is no mode of cleaning but by breaking them up, if they are too long to be raked they should not be employed except with a considerable fall, and a frequent or constant stream of water through them, as from a pump trough, rain-water trunks, &c. They are constructed on a barrelled centre, which the bricklayer drags on as he advances with his work, finishing as he goes. Large sewers, which are accessible from the ends by men to clear or remove any accidental obstructions, are best circular or elliptical; the latter of the two is generally preferred, because, in proportion to its capacity, its height is greater. No drain should have an inclination or fall of less than one-quarter of an inch to a foot; and where the stream is infrequent and dull, as much more would be a great advantage. In building drains it is of great importance that proper traps should be constructed to prevent the return of foul air and the passage of vermin. At every sink there should be a bell-trap, and a well-trap within that, or near the hither end of the drain. Suppose a drain of the form of that shown at a, fig. 11, nine inches wide and nine inches deep, leading from a kitchen or scullery to the common drain of the house, in which it meets that which comes from the water-closet and other places. The belltrap in the sink itself will prevent the return of smell when it is constantly in use, but it is liable to be broken and otherwise injured by the ignorance and impatience of servants and others, or it may become dry by evaporation in some situations; it is therefore necessary to have a trap not so liable to contingencies. Let a well be made eighteen inches or two feet in diameter, square or round, and two feet six inches or three feet deep, across and below the level of the drain, as shown in the plan, fig. 12, and longitudinal section of the same, fig. 13; it must be built around with brick, in cement, and be plastered on the inside with the same material, which will make it capable of retaining fluids. Uprightly across this well, and in the transverse direction of the drain, must be placed a sound piece of paving stone, so long that its ends may be inserted in the sides of the well, as shown in fig. 12, and so wide that its upper edge shall touch the covering of the drain, and that its lower may reach six or nine inches down into the well below the bottom of the drain. Mortar or cement must prevent the passage of air between the upper edge of this trap-stone and the cover of the well and drain, and the trap is complete. The water coming from the sink flows along the drain from a to b (fig. 13), where it falls into the well, and filling it up to that level, it flows on again from c in the direction of d, to the cess-pool or common sewer, from which, however, no smell can return; for the trap-stone e, the lower half of which is thus immersed in water, completely bars the passage. It is evident, however, that if the well should leak, the water in it may fall below the lower edge of the stone, and the efficiency of the trap be destroyed; but if it be made perfect in the first instance, there can be no danger of any inconvenience that a bucket of water thrown in at the sink will not cure. It is from the drying up of the water in these well-traps (vulgarly called stink traps) that uninhabited houses are so frequently offensive. It must be clear, moreover, that these traps form an effectual bar to vermin, and they may therefore be advantageously placed at the entrance of water-closet drains, to prevent rats from getting at the soil-pipes, which they will gnaw and destroy if they can get access to them. Internal drains, or those which go through a house, should always pass under the doorways if possible, in external walls at least. If, however, circumstances should render it absolutely necessary to take a drain through a wall, an arched ring or bull's eye should be made for it to pass by.

Cess-pools should be made cylindrical, and be bricked round, but whether they are made to retain fluids or not, can seldom be a matter of consequence, as they are generally put in secluded places, where, if the object be not to get rid of the waste, there is seldom, at least, any desire to retain it. In towns and cities where the common sewering is as complete as it ought to be, and waterclosets are used instead of privies, cess-pools are unnecessary, as the soil becomes so much diluted by the water that goes down with it, that it flows readily enough through the private drains to the common sewer, and so on with the rest, to the common receptacle. Sometimes, indeed, it may be found necessary to clean out the welltraps, but this cannot often occur.

Pipes being hollow cylinders of well-made and well-burnt pottery form the most efficient house-drains. Such pipes may be put together end to end, with great accuracy and sufficient strength, with the aid of collars of the slightest sheet-iron looped together as hoops. The common and bad practice is to form such pipes with sockets, so as to fit spigot and faucet fashion; but the addition to the substance of the pipe to form the socket almost insures a defect in the pipe in or about the socket, whilst the kind of connection which the socket establishes renders it impossible to take out any one length of pipe, and thereby to open a drain in the event of an

obstruction occurring without disturbing many lengths, and makes Building. perfect re-instatement impossible, without taking up and relaying the drain from one or other of its ends. All this is precluded by the use of a collar, but the collar used must not be of the brittle pottery itself. In using pipes for drains, it should be borne in mind that a little larger than large enough, is better than the reverse of this. No pipes should be laid down for a house-drain of less bore than six inches, nor should pottery be used for drains requiring a greater bore than twelve inches; the material is too weak to allow of more. Nor should pottery drain-pipes be laid under any carriage road, for the same reason, that the material is not strong enough to stand more than a dead pressure.

Brick and tile paving is performed by the bricklayer. Brickpaving is either flat or on edge, in sand or in mortar or cement. Brick flat-paving in sand, that is, with the bricks laid on their broadest surfaces, and bedded in and on dry sand, is very slight and fragile, and brick flat-paving set and bedded in mortar is very little better; for if the soil on which the paving is laid be light and sandy, the bricks are easily displaced by being pressed unequally; and if it be clayey it will probably be moist, and the thin porous brick absorbing the moisture, will generally become saturated, and present a damp, unwholesome floor. Paving with bricks on their edges, however, forms a much better floor, and is preferable to a stone paving, if the latter be laid on the ground without the intervention of footings. Brick-on-edge paving in sand is generally used in beer cellars, pantries, dairies, stables, &c., as its numerous open joints allow wasted or discharged fluids readily to escape; and it is both cool and dry under ordinary circumstances. In mortar or cement, bricks on their edges form a sound, dry floor: the smallness of the surface exposed by each brick in this manner leaves them of course less susceptible of partial pressures, and the depth from the soil to the surface is such that damp rarely shows through. The paving brick differs from the common brick only in thickness, its dimension in that direction being rather less than two inches. instead of two inches and a half, and in being rather harder and more compact. Dutch clinkers are paving bricks, smaller and much harder than the English; they are six inches long, three inches wide, and one inch and a half thick, and are always set on edge and herring-boned; that is, instead of being placed in parallel lines, they are set at right angles to each

other thus,-with nevertheless a perfectly even face. Paving tiles are made nine inches and a half and eleven inches and a half square, though they are called teninch and twelve-inch or foot tiles respec-



tively, the former being one inch, and the latter one inch and a half thick; they are set in courses, as stone paving would be, the alternating courses breaking joint.

Tiling being much less in vogue than formerly, in consequence of the better appreciation of the superior qualities of slate for covering roofs, and the moderate cost at which slates are now furnished to the builder, it no longer maintains its separate artificer, but is performed, when it is required, by the bricklayer. It consists, for the most part, of two sorts—plain tiling and pan tiling. Plain tiles are simple parallelograms, generally about ten inches and a half in length, six inches wide, and five-eighths of an inch thick; and each tile has a hole pierced through it near one end, to receive the wooden pin by which it is hooked on to the lath. The tiles are laid in mortar on the laths, which in this country are of oak or fir, with an overlap of six, seven, or eight inches. The greatest overlap or smallest gauge makes the securest work, though it does not present so good an appearance externally as a longer gauge does; and it requires, moreover, a greater number of tiles and laths, thereby adding materially both to the weight and the cost. The great overlap and the mortar are both necessary, nevertheless, to prevent the rain and snow from driving in between and under the tiles. Plain tiling requires the pitch of the roof to be at an angle of at least 50°, and is one of the heaviest coverings that can be used, though it is at the same time one of the warmest. The tiles, however, readily and rapidly absorb moisture, which they communicate to the laths and rafters under them, to the serious injury of both the latter; and the mortar in which they are set requires to be frequently pointed, the constant atmospheric changes to which it is exposed occasioning it to crumble and fall away in no long time.

Pan tiles are parallelograms of irregular surface, straight in the direction of their length, which is thirteen inches and a half, but twisted to this form and in the transverse section. Measuring the whole surface across, a tile is nine inches wide, but in a right line from point to point not more than seven, and its thickness is half an inch; a small tongue or lip is bent down at one end from its flatter convexity, on the under side, to hook it on to the lath by, instead of a wooden pin through it, as in a plain tille. Pan tiles are set dry or in mortar, on laths. They are not laid side by side, but overlapping laterally thus; consequently all the overlap

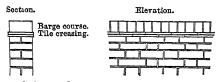
Building. they have longitudinally is three or four inches only, or enough to prevent rain and snow from driving up under the upper, over the end of the lower tile; and thence pan tiling is but little more than

half the weight of plain tiling. It is nevertheless a much less warm covering for houses, and is more liable to be injured by violent gales or gusts of wind than the latter is; but again, it presents a far more pleasing appearance to the eye. Pan tiling will not bear a much flatter pitch than the other, but it is greatly improved by being pointed on the inside with lime and



hair. Sometimes indeed the whole of the work is, as we have said, set in mortar; but this mode has disadvantages to which pointing internally is not liable, and its superiority in other respects is questionable. To both pan and plain tiling there is a large concave tile used to cover the hips and ridges of a roof. These are not generally made to overlap each other in any situation, but are set in mortar, and fastened with nails and hooks fitted for the purpose, and driven into the wood-work of the roof.

When the top of a brick wall is not protected by a roof, it must be covered or coped in some manner, or it will soon be destroyed by the weather. Sometimes this is done by means of a course of bricks set across it on their edges in cement, and called a barge course, but it is a very imperfect covering, for water will trickle down the face of the wall on both sides, as the coping brick can be no longer than the thinnest wall is in thickness. Two double courses of plain tiles may be put side by side under the barge course, making a projection over either face of about one inch and a half: thus,-



This is much better than the barge course alone: but still the covering receives no inclination outwards to throw the water off; the upper surfaces are all horizontal. The same objection exists to foot-paving tiles, which are also used as a coping; but none of these methods is available for any wall above nine inches in thickness. Stone coping, therefore, which may be made of sufficient width, and be both weathered and throated, is much to be preferred.

One of the greatest faults in the modern practice of building, both architecturally as a matter of taste, and practically as a matter of prudence, is, that these copings, and cornices which serve as such, do not project sufficiently to protect the face of the wall on which they may be placed, from the weather. A bold, massive, and well-projected cornice on a wall serves as a roof or pent-house to it, and, besides imparting great beauty to the plainest structure, protects the wall from the premature decay of its upper part especially, and of the joints generally, if it be unplastered brick-work, which thereby calls for the frequent repetition of pointing. Effective and pleasing cornices and blocking courses may be formed with uncut bricks alone; and these, set in cement, would, with judicious management, add materially both to the appearance and durability of brick-work, without the foreign aid of either the plasterer or the

From the injury which accrues to the joints of brick-work through bad management in its execution, and imperfect protection when executed, arises the necessity so frequent at the present day of pointing.

Sometimes frost will have supervened before the surfaces of the joints in a wall are dry; consequently the mortar bursts and peels away, and the whole then requires to be pointed. Preparatory to this operation the scaffold, if it has been struck, must be re-erected. the mortar raked out of the joints to a depth of about three-eighths of an inch, or deeper if the injury have reached further; -this can be done by a labourer; - a bricklayer then goes over the whole with a hard hair brush and water to cleanse and moisten the joints; and then, with mortar prepared for the purpose, he carefully fills them all up, and neatly draws them with his trowel. This mortar must be of the best quality; it is generally compounded with a certain proportion of forge ashes, which gives it a blue tinge, and greatly aids its power of resisting the action of the weather. Cement is sometimes used instead of this blue mortar. If the wall to be pointed be a front or other important one, in which peculiar neatness is required, every joint is marked with a narrow parallel ridge of a fine white putty, in the composition of which bone lime

forms a principal ingredient. The former is called flat-joint, and

the latter tuck-pointing. If it be an old wall that requires point-

ing, a scaffold must be erected before it; and where the putlocks

cannot be rested on window-sills and the like, half bricks are generally drawn from the wall to make rests for them, and restored again when the work is done. The former process is then gone through with a common wall; but if it require tuck-pointing, the whole surface is well washed, and then coloured, to look like new, before the pointing is done. The gauged arches over the windows and doors are always coloured, and the joints drawn with peculiar neatness. If in the original building of the wall the perpends have not been preserved, that is, if the vertical joints have not been made to fall perpendicularly in the alternately recurring courses, the workman in pointing stops up the old joints, which are irregular, with putty of a brick colour, and forms false new ones in the proper places.

Building.

The tools and implements mostly employed by the bricklayer are the trowel, the plumb-rule, the level, the square, the bevel, linepins and lines, the raker, and the hammer, together with a hod and spade for his labourer. Besides these there are sundry others used in cutting and gauging bricks and some which are peculiar to tiling and paving; but the most material operations can be performed with those enumerated here. A pug-mill and screens for mixing and tempering mortar are also auxiliaries of great importance.

Brick-work is valued by the rod. A rod of brick-work is a quantity whose superficies is 2724 feet (taken in practice at the round number 272 without the fraction), and thickness one brick and a half. Reckoning the one brick and a half at thirteen inches and a half,-its average extent,-the cubic foot is to the reduced superficial foot as eight to nine, so that a cubic rod of brick-work consists of 306 feet, the result of 272 multiplied by nine and divided by eight. The reduced superficial rod, however, is that commonly used in practice; and the process of measuring, to ascertain the quantities and bring them to a standard, is as follows :-

The exact superficies of so much of a wall as may be of the same thickness is taken, and the number of bricks it is in thickness placed marginally; all the different portions or parts being of the same thickness are taken in like manner, and then deductions, as of window openings and doorways, are taken as such, in superficies, with their respective thicknesses placed marginally also. mensions, on being squared, are abstracted it half bricks, the deductions made of like thicknesses from like thicknesses, and the whole reduced by multiplying each quantity by the number of half bricks in the thickness of the parts of the wall which the margin expresses, and dividing the product by three (the number of half bricks in one brick and a half, the standard), the reduced quantity which results, divided again by 272, the number of feet in a rod, gives the quantity of rods and feet in the wall; as, for example,-The front wall of a house is thirty-five feet in length on the ground floor. (Fig. 14.) It has a basement story twelve feet high from the top of the footings to the level of the ground floor, and two and a half bricks thick, which is a half brick more than the wall above. The footings are three spreading courses high, each course a half brick thicker than the one above it. In the basement wall there are a door and two windows, the former seven feet by three feet six inches between the reveals, and the latter five feet by three feet nine inches between the reveals also. The measurement of thus much will show how all the rest must be done.

The footings consisting of three equally spreading courses, the extent of the middle one both in length and breadth will be an average of them all, so that they may be taken in one height. To the length of the ground floor, thirty-five feet, must be added twice three sets-off of one-fourth of a brick at each end of the basement, and of the two first courses of footings for the length of the second of them; this is equal to three half bricks, or thirteen and a half inches, which, added to thirty-five feet, makes thirty-six feet one and a half inch the dimension of length for the footings, by nine inches, their height; their average thickness, to be placed in the margin, is three and a half bricks, the highest course being three bricks, the second three and a half, and the third or lowest tour bricks. That is the first quantity. The next is of the wall above. The length (onehalf brick, for the two sets-off, added to thirty-five feet, gives) thirtyfive feet four and a half inches, by the height twelve feet, two and a half bricks thick. The deductions are seven feet by three feet six inches in one brick for the door, between the reveals, and seven feet four and a half inches by four feet three inches in one and a half brick behind the reveals, the rest of the thickness of the wall, an addition of one-half brick being made to the height, and of two half bricks to the width, because of the reveals. The windows are taken in exactly the same manner, with the same additions; but as the two are of the same size, their number is marked against the one dimension. The dimensions are now to be squared, and the squaring is done by duodecimals, or cross-multiplication. 36 feet 11 inches  $\times$  9 inches = 27 feet 1 inch; 35 feet  $4\frac{1}{2}$  inches  $\times$  12 feet is = 424 feet 6 inches, and so on with the rest. An abstract is then made of these quantities in two columns, the first is marked "onehalf brick," and the second "deductions in that thickness." In the

Building. first column is placed the first quantity, multiplied by seven, the number of half bricks in three and a half, which stands marginally

to it; 24 feet 6 inches  $\times$  7 = 189 feet 7 inches. The second dimension follows in the same column, multiplied by five, the number of half bricks in its thickness; the next quantity is a deduction, that is placed in the second column, multiplied by two, the thickness of the part deducted being one brick, and the rest in the same manner. The abstract being completed, the columns are added, and the amount of the second deducted from that of the first, and the difference divided by three, which brings it to the reduced standard. Dividing now by 272, the number of rods and feet in the given wall appears to be 2 rods, 185 feet, 8 inches. The quantities are more generally abstracted in one-brick and one and a half brick columns, with deductions in other parallel columns, to which thicknesses they are all readily brought. The single column in one-half brick is, however, assumed here as the more simple and the more easily explained.

It must be remembered, that in taking the return or end walls,

Basement wall from the top of footings to the level of ground floor. Deduct for door 24 6 between the reveals.

Do. behind the reveals. 31 4 Do. for the windows between the reveals. 37 6 Do. behind the Abstract of the above Quantities. Deductions in 1 brick. ½ brick 189 7 2122 6 49 0 94 0 75 0 145 13 272)649 8(2 rods 105 feet 8 inches. 105 8

27 1

Footings.

the thickness of that which has been already taken in front is to be deducted from their length, or the angle-pier or quoin will be taken twice. Work which is circular on the plan may be taken separately, and charged at a higher price altogether, or it may be measured as plain, and an extra taken at so much the superficial foot. Chimney breasts are taken as additional quantities, with the thicknesses they project, and the opening for the fire-place is deducted; but the flues are measured as solid, the extra labour and mortar in forming and pargetting them being fully equal in value to the bricks saved.

A rod of brick-work will consume about 4500 bricks, though the number will be a few more or less than this, as the bricks happen to be below or above the average size, and as the joints are made thicker or thinner. The quantity of mortar, it is evident, will be affected by the latter consideration also; but in London it is generally reckoned at from ninety to a hundred striked bushels, or from four to four and a half cart loads, each containing about one cubic yard, to the rod. The labour on a rod of brick-work may be taken on an average at the wages of a bricklayer, and his assistant or labourer, for four days; this, however, does not include making and turning the mortar, nor scaffolding, which latter must be separately considered. Many things will, however, affect the time in which the work may be performed, both of the bricklayer and his labourer; the former can do one-fourth as much more, at the least, in walls which are to be plastered, as in those in which he has to keep the perpends and draw the joints, &c., and more in thick walls than in thin ones; and the capability of the latter will depend, inversely, on the rate at which the former can proceed, on the distance he may have to carry the bricks and mortar to the foot of the ladder, and mainly on the height he has to carry the materials up the ladder. In great heights, however, the materials should always be hoisted.

Gauged arches are taken at so much per foot superficial, in addition to being measured in as brick-work. Both the vertical and horizontal surfaces are measured to obtain the superficies of the arch, or rather of the work upon it. Rough arches are also taken as an extra superficial quantity; but plain arches in vaults, &c. and discharging arches, are not considered extras, though an allowance is made for cutting to moulds, for inverted discharging arches, at per

If a wall be faced with bricks of a more costly sort than that of which the bulk is composed, or worked in a peculiar manner, it is calculated by the foot superficial, also in addition to its measurement as brick-work. It should be a matter of previous agreement whether or not there shall be an extra charge for plumbing quoins and reveals. Under ordinary circumstances no allowance is made for it; but oblique vertical angles, both internal and external, which require to have bricks neatly cut to form them, are taken at so much per foot running measure. External oblique angles are technically termed squint-quoins, and internal, birds-mouth. Oblique

angles within a building are taken as run of cut splay. Cuttings Building. to rakes or inclined straight lines are taken by the running foot also, but with reference to the thickness of the wall. Cuttings to ramps or concave lines are measured and valued in the same manner. Sailing or projecting courses, preparations for plaster cornices and brick cornices themselves, are all taken at so much per foot run, according to the labour and materials involved in working them, over and above the regular charge for the brick-work by the rod.

Everything, indeed, which adds to the labour of executing brickwork, and consumes more than the ordinary quantity of materials, is taken in addition, either by the foot superficial, or by the foot running, or in numbers, as the setting of chimney-pots, bedding and pointing door and sash-frames, &c. Bond-timbers, lintels, and wallplates, are generally measured in with the brick-work, on account of the trouble of bedding them, and the delay generally occasioned to the bricklayer in setting them. If they are not included with the brick-work, bedding them is an extra charge, at so much per foot run; and then filling in between the ends of the joists and beams generally requires to be taken also.

Brick-nogging is measured by the superficial yard, including the quarterings and interstices, and making no deductions but for openings. Drains and sewers are measured by the foot run, according to their form and capacity. The quantity of materials consumed, and labour required in constructing them, may be readily obtained by calculating the one, and observing the quantity a man with a labourer can execute under the circumstances, whatever they may be, within a given time. Digging out the ground, filling in over, and the removing of the spoil, necessarily cause an addition to the charge for the drain, which must vary according to circumstances.

Paving is measured by the superficial yard of nine feet; tiling by the square of one hundred feet; -eaves courses, ridges, and hips, being extra charges, by the foot run. Pointing, whether to old or new work, is measured by the superficial foot; and the scaffolding for it, when scaffolding is required, is either included in the price per foot for pointing, or a charge is made for the use of it, together with the cost of carting, and the men's time in setting up and removing it.

Mason.—We must refer to the separate articles under STONE-MASONRY for information on that subject. It will, however, be necessary to give a few particulars here on masons' work, as it has to do with other artificers' works in the process of building, and especially with reference to various species of walling, or modes of constructing walls of

From the regular and determined form of bricks, modes or systems for setting or arranging them may be formed, and any workman, by habit and an exertion of memory merely, may become competent to build a brick wall as well as it can be built; but it is not so with stone used in common masonry The workman in this material has for the most walling. part to deal with masses of all forms and of all sizes, and a continual exercise of the judgment is required from him beyond the tact or skill which may be acquired by practice. For this reason workmen are generally less to be trusted to themselves, or to their own discretion, in stone than even in bricklaying or walling. The best or highest sort of stone walling is the easiest to set; it is that in which the stones are all tooled and gauged in regular parallelogramic figures, to range in courses and suit the thickness of the wall to which they are to belong; and the most difficult to execute properly is that in which amorphous stones are used,—the mason being allowed merely to dress them roughly with his hammer or axe, and fit them in as he best can to form the most compact mass: this is called rubble walling.

From the brittle nature of stone, great tact is required in setting, to prop or bear up the longer pieces in every part, or they will break across, and thus occasion more injury than could accrue if their whole mass had been made up of small Very long lengths, therefore, should be avoided, even in regular tooled courses, with which the bearing is or should be perfectly even, and a settling down of the work itself is hardly to be feared. There is a certain medium which may be preserved; and although the object is obviously, in stone as in brick walls, to form a compact mass, as unbroken into parts as possible, a mason will act judiciously in breaking a very long stone into two or more shorter ones,

Building, and working them in that state, though he thus makes two or more additional joints, well knowing that he has the power of counteracting to a certain extent the ill effect of joints made by himself, but that those made by accident are irremediable.

The observations made in the section of this article on bricklaying, on the use of mortar, will apply here also. Of whatever quality the stone may be of which a wall is to be built, it should consist as much of stone and as little of mortar as possible. If it be inferior in durability and power of resisting the action of the atmosphere, &c. to the mortar, besides the certain fact that the mortar will yield until it has set hard, and so far act injuriously, no ulterior good is gained; and if the stone be the more durable material, the more of it that enters into the wall the better. Indeed, in rough walling, if the stones be pressed together until the more prominent angles on their faces come into actual contact, the interstices being occupied by mortar, it will be better than if a thick yielding mass were allowed to remain between them. Absolute contact, however, should not be permitted, any more than in brick-work, lest the shrinking of the mortar in drying leave the stones to such unequal bearing as the prominent parts alone would afford. Stone being generally of a less absorbent nature than brick, it is not a matter of so much importance that it be wetted before setting; nevertheless, adhesion on the part of the mortar is more certain and more complete if the stones be worked in at least a damp state. What bond is, and the necessity for it, have also been shown in the preceding section; and bond is of not less importance in stone walling than in bricklaying. have also hinted above at the greater difficulty of understanding, forming, and preserving it in the former, and can now only add a few observations in addition that can be of any use, and these with reference to rubble walling particularly. Instead of carefully making the joints recur one over the other in alternate courses, as with bricks and gauged stones, the joints should as carefully be made to lock, so as to give the strength of two or three courses or layers between a joint in one course, and one that may occur vertically over it in another. In bonding through a wall, or transversely, it is much better that many stones should reach two-thirds across, alternately from the opposite sides, than that there should be a few thorough stones, or stones extending the whole thickness of the wall. Indeed, one of the many faults of stone-masons is that of making a wall consist of two scales or thin sides, with thorough stones now and then laid across to bind them together, the core being made up of mortar and small rubble merely. This is a mode of structure that should be carefully guarded against. There is no better test of a workman's tact and judgment in rubble walling than the building of a dry wall, or wall without mortar, affords; -walls are frequently built with mortar that without it would have fallen down under their own weight in a height of six feet, in consequence of their defective construction;—thus rendering it evident that they are only held together by the tenacity of the mortar, which is very seldom an equivalent for a proper bond of stone. Masons are very apt to set thin broad stones on their narrow edges to show a good face, by which the wall is injured in two ways; it tends to the formation of a mere case on the surface of a wall, and it for the most part exposes the bed of the stone to the atmosphere, as a stone is more likely to be broad in the direction of its bed than across it.

Rubble walling is either coursed or uncoursed. In the latter sort, fig. 15, the work is carried on with stones of any sizes, as they may occur, and without reference to their heights, somewhat in the manner of the Cyclopean walling of antiquity; the interstices of the larger being filled up with smaller stones. For this work the mason uses no tool but the trowel to lay on the mortar, the scabling hammer to break off the most repulsive irregularities from the stones,

and the plumb-rule to keep his work perpendicular. The Building. line and level are equally unnecessary, as the work is independent of considerations which are affected by them. An attentive and intelligent workman will, however, make a sound wall with this species of construction, by fitting the stones well together and packing them with as little mortar as possible, yet filling every crevice with it, and carefully bonding through to secure compactness, transversely at the

In coursed rubble walling, fig. 16, the line and level are used, the work is laid in courses, each course being carefully brought up to the same level in itself, though no attention is paid to uniformity in the heights of the different courses. For this species of walling the stones are generally roughly dressed by the workman in the gross before he begins building. He is careful to get parallel beds to them, and he brings the best face of each stone to a tolerably even surface at right angles to the beds; the ends, too, receive some little attention, and for this purpose he uses an axe in addition to his scabling hammer. The quoins in coursed rubble walling are generally built with peculiar neatness and precision, and they are set to serve as gauge courses for the rest. This, when well executed, makes a sound and excellent wall. It presents, however, rather a rough and homely appearance, and in finer works must be covered with stucco or cement, or faced with ashlar.

Ashlar is an external rind of gauged stones in equal courses, having tooled or closely-fitting joints to give a wall a neat and uniform appearance; it is axed, tooled, or rubbed, as may be thought most in character with the structure, or that part of it to which it is to belong. Ashlar stones, or ashlars as they are commonly called, are made of various sizes on the surface, as the character of the edifice may require or convenience demand, and vary in thickness from five to eight or nine inches. Some of the ashlar stones must, it is clear, be used transversely as bond stones, or the facing, having nothing to connect it with the wall behind, would soon totter and fall. Bond stones are generally put in alternate courses, with the backing to the jambs of openings, such as windows, and oftener, if these do not recur within a length of five or six feet; the bond stones themselves, too, should not fall in the same vertical chain, except when they are in the jambs of openings, but break in their alternate courses. Ashlar is commonly set in a fine mortar or in putty. It is generally recommended that ashlars should not be made regular parallelopipedons, but run back irregularly to tooth in with the backing, the vertical joints being left open from about an inch within the face of the wall, and the upper surface or bed of the stones made narrower than, though perfectly parallel to, the lower. These things may exert a slightly beneficial influence under some circumstances; but the mode of construction involved is so radically bad, that unless the backing is set in a quick-setting cement, or be so well packed as to be proof against its general tendency to settle away from the ashlar facing, no means of the kind can materially improve it. A well-compacted wall of coursed rubble, the courses being frequently made up of whole stones and faced with ashlar, may be made tolerably sound and trustworthy. Brick backing, with ashlar facing, cannot be considered as good, though it has the advantage of not requiring battening and lathing for inside plastering, as the stone-backed wall does. Uncoursed rubble with ashlar has all the disadvantages of both the preceding, with nothing to recommend it before either of them.

There are, besides, many sorts of walling or modes of structure arising from the nature of the materials furnished in various localities. That of most frequent occurrence, perhaps, is a manner in which either broken or rounded flints are used. These depend almost entirely on the mortar with which they are compacted, and on a coursed chain, which is commonly introduced at short intervals of larger Building. stones or of bricks, to act as a bond; the quoins, too, in this species of structure are generally constructed of dressed stones or of brick.

wall by pressing unequally, and their own seat be also en-Building. String courses (vide ut sup.) economically, in contradistinction to architecturally, are meant to protect a

Whatever objections lie against bond timber in brick-work apply with equal force at least to the use of it in stone walls. Hoop-iron bond is not only available in all kinds of stone walling, including the highly-wrought close-jointed kind, but it is invaluable, as it may be used both longitudinally and transversely as it may in brick-work; whilst it compels the building mason to bring his work up to a true and fair bed as often as the bond is to be laid in it.

Discharging arches, it must be evident, are as necessary in and to stone walls as to walls of brick, and they may be treated much in the same manner.

Rubble walls are scaffolded with single, and ashlar-fronted or other gauged stone walls with double-fronted scaffolding, the former tailing one end of the putlocks in on the wall, and the other having an inner row of standard poles and ledgers parallel to the outer, making the scaffold entirely independent of the wall. In some places, however, it is the custom to dispense altogether with an external scaffold in building stone walls, particularly with gauged stones. With light and plain work this may be done without much inconvenience or retardation; but if the work be heavy or delicate, considerable delay and incorrectness result. Sometimes the finer work, such as that to mouldings, flutes, and foliate or other enrichments, is merely boasted or roughed out before the stones are set, and finished afterwards. This can be done well only from a secure floor or scaffold, on which the workman may move freely.

When walls are not entirely of masonry, in the ordinary course of economic building, stone is frequently used for copings, cornices, string and blocking courses, sills, landings, pavings, curbs, steps, stairs, hearth-stones and slabs, and chimney-pieces; to these may be added quoins and architectural decorations, or dressings for windows, doors, &c., though both the former and latter are not unfrequently executed in plaster composition, or cements. Copings (see Glossary to the article Architecture) to cover walls, parapets, &c., are worked with a plain horizontal bed, two vertical faces, and an inclined or weathered back or upper surface; either forming an acute angle with the outer and wider, and an obtuse angle with the inner and narrower face, to throw the water off, as shown at a, fig. 19; or to both sides from the middle, as at b; the latter is technically termed saddle-back coping. In both cases they are made to project over the wall or parapet on both sides; and in the projected part of the bed under the edge or edges towards which the inclination is given, a channel or groove, called a throat, is cut, to intercept the water in its inclination to run inwards to the wall. On gables or other inclined planes the coping is neither weathered nor throated, as the water is necessarily impelled along its course to the lower end, and not over the sides. To protect the separate stones of a coping course from the danger of being displaced by high winds or other accidental cause, and to form a chain through its whole length, the stones are linked together by cramps of copper or iron let into their backs and run with lead. These metals, however, especially the iron, for the most part act very injuriously, from their exceeding susceptibility of atmospheric changes, and their greater or less tendency to oxidation; indeed, the stone invariably suffers more than the work benefits from the metal cramps. Tenons, dowels, joggles or dovetails of stone, or of hard wood or cast iron, applied so as to be protected from the weather, would be far better, and would answer every desirable purpose sufficiently. Cornices (vide ut sup.) are but ramified copings, and are or may be subjected to the same general laws. Care must be taken, however, in arranging them, that their centre of gravity be not brought too far forward, in the anxiety to project them sufficiently, lest they act injuriously on the

dangered. String courses (vide ut sup.) economically, in ' contradistinction to architecturally, are meant to protect a set-off in a wall, by projecting over its lower face in the manner of a coping (see fig. 17, at c); the beds are worked parallel, and the outer face vertical or at right angles to them, but so much of the upper surface is weathered or sloped off as protrudes from the upper part of the wall to carry the water off; and, for the reason above stated with regard to copings, the lower bed just within the outer face is throated. A stone string course, cramped or dovetailed in the bed, forms an excellent chain round a brick-wall; but the part of it in the wall should be of the exact thickness of one, two, or more courses of brick-work. A blocking course (vide ut sup.) is either a very thick string projecting over or flush with the face of the lower part of the wall to cover a setoff, or it is a range of stone over a crowning cornice to bring the centre of gravity more in on the wall than it otherwise would be; in the former case it is treated exactly as a string, excepting that, if it be flush below, there is no occasion for a throat; and in the latter it has a horizontal bed, parallel vertical sides, and a weathered back or upper surface. Sills (vide ut sup.) are weathered and throated like the parts of a string course (see fig. 17, at a-and b); they are laid across window openings as a base to the sash-frame; distinct sills in the same line may, indeed, be considered as an intercepted string course. In the ordinary practice of building, window sills are seldom set in brick walls until they are absolutely required to set the sash-frames on; or they are set but not bedded, except at the ends. The object of this is to prevent any settlement that may occur in the piers from breaking the sills across on the unyielding part of the wall under the windows. A necessity for this, however, can only arise from bad construction; for with a good bond in the brick-work, all would settle together, and the sills might be completely bedded across at once. Landings are platforms of stone, either over an area before a door, at the head of a flight of stairs, or as the floor of a balcony. They are made four, five, six, or eight inches in thickness, according to their extent and bearing; if not of one piece of stone, they are of nicely jointed pieces joggled and plugged together, and are worked on the face and edges just as their situation may demand. Stone pavings are of various kinds, and are prepared, shaped, and laid in various ways. Stone paving that is not exposed to the sun and air, if next the ground, should be laid on footings of brick or stone, or it will be constantly damp if the soil be close and clayey; but in yards, open areas, &c., it may be laid on the ground, bedded in sand, and jointed with mortar or cement. Stonepaved floors are either on brick arches, or on a timber floor prepared for the purpose; the latter is a very bad mode of supporting paving, as the impression derived from the presence of the stone is, that the floor is incombustible; but if it be bedded on combustible material, the danger to human life in the event of fire is greater than if the stone paving did not exist at all. It is worked, cut, and set more or less expensively, according to circumstances. A curb is a range or course of thicker and stronger stone to bound a pavement, and is either flush with the paving, showing as a step on its outer edge, or raised above it to receive a balustrade, and shows on the outer side as a blocking course; in the latter situation it is generally joggled and plugged in the joints. The term step or steps alone is generally understood to mean external steps, whether arranged in long or short flights, or the single step in a doorway into which the door-frame is tenoned. A step should have a plain horizontal bed, and a very slightly weathered tread or upper surface; the front or riser worked plain and vertical, or with a moulded nosing, and the back sunk with a joggle or bird's-mouth joint to receive the step or landing above or behind it. Stairs are but a flight or combination of steps

Building. used internally; the principles upon which they are constructed will be found under the heads Stone-Masonry and JOINERY. Hearths are the stone-flooring of fire-places; and a slab is that part of the floor of a room which lies immediately before the fire-place and along the extent of its front. This slab is supported by a flat brick arch called a brick trimmer, which is turned from the chimney-breast under the hearth on one side, to the trimmer joist on the other. (See a section of all these at fig. 18.) Chimneypieces consist simply of mantle and jambs; that is, the vertical sides, and the architrave or transverse covering with its shelf or cornice. The parts of a chimney-piece are generally put together with an adhesive plaster or cement, and affixed to the wall or chimney-breast behind with cramps, holdfasts, and plugs. The material of which chimney-pieces are composed varies from the coarsest stone to the finest marble; and the labour on them varies to a still greater extent. Quoin-stones are gauged and wrought blocks with parallel beds and vertical faces, placed on the angles of buildings with the intention of adding to their beauty and strength; they are used either with brick or stone walls, and are generally made to project before the face of that to which they are attached, mostly with a weathered angular joint, or with a rectangularly grooved or moulded one. The quoins are coursed with the rest of the wall if it be of stone, and are made to occupy the exact space of a limited number of courses of brick in a brick wall. (See fig. 17.)

Masonry to receive architectural decorations is generally worked into the walls as they are carried up; but as they are seldom homogeneous either in matter or construction, the result is mostly the converse of what it purports to be, for the work is more frequently weakened than strengthened by the decorative masonry. Stones of which columns are to be composed, whether each column is to be of one stone or more, are generally roughly boasted out before they are set, and are finished afterwards to traversing moulds and templets with a plumb-rule, whose sides are cut to the diminution, whatever it may be. Flutes are cut at the same time and in the same manner. The beds of the joints in columns should be worked with the greatest precision, that they may fit firmly and closely together; they must not, however, be worked hollow to make a close joint externally, or the arrises will chip off. It is considered a good plan to put a piece of thin milled lead between the beds, cut circular, and extending to within a short distance of the surface, and that the rest be filled with a fine adhesive putty, made as nearly of the colour of the stone as possible. This makes a solid bed, and protects the arrises effectually; but it will not do so well for slight columns, because it narrows the bed so materially. A joggle or dowel of hard wood or cast iron let into the core might be a sufficient counteraction, and it would certainly add to the stability of a polylithic shaft. The other parts of a columnar composition may be sufficiently cramped and joggled together with wood and metals, according to the situation, though it may be again remarked, that neither wood nor metal should be used, unless it can be protected from access even of the atmosphere.

Stone walling is generally measured by the perch of twenty-one feet superficial, at a standard of eighteen inches in thickness, or a cubic quantity of thirty-one feet six inches. Sometimes it is taken by the rod of 272 feet, like brickwork, but at the eighteen-inch standard instead of the fourteen-inch, or a brick and a half, as in the latter species of walling. The perch, however, as first stated, is the standard of this country. The quantities may be ascertained in the same manner that they are in measuring brick-work, the number of inches the wall is in thickness being substituted in the margin for the number of brick lengths. In abstracting, the superficial quantities may be taken out in

columns under the different thicknesses; the amount of Building. each column being multiplied by the thickness in inches. and divided by eighteen, gives the reduced quantity; but if the work be taken in cubic quantities, it is evident that three dimensions of every part multiplied together brings the whole at once to cubic feet, and no further process is necessary, unless it be required to bring the total quantity into reduced perches, which may be done by dividing it by thirty-one and a half.

The custom being different in different places with regard to the double measurement of quoins or angle piers, and as to whether openings, such as windows and doors, shall or shall not be deducted, because of the greater care and trouble required in setting and plumbing quoins and reveals, these particulars should be made matter of previous agreement. Perhaps the best way is to take the quantities exactly, and allow a running measurement extra on the parts requiring more than the usual quantity of labour, or, the nature of the work being of course obvious beforehand, the price per perch, per rod, or per foot cube, on the exact quantity, may be made to include the proposed extras. In the same manner, chisel-dressing (that is, facing the stones neatly and truly with the chisel), whether plain or sunk, may or may not be charged extra, according to agreement, or, in the absence of a previous agreement, to the custom of the place. To ascertain the value of stone walling, the cost of everything that enters into some fixed quantity on the spot must be calculated, for almost everything connected with it varies in almost every place. The original price of the stone at the quarry; the expense of carrying it from thence to the place where it is to be worked up; its texture or comparative hardness, which will materially affect the quantity of walling a mason may execute in a certain time; the cost on the spot, of lime and sand, and the height to which stones must be carried or hoisted from the ground; must all be ascertained and considered, as well as the wages of masons and labourers, and the sort of walling proposed to be executed.

Stone used in string and blocking courses, sills, copings, cornices, steps, quoins, columns, entablatures, &c. is measured by the foot cube, and the work on it is taken as plain, sunk, or moulded, by the foot superficial. The dimensions for the cubic quantities are taken on the unreduced block, or rather on the greatest breadth and thickness which the finished works exhibits; for instance, the string course, which appears in section at c, fig. 17, would be taken as of the thickness throughout which it holds in the wall; and in the same manner, the thickness of the sill at b would be taken under the wooden sill of the sash frame, which must have been the original thickness of the whole scantling. Stone sawed into thin slabs for paving, chimney-pieces, &c., is taken by the superficial foot, at a certain thickness, the value being ascertained from the cubic quantity and the cost of sawing on the surface, whilst some articles, being of a fixed breadth and thickness fitting them to peculiar purposes, are taken by the running foot; but both these latter modes suppose labour included.

Plain work is the even surface produced on stone by the chisel, without the necessity of taking away more than the mere inequalities, and is equivalent to what the joiner calls trying-up, that is, making the surfaces perfectly straight both longitudinally and transversely, and so that it shall be quite out of winding, which indeed is a term to express the result of trying up. Sunk work arises from the necessity of chiseling or hacking away below the level surface of the plain work, such sa the weathering of copings, string courses, cornices, &c.; and mouldings cut in stone produce what is called moulded work. Sunk and moulded work are either straight or circular; circular plain work is certainly spoken of, but incorrectly, for every flexure in stone must be produced by sinking. The joints and beds, that is, the upper

Building, and lower horizontal sides, and the vertical ends of stones. ✓ are taken as plain work, as well as their faces and edges, if they have been wrought with the chisel to produce the surface; or their superficies are taken as sawing or half plain work, if the surfaces are as the saw left them. An extra charge is made on plain work for rubbing to produce a smooth unchannelled surface; and again, a higher charge is made for plain work if it be equally channelled or furrowed in vertical lines over the surface; this latter operation is technically termed tooling. Whenever any two surfaces meet in an oblique angle, one of them may be taken as sunk work, and it will generally be that which is not parallel to its opposite side. It is valued at about two-sevenths more than plain work; and circular sunk work, that is, circular in the direction of its length, at about one-sixth more than straight sunk. Moulded work is measured by girding the moulding or mouldings with a cord or tape, carrying it into all the quirks, and round all the arrises; the dimension thus given is multiplied by the length for the superficial quantity. This is valued at about one-fifth more than sunk work, and circular-moulded at about one-half more than straight. Narrow jointings, groovings, throatings, jogglings, &c. are taken by the foot run. Mortises, holes, notches, cramps, dovetails, &c. are numbered and charged at so much a piece, according to the labour and cost involved in making them. The common pavings, landings, copings, sills, and steps generally used in London for ordinary purposes, are of a laminated stone from Yorkshire, and they are for the most part worked to size and shape in the quarry, so that there can be very little labour on them beyond the mere fitting and setting, making mortises, fitting coal-plates, traps, &c., when such are required, unless they be rubbed, which occasions, of course, an extra charge. York pavings and landings are taken by the superficial foot, at such a thickness; and copings, sills, steps, &c. by the foot run, according to their size.

Plasterer, &c.—No art in the economy of building contributes more to produce internal neatness and elegance, and no one is less absolutely important, so far as the use and stability of a structure are concerned, than that of the plasterer. Its very general application, too, is of comparatively late date; for wainscotted walls, and boarded or boarded and canvassed ceilings, or naked joists alone, are frequently found in houses of even less than a century old, both in these countries and on the Continent.

The plasterer, as the term imports, works in plastic, adhesive compositions, which are laid on walls, both internally and externally, to stop crevices, reduce inequalities, and produce an even, delicate surface, capable of receiving any decoration that may be applied to it, either in colour or otherwise. These compositions are as various as the modes of applying them, the rudest being a compost of loam, a marly clay, and lime; this is used only for the commonest purposes, and being laid on in one coat, is washed over with a thin mixture of lime and water, which process is termed white-washing; the highest work of the plasterer is the making an imitation of marbles and other costly stones, of the purest calcined gypsum, mixed with a solution of gum and isinglass, and colouring matter to produce the required imitation. For the more common operations of plastering, however, comparatively few tools and few materials are required. The plasterer is attended by a labourer, who supplies his boards with mortar, and by a boy on the scaffold with him to feed his hawk; he is necessarily furnished with a lathing hammer, a laying-on trowel, a hawk, floats, brushes, jointing trowels and rules, moulds and straight edges, together with a screen, spade, rake, and hod, for his labourer, and a feeding-spade or server for his hawk-boy. The lathing hammer is chequered on the face with indented lines, to make it less liable to slip over the head of the nail; the upper or back part of the hammer is made like a hatchet,

but very narrow, and on its inner side or edge there is Building. sometimes a square nick or grove, by means of which the workman is enabled to draw a nail that has gone awry. The laying-on trowel is a thin plate of hardened iron or steel, ten inches long and two and a half inches wide, rounded at one end and square at the other end or heel; it is very slightly convex on the face; and to the back, about the middle of it, the spindle or handle is rivetted in at right angles, which, returning in the direction of the heel parallel to the tool, fits into a rounded wooden handle, by which the workman grasps it. The plasterer is obliged to keep this implement particularly clean and dry when he is not actually using it, lest it rust in the slightest degree, as it is clear that the brown oxide of iron would sadly discolour his finer work on touching it again with the trowel. The hawk is a piece of wood about ten inches square, to receive a small portion of mortar on, for the convenience of carrying it readily up to the wall or ceiling, to be there delivered and spread by the trowel. The hawk is traversed across the back by a dove-tailed piece, into which the wooden handle is fixed at right angles, and by this the workman holds it in his left hand. A hand-float is a piece of board shaped something like a plastering trowel, with a ledge handle to it, and is used to rub over the finished work, to produce a hard, smooth, and even face. A quirk-float is of wood also, and is angularly shaped to work in angles; and a derby is a long two-handed float, which is that principally used in forming the floated coat of lime and hair. The plasterer's brush is broad and thin, with a stout or slight row of coarse or fine hair, as it may be required for rough or fine work. Jointing trowels are thin plates of polished steel, of triangular shape, the point being a very acute angle; the handle is adapted to the heel or base of the tool. They are of three or four different sizes, and are principally used in making good cornices, and joining them at their internal and external angles, which is called mitring. Jointing rules are auxiliary to the jointing trowel. Moulds are pieces of hard wood cut to the contour of cornices or separate mouldings, to assist the workmen in forming them readily. For work of any importance the moulds are cut in copper plates, which are inserted in the wooden stock, and narrow pieces of wood are fixed to the moulds transversely, to guide and steady them along the screeds. A straight edge is a board of considerable length, shot perfectly straight on one edge, to bring the plastering on a wall or ceiling to a perfectly even surface, by traversing it in every direction. A screen is a large parallelogramic wooden frame, on which metal wires are fixed at regulated distances from each other, to act as a sieve. This is propped up in nearly a vertical direction by a counter-frame hinged to it like a common step ladder, and the coarser materials which enter into the composition of plastering mortar are thrown against its outer face, to separate the particles which are too large for the purpose from the finer. The sand and lime, too, are mixed much more efficiently and completely by screening them together than in any other manner. The spade and hod are like those of the bricklayer's labourer. The rake is used to separate the hair used in the mortar, and distribute it throughout the mass. The hawk boy's server is about the size and shape of a common garden hoe, but the handle is in the direction of the instrument. With this the boy rebeats the mortar on the board, to destroy any set it may have taken, and delivers it in small pats or portions on to the plasterer's hawk.

The plasterer's materials are laths and lath nails, lime, sand, hair and plaster, of which are formed coarse stuff or lime and hair, fine stuff, gauge stuff, &c.; and besides these, a variety of stuccoes and cements, together with various ingredients to form colouring washes, &c. are more or less in request.

Laths are narrow strips of some straight-grained wood (in this country they are generally of fir, though oak laths are sometimes used), in lengths of three and four feet, or to

quarterings of a partition are set, and in thickness from one-eighth to three-eighths of an inch; those of the greater thickness are called lath and a half. Lath nails are either wrought or cut; cut nails are in common use in this country with fir laths. Coarse stuff is composed of ox or horse hair from the hide, in addition to the lime and sand mortar of the bricklayer and mason; this is intended to act as a sort of mesh to net or tie it together, and form a coarse but plastic felt. The hair should be as long as it can be procured, and free from grease and filth of every kind. Road drift is unfit to be used for mortar, unless it be completely cleansed from all animal and vegetable matter, and of all mud and clay. Nothing but clean sharp sand should be used with the lime and hair in the composition of this, any more than of brick mortar. Fine stuff is a mortar made of fine white lime, exceedingly well slaked with water, or rather macerated in water to make the slaking complete; for some purposes a small quantity of hair is mixed up with this material. Fine stuff very carefully prepared of the finest powdered lime macerated so completely as to be held in solution by the water, thus forming a mere paste, which is then allowed to evaporate until it is of a sufficient consistence for working, is called putty. Gauge stuff is composed of about three-fourths of putty and one-fourth of calcined gypsum or plaster of Paris; this may be mixed only in small quantities at a time, as the plaster or gauge renders it liable to set very rapidly. Bastard stucco is made of twothirds fine stuff, without hair, and one-third of very fine and perfectly clean sand (the cleanliness or purity of sand may be determined by the facility with which it may, when in a moist state, be struck off from the hand without leaving a soil); and common stucco is composed of about threefourths of clean sharp sand and one-fourth of the best lime, well incorporated. This must be protected from the air from the time it is made up until it is required to be laid on the walls. The cement best known and most commonly used in this country is called Parker's, or Parker's Roman cement. This material, when of good quality, with fine clean sharp sand, in the proportion of about three of the former to one of cement, and well executed, forms a very good external coating for walls.

A composition known as Portland cement, because the mortar formed by it when mixed with sand, presents, or is supposed to present, the appearance of stone from the Portland quarries, has grown of late years into repute in London more particularly, and it is in one particular at least preferable for an outside stucco, that the colour to which it dries is sufficiently agreeable to the eye without any colouring wash, whereas Parker's cement is too often of a dark dirty tint, requiring painting or colouring to render it tolerable. Portland cement is also much esteemed as being proof against water when used as a mortar in setting brickwork, and in the composition of concrete for foundations.

The various coatings of plastering are thus designated: On laths, plastering in one coat simply is said to be laid, and in two coats, laid and set. In three-coat plastering on laths, however, the first is called the pricking up, the second is said to be floated, and the third set. On brick or stone walls, without the intervention of laths, plastering in one plain coat is termed rendering; with two coats, a wall is said to be rendered and set; and in three, rendered, floated, and set. Before the plasterer begins to lath a ceiling, he proves the under face of the joists, to which he has to work, by the application of a long straight edge, and makes out any slight inequalities in them, when the work is not to be of a very superior description, by nailing on laths or slips to bring them as nearly even as he can. When the inequalities are great, or if the work is to be of fine quality, he recurs to the carpenter, who takes off inordinate projections with his adze, and nails on properly dressed slips where the joists

Building, suit the distances at which the joists of a floor or the do not come down low enough, and thus brings the whole Building. to a perfect level. This operation is called firring, that is, putting on pieces of fir, though it is vulgarly termed and frequently spelt furring. If it be a framed floor of ceiling joists the plasterer has to work to, it is tolerably sure to be straight; but the carpenter must have firred down on the beams or binders to the level of the ceiling joists, unless the ceiling joists have been nailed to the beams or binders, when nothing of this kind need be necessary. If a ceiling is to be divided into compartments or panels, the projecting or depending portions must be bracketed or cradled down to receive the laths. It is an important point to be attended to in plastering on laths, and in ceilings particularly, that the laths should be attached to as small a surface of timber as possible, because the plastering is not supported or upborne by its adhesion or attachment to the wood, but by the keying of the mortar itself, which passes through between the laths, and bends round over them. If then the laths are in constantly recurring contact with thick joists and beams, the keying is as constantly intercepted, and the plastering in all such places depends entirely on the portions between them which are properly keyed. Under a single floor, therefore, in which the joists are necessarily thick, a narrow fillet should be nailed along the middle under the whole length of them all, to receive the laths and keep them at a sufficient distance from the timber to allow the plastering to key under it; and thus too the surface might be made more perfectly even, by blocking out the fillets, and contrariwise, as it is in single floors that inequalities mostly occur. This being all arranged, the plasterer commences lathing. The laths should be previously sorted, reserving the crooked and knotty, if there be such, for inferior works, and selecting the best for the work of most importance, so that the workman shall find none to his hand that is not fit to be brought in. Taking a lath that will reach across three or four openings, he strikes a nail into it on one of the intermediate joists, at about three-eighths of an inch from the one before it, and then secures the ends of that and the one that it meets of the last row with one nail, leaving the other end of the lath he has just set to be secured in the same manner with that which shall meet it of the next bay in continuation. It is of importance also that he pay attention to the bonding of his work, either by using longer and shorter laths in bays or squares, and in breaking the headings, or with laths of the same length, the first and last courses or bays only having the bond formed by half laths. In lathing on quartering partitions and battened walls, the bonding is not a matter of much importance; nor is the thickness of the timbers behind the latter of so much consequence as in a ceiling, because the toothing which the thickness of the lath itself affords to the plastering is enough to support it vertically; but, nevertheless, the more complete the keying, even in works of this kind, the better, as the toothing above will not protect it from any exciting cause to fall forwards, or away from the laths. The thinner or weaker sort of lath too is generally considered sufficiently strong for partitions, whilst the stronger is used for ceilings. Thin weak laths, if used in a ceiling, are sure to produce inequalities, by sagging with or yielding to the weight attached to them. A chance one or two weak ones in a ceiling of otherwise strong laths may be the ruin of the best piece of work. Care should be taken therefore not to allow a thin lath, or one of unequal thickness, to go on to a scaffold with thicker and more equable ones, lest the workman should, through carelessness or otherwise, put it up with the rest. When the lathing is completed, the work is either laid or pricked up, according as it is to be finished with one, two, or three coats. Laying is a tolerably thick coat of coarse stuff or lime and hair brought to a tolerably even surface with the trowel only; for this the mortar must be well tempered, and of moderate consistence,—thin or moist enough to pass rea-

Building, dily through between the laths, and bend with its own weight over them, and at the same time stiff enough to leave no danger that it will fall apart, a contingency, however, that in practice frequently occurs in consequence of badly composed or badly tempered mortar, unduly close lathing, or sufficient force not having been used with properly consistent mortar to force it through and form keys. If the work is to be of two coats, that is, laid and set, when the laying is sufficiently dry, it is roughly swept with a birch broom to roughen its surface, and then the set, a thin coat of fine stuff, is put on. This is done with the common trowel alone, or only assisted by a wetted hog's bristle brush, which the workman uses with his left hand to strike over the surface of the set, while he presses and smooths it with the trowel in his right. If the laid work should have become very dry, it must be slightly moistened before the set is put on, or the latter, in shrinking, will crack and fall away. This is generally done by sprinkling or throwing the water over the surface from the brush. For floated or three-coat work, the first, or pricking up, is roughly laid on the laths, the principal object being to make the keying complete, and form a layer of mortar on the laths to which the next coat may attach itself. It must, of course, be kept of tolerably equal thickness throughout, and should stand about one-quarter or three-eighths of an inch on the surface of the laths. When it is finished, and while the mortar is still quite moist, the plasterer scratches or scores it all over with the end of a lath in parallel lines from three to four inches apart. The scorings should be made as deep as possible without laying bare the laths; and the rougher their edges are the better, as the object is to produce a surface which the next coat will readily attach itself to. When the pricked up coat is so dry as not to yield to pressure in the slightest degree, preparations may be made for the floating. Ledges or margins of lime and hair, about six or eight inches in width, and extending across the whole breadth of a ceiling or height of a wall or partition, must be made in the angles or at the borders, and at distances of about four feet apart throughout the whole extent; these must be made perfectly straight with one another, and be proved in every way by the application of straight edges: technically these ledges are termed screeds. The screeds are gauges for the rest of the work; for when they are ready, and the mortar in them is a little set, the interspaces are filled up flush with them; and a derby float or long straight edge being made to traverse the screeds, all the stuff that projects beyond the line is struck off, and thus the whole is brought to a straight and perfectly even surface. To perfect the work, the screeds on ceilings should be levelled, and on walls and partitions plumbed. When the floating is sufficiently set and nearly dry, it is brushed with a birch broom as before described, and the third coat or set is put on. This for a fine ceiling that is to be whitened or coloured must be of putty; but if it is to be papered, ordinary fine stuff, with a little hair in it, will be better. Walls and partitions that are to be papered are also of this latter, or of rough stucco; but for paint the set must be of bastard stucco trowelled. This coat must be worked of exactly the same thickness throughout, to preserve to the external surface the advantage that has been obtained by floating. For all but this last mentioned, the set on floated work, the trowel and brush are considered sufficient to produce fine and even work; but trowelled stucco must moreover be hand-floated. In this operation the stucco is set with the trowel in the usual manner, and brought to an even surface with that tool to the extent of two or three yards. The workman then takes the handfloat in his right hand, and rubs it smartly over the surface, pressing gently to condense the material as much as possible. As he works the float he sprinkles the surface with water from the brush in his left hand, and eventually pro-

duces a texture as fine and smooth almost as that of po- Building. lished marble. But lathing and plastering on laths as practised in England, is at best a very flimsy affair, and greatly requires improvement. Stronger laths than the laths commonly employed, put on further apart, and with headed wrought nails, and the plastering laid on upon both sides in upright work, or both above and below the ceilings at the same time, two men working against one another will produce work in some degree worthy of the name. But the practice of the French in this respect—a recent practice truly—is well worthy the consideration, and to a great extent the imitation, of English plasterers. The process of plastering on the naked brick or stone wall differs but little, except in name, from that we have described as the mode on lath. The single coat, or equivalent for laying, on lath, is rendering, and it need differ only in the quantity of hair, which may be less than is necessary for laying, and in the consistence of the mortar, which may be made more plastic, to work easier, and because in a moister state it will attach itself more firmly to the wall: the wall, however, must itself be wetted before the rendering is applied. The set is the same, and is put on in the same manner as to two-coat work on lath. For three coat, or floated work, the first or rough rendering should be made to fill up completely whatever crevices there may be in the work behind it, and be incorporated with it as much as possible. As its name imports, its surface may, indeed should, be rough; but it is not scratched or lined as the similar coat on lath is: for this, too, the wall must be previously wetted, that the mortar may the better attach itself to it. For the floating, screeds must be formed as before described, and the consecutive process is exactly the same as on lath, both for the floated and for the set coat. In almost every case in which plastering is to be floated, the workman finds a guide for the feet of his wall screeds in the narrow grounds which the joiner has previously fixed for his skirtings; from these he plumbs upwards, and makes his work perfectly flush with them.

Mouldings and cornices, as large combinations of mouldings and flat surfaces in the angles of rooms, immediately under their ceilings, are called, are formed with running moulds, and are generally executed before the setting coat is put on the walls and ceiling. If the cornice do not project more than about an inch and a half, or two inches, from the ordinary work, a backing of lime and hair will be sufficient; and if any one part only happen to be more than ordinarily protuberant, a row of nails from six to twelve inches apart stuck into the wall or ceiling in the line of that part will give it sufficient support. But if the general mass of the cornice be more than that amounts to, and extend more than six or eight inches along the ceiling, it must be bracketed out, and the bracketing lathed and pricked up, as for ordinary work. This pricking up, or other preparation, must of course be perfectly set before the cornice is run; and there should be one-fourth of an inch at least of clear space between the preparation and the mould in the nearest part. A wooden screed or parallel straight edge is tacked with brads on to the wall, and another on the ceiling, if the cornice be large and heavy, as guides or gauges for the mould, whose rests are chased to fit them; and then one man laying on gauge stuff in an almost fluid state with an angular trowel, another works the mould backwards and forwards over it, which strikes off what is superfluous, and gives the converse of its form to the rest. The mould is never taken down from the work at right angles to the line of it, but is drawn off at the end, so that none of the parts of the moulding or cornice is injured or torn by it, which must otherwise frequently be the case, from the peculiar forms at times given to the details. If a cornice be too large and heavy to be executed at once, it may be done in the same manner at two or more times, in so many parts; and if any part or parts of a moulding or cornice is to be

Building. enriched, the space for it is left vacant by the mould, and the enrichment is afterwards supplied. As a cornice cannot be completed up to the angles by the mould, it is worked by hand in those situations to a joint. The joinings are termed mitres, and in forming them the plasterer uses the jointing tools we have already described. Models for enrichments are made by the modeller, according to the design or drawing submitted to him, and from them the plasterer makes wax moulds, or, as in ordinary practice, the modeller supplies the moulds in which the ornament is cast in plaster of Paris. If the ornament be in recurring lengths or parts, as is usually the case, only one length or part is modelled, and casts of as many as are required are taken from the mould; some single ornaments, again, which are very large, require to be moulded and cast in parts, which are put together by means of cement. When the cast ornaments are sufficiently dry the pieces are scraped and trimmed, the joints made clean and even, and they are set in the cornice with plaster of Paris, with white lead, or with a composition called iron cement, as the case may require. If the castings have something in the cornice to rest upon, the first will do; but if there is nothing to retain or attach them but the cement, one of the two latter must be used. Flowers and other ornaments in ceilings which are too large and heavy to be trusted to adhesive matter alone, must be screwed on to wooden cradling behind and above them.

In plastering a wall with common stucco (and its use is mostly for outside work), the first thing to be done is to remove the dust from it by brushing, and then wetting it very completely with water; if the wall to be stuccoed be an old one, or one of which the joints have been drawn, the mortar of the joints must be chipped or even raked out, and the bricks picked, to expose a new and porous surface to the plastering before brushing and wetting. The wall is then covered with stucco in a fluid state, applied with a broad and strong hog's-bristle brush, like common whitewashing. When this is nearly dry the stucco must be laid on as in common rendering, unless the work is to be floated, when the process is nearly similar to that in floated plastering. Screeds must be formed at the highest and lowest extremities of the wall, or of that part of the wall which is in the same vertical line, and is not intercepted by string courses, and be returned at the angles, putting the whole surface into a sort of frame. These must be made perfectly straight and plumb, so as to be quite out of winding, by the careful application of the plumb-rule and straight edge. Inner vertical screens must then follow at three or four feet apart across the whole surface, and be made to range exactly with the outer ones, and then the interstices must be filled in as before. As the work is made good it must be well rubbed with the hand float, as in the execution of trowelled stucco internally, to compress the material, and produce a hard, even, and glossy surface. Preparations for cornices and other projections from the straight surface of the work must have been previously made in or on the brick or stonework, by the protrusion of bricks, tiles, or whatever may be best suited to form a core, and the mouldings and cornices are run with moulds, in the manner described for the same things internally, only that in work of this kind no plastic material but the stucco itself is used; that is, there is no preparation of any softer material than the stucco itself put under it. In running cornices in this material, workmen are very apt to mix a little plaster of Paris with the stucco to make it set under the mould, and thus give sharpness and fulness to the mouldings; but this should not be permitted; for the plaster is not qualified to stand the weather as the stucco is, and, if mixed with it, will produce premature decay. When the stucco is perfectly dry, it may be painted in oil colours, or be coloured in distemper; and in either case it is generally ruled over the surface with a lead point, to give it the appearance of gauged stone-work.

Rendering in Roman cement is executed almost exactly Building. in the same manner as stucco rendering is, only that it is laid on the saturated wall directly, without the preliminary operation of roughing in, or washing the surface with a solution of the material. The same process, too, is followed in floating this cement, and with the same exceptions; and as, in addition to its superior hardness and capacity for duration, it is a quick-setting cement, it is far preferable to any of the common stuccoes for running cornices, mouldings, &c. Roman cement, or as it is vulgarly called by most persons concerned in the operations of building, compo, a contraction of composition, may, like stucco, be painted in oil or coloured; but instead of a size colour, which is used for almost every other purpose in plastering, the colour for this composition is mixed with diluted sulphuric acid. This too may be lined and tinted to imitate stone and stonework of any description.

It may not be amiss here to refer to some of the causes of the premature decay which takes place in stuccoes and cements when used externally as a coating to walls. The primary cause is the presence of muddy earth and decayed animal and vegetable matter in the sand used with the lime and cement. To this may be added frequent impurities in the limes and cements themselves, particularly of argillaceous matter in the former, and sometimes to the too great proportions of lime or cement to sand. These things might, however, remain quiescent for a long time, if the work were well protected from access of moisture, which is the grand exciting cause. The paint, or distemper wash, on the surface, is generally sufficient to prevent the rain which may beat against a vertical face from penetrating, especially if the work have been well hand-floated and trowelled, to make it close and compact; but the evil arises from exposure above, and from the numberless horizontal unfloated surfaces which are constantly presented. These receive and collect the water, and convey in streams over the vertical surfaces what is not immediately absorbed; and the work thus becoming saturated, frost seizes and bursts it, or warmth calls the vegetative powers of the impurities in it into action, and the whole is covered with a green sward. Let the sand of which a plaster composition is to be formed, whether with lime or cement, be washed until it no longer discolours clean water, and be well compounded with cementitious matter free from the impurities with which it is so frequently charged; let the work be well hand-floated and trowelled, particularly on the backs or upper horizontal surfaces of projections, and protected above by projecting eaves or otherwise; and the work, with common care and attention to paint or distemper at intervals, will last as long as anything of the kind can be expected, or is found, to last anywhere.

A cheap and useful covering for external walls which are protected by projecting eaves, in plain buildings, is rough cast. This is executed in the following manner. The surface is first roughed in, or rendered with lime and hair; and when that is set dry, another coat of the same material is superadded, laid as evenly as it can be without floating, and as soon as a piece of two or three yards in extent is executed, the workman lays on it an almost fluid mixture of fine clean gravel and strong lime, which have been well mixed together. This is immediately washed with any ochreous colour that may be desired, and the whole dries into one compact mass.

In renovating and repairing plastering, the whole surface is first well washed to remove the dirt which may have attached itself, and as much of the earthy matter of the previous coat of whitening or colouring as will come away; any injuries the work may have received, such as cracks and fractures, are then repaired; and when the new stuff is quite dry, the joinings are scraped to produce an even surface, and the whole is again whitened or coloured once or twice, or oftener, as may be required, to make it bear

Building. out well. Stuccoed walls which have been painted must ing eaves, a wide board is placed over the rafters' feet; but Building. be well rubbed with pumice stone, to take off the old paint as much as possible before they are newly painted.

Plastering is measured in feet and inches, and valued by the yard superficial of nine square feet. It is taken under separate heads according to the nature and description of the work, such as rendered; rendered and set; rendered, floated, and set; and with lath, for the lathing and plastering are valued together; lathed and laid; lathed, laid, and set; and lathed, plastered, floated, and set. Whitening and colouring are taken under separate heads, and the quantities of them are reduced to yards also. Work done in narrow slips, such as to the jambs and soffits of doorways and other openings, is measured by the foot superficial, and so are the backs of niches, niche-heads, &c. Arrises, or external angles and quirks, are taken extra by the running foot, and beads and other very small mouldings are measured in the same manner. Larger mouldings, however, and cornices, whether plain or enriched, are taken by the foot superficial, and the quantity is ascertained by multiplying the length, minus once the projection, by the girth, of the moulding or cornice, which is best determined by measuring its mould with a tape or cord. Enrichments are either numbered or taken at so much the running foot, making the modeller's an extra charge, if the design was original and required special modelling and moulding; and mitres are taken at so much a piece beyond a limited number. This number, in an ordinary room, is generally the four which necessarily occur in its four angles, making those which are usually occasioned by the projection of the chimney-breast extra; but it is not an uncommon practice to bring them within the limit, and count only all that may occur above eight, for no difference is made between internal and external angles. Circular work, whether it be convex or concave, of every kind, may be charged about one-fourth higher than straight. Stuccoes and other compositions are also valued by the yard, and according to the description of the work, with almost similar exceptions to those mentioned with regard to common plastering. Used externally, however, all the arrises or external angles, throatings, grooves, chamfers, &c., are taken as extra by the running foot at such a width.

In the practice of measuring plasterer's work, it is customary to take the whole surface at first, and then whatever deductions there may be. Thus the side of a room is measured over all, from the upper edge of the skirting grounds up to the cornice. The windows and doors are deducted by taking to the outside of their framed grounds for the width, and from the skirting grounds up to the top of those of the door or window for the height. If there be more than one of each, or either of them, to deduct, of course the same dimension will serve for all, multiplied by as many times as each deduction occurs. A ceiling also is generally taken over the whole surface, from cornice to cornice, a chimney-breast or other projection being made a deduction. It is a moot point whether the plasterer should not be allowed that part of the ceiling and wall which is covered by the cornice, as he has actually finished the whole except setting. When the cornice is bracketed, however, he may fairly claim up to the brackets.

Scaffolding is not generally made an extra charge with new work; but with old work it is, if scaffolding be necessary; for, under ordinary circumstances, the plasterer is enabled to wash, stop, and whiten the ceilings and walls of rooms from trestles, with boards laid across them. In lofty saloons and halls, churches, &c. scaffolding is indispensable, and must then be charged. A scaffold is necessary, too, to a front that is to be plastered in any way; but it may be afterwards washed, repaired, and coloured, from a ladder, without the intervention of a scaffold.

Slater.—The principle on which slates are laid is that which is employed in plain tiling. To a roof with project-VOL. V.

when the eaves tail into gutters, the gutter-board is made wide enough to receive the eaves-course. For light slating it is necessary to board a roof all over. This is done by the carpenter, and is called sound-boarding; but for strong heavy slates, fillets or battens are better; and these are laid by the slater himself, to suit the length of his slates. Three inches wide and one inch thick is a sufficient size for them, if the rafters be not more than twelve inches apart. Against gable or party-walls, a feather-edged board called a tilting fillet is laid to turn the water from the wall.

Before he begins to work on a roof, the slater shapes and trims the slates on the ground. With a large knife or chopper called a saixe, sax, or zax, he strikes off the unevenness on one side of a slate, making it as nearly straight as he can; he then runs a gauge along it, marking the greatest width the slate will bear, and, cutting to that line, makes it perfectly parallel. He next, with a square, brings the thickest and best end to right angles with the sides, generally by chopping, but sometimes by sawing; and then marking upward from the squared foot or tail, makes two nail holes, where, by calculating the gauge the slate in hand will bear, he knows the batten must come. All the slates being thus gauged to width, dressed, and sorted in lengths, they are then taken up to the roof in rotation, beginning with the longest and largest for the lowest courses. The first course the slater lays is little more than half the length of that which is intended to cover it, and is necessary to break the joints at the eaves. This is called the doubling eaves-course; and the covering eaves-course is brought to the same foot line, completely to cover it. Then to ascertain the gauge: From the length of the slate deduct the bond, which should never be less than two inches, and need not be more than three and a half inches, and the half of what remains will be the gauge. Thus, if the bond be fixed at three inches, and the slate is two feet three inches in length, the gauge will be one foot. This gauge or margin is set up from the foot of the eaves-course at each end, and a line strained to mark it along the whole length, and so on, to the ridge or top, where another half-course is required to complete the work, and that is in its turn secured by a covering of sheet lead. To a hipped roof care is taken to complete every course up to the angle, by cutting slates to fit its inclination; and these are also covered by an overlap of sheet lead. In nailing a slate, it must not be strained or bent in the slightest degree, or it will certainly fly in some sudden atmospheric change, to which it is of course constantly liable, even if it escape fracture, from being trodden on by the workmen themselves or by others. Copper, being less liable to oxidize from exposure to common causes than any other metal that will answer the purpose, is generally used for slate nails. Zinc is also used for the purpose; and iron tinned and painted nails are sometimes substituted by dishonesty on the part of the workman or builder, or bad economy on that of the proprietor.

A very light and neat covering is produced, by laying wide slates side by side, and covering their joints with narrow slips bedded in putty, the overlap at the ends being no more than the bond is with the usual mode. It is known as patent slating, and was introduced by the late Mr Wyatt, though he never obtained a patent for it. Indeed it is in principle the mode which was adopted in ancient Greece in covering the roofs of temples. Neither boards nor fillets are used, the slates bearing from rafter to rafter, and to the rafters the slates are screwed. The covering slips are also screwed, as well as bedded in putty. Slating of this kind may be laid at no greater elevation than ten degrees; whereas, for slating in the ordinary way, the angle should never be much less than twenty-five degrees, though large slates with a three and a half inch bond, carefully laid and pointed, may perhaps be trusted at a rise of twenty degrees.

Building. This mode of applying slate is not without the disadvantage attending the fixing of any substance that freely takes up and readily parts with heat. In expanding and contracting, the joints are too often destroyed and leaks are the common

The mode above described of ascertaining the gauge or margin by the bond, is equally applicable to every sort of roof-covering that is made up of small inflexible parallelogramic slabs or tablets; and it should be borne in mind that the greater the angle is at which the rafters rise, or, in technical language, the higher the pitch of the roof, the less the bond may be, and vice versa. With slabs or tablets that vary in length, too, as slates generally do in this country as they are brought to market, it is the bond which it is of importance to observe; but if they are of an invariable length, as tiles are, it is sufficient that the gauge or margin be attended to.

The best slate this country produces is from the quarries of Bangor in Caernarvonshire, and of Kendal in Westmoreland. Good slate is also procured in the neighbourhood of Tavistock in Devonshire, and in some parts of Scotland. The scantlings of slate are cut in the quarries to set sizes, and these are split into tablets, thicker or thinner according to the size of the slab and the capacity of the slate; for the inferior qualities are neither so compact in material, nor so clearly laminated or schistose, as the superior, and will not therefore rend so freely. The sizes of slates best known in the British market are distinguished by the names of ladies, countesses, duchesses, and queens. Ladies measure fifteen inches by eight, countesses twenty inches by ten, duchesses twenty-four inches by twelve, and queens thirty-six inches by twenty-four; and they are esteemed in proportion to their magnitude. Besides these, there is a slate which equals the queen in extent of surface, but is of very much greater thickness; this is called Welsh rag. A smaller slate, again, which is less indeed than the lady, and is cut from the refuse of large scantlings, is called a double. In size it does not often exceed twelve inches by six. Westmoreland slates are thick and heavy like the Welsh rag, but do not generally run so large.

The best slate is of a bluish-gray colour, and breaks before the zax like well-burnt pottery, and will ring in the same manner on being struck. Whitish or light gray-coloured slate is for the most part stony: dark blue or blackish slate, on the other hand, cuts very freely; but it absorbs moisture, and decays rapidly.

Slater's work is measured by the square of a hundred superficial feet. In a parallelogramic piece of slating, as in a gabled roof with projecting eaves, the length along the eaves by the breadth or height from that to the ridge, with the addition to the latter dimension of the gauge or margin for doubling the eaves, will give the quantity of one side. Projections for chimney-shafts or breasts, skylights, &c., must be deducted; but an addition must be made of the run round them by six inches, for cutting and waste. In a hipped roof the length from point to point of the eaves on one of the long sides of a quadrilateral roof, by the breadth or height, with the addition as before, will give that side and half of The other side will, of course, in the each of the ends. same manner, include the other halves of the ends. length of the hips taken as a superficial dimension in feet, or by twelve inches, is added for cutting and waste, and valleys are taken and added in the same manner when they occur.

Carpenter.—For the scientific principles of carpentry we must refer the reader to the article under that head, and to the articles Roof, Strength of Materials, and Timber. Here we have merely to speak of the practical details of carpenter's work in the operations of building,—of carpentering, indeed, or the practice of carpentry, considering it as a mechanical art.

The carpenter works in wood, which he receives from the sawyer in beams, scantlings and planks, or boards, which he cuts and combines into bond-timbers, wall-plates, floors, and

roofs. He is distinguished from the joiner by his operations Building. being directed to the mere carcass of a building,—to things which have reference to structure only, Almost everything the carpenter does in and to an edifice is absolutely necessary to its stability and efficiency, whereas the joiner does not begin his operations until the carcass is complete; and every article of joiners' work might at any time be removed from a building without undermining it or affecting its most important qualities. Certainly, in the practice of building, a few things do occur which it is difficult to determine to whose immediate province they belong; but the distinction is nevertheless sufficiently broad for general purposes. The carpenter, with the bricklayer or mason, and some of the minor artificers, constructs the frame or hull; and the joiner, with the plasterer and others, decorates and rigs the vessel: on the former the actual existence of the ship depends, and on the latter depends her fitness for use.

The carpenter frames or combines separate pieces of timber by scarfing, notching, cogging, tenoning, pinning, and wedging; and the tools he uses are the rule, the axe, the adze, the saw, the mallet, hammers, chisels, gouges, augers, hook-pins, a square, a bevel, a pair of compasses, and a gauge, together with the level and plumb-rule; besides these, planes, gimlets, pincers, a sledge hammer, a maul or beetle, wedges, and a crow-bar, may be considered useful auxiliaries, though they are not absolutely necessary to the

performance of works of carpentry.

To scarf is to cut away equally from the ends, but on the opposite sides, of two pieces of timber, for the purpose of tying or connecting them lengthwise. This is done to wallplates and bond-timber, and especially to beams when they are required of greater length than can be procured without joining. (See CARPENTRY.) The usual mode of scarfing bond and wall-plates is by cutting about three-fifths through each piece on the upper face of the one and the under face of the other, about six or eight inches from the end, transversely, making what is technically termed a calf or kerf, and longitudinally from the end, from two-fifths down on the same side, so that the pieces lap together with a sort of half dovetail. The heavy supervening weight of the wall and joists renders it impossible that they should be drawn apart without tearing the fibres asunder or lifting the weight. (See fig. 20.) Nevertheless these joints are generally spiked, Plate and it is always required that they be made to fall in or un- XLIX. der a pier. Notching is either square or dovetailed; it is used in connecting the ends of wall-plates and bond-timber at the angles, in letting joists down on beams or binders, purlines on principal rafters, &c. Nos. 1, 2, 3, 4, and 5, fig. 21, show varieties of notches applied as we have described. No. 1 is a simple square notch or halving of the ends of bondtimbers or wall-plates at a right angle; No. 2, a dovetailed notch. No. 3, the notch most commonly used; it is similar to No. 1, but that the ends are allowed to run on so that the one piece grasps the other, and each forms a cog to the other. No. 4 is an oblique-angled, dovetailed notch; and No. 5 shows how joists are notched or let down on beams and binders, and purlines on principal rafters. A notch is cut into the under edge of the joist or purline an inch or an inch and a half in depth, and considerably shorter than the beam, binder, or rafter is in thickness. Notches are also cut down on the upper angles of the bearing pieces as long as the rider is thick, as deep as the notch before described of the latter is, and so far in as to leave a thickness on its own edge equal to the length of the notch in the riding joist or purline. In the diagram one joist is indicated in its place let down in the notch, and another indicates the notch in its own edge, and leaves exposed the notches in the binder. Cogging, or corking, as it is vulgarly termed, is the lastmentioned species of notch extended on one side, and leaving a narrow tooth or cog alone in the bearing-piece flush with its upper face, No. 1, fig. 22. It is used principally in

cog is here made narrower, because the end of the joist or rider coming immediately beyond the plate, that part which forms the shoulder of the notch would be liable, on being strained, to be chipped off or torn away, if it were not kept as long as possible; and it is not of so much importance to guard against weakening a wall-plate which is supported along its whole length, as a beam, binder, or principal rafter, which rests on distant points alone. No. 2 of the same diagram shows another mode of tailing on joists and beams by a dovetail notch, which, to distinguish it from the flat notches, Nos. 2 and 4, fig. 21, is called corking, or cogging also, though the operation certainly is not cogging. This is a good mode if the timber be so well seasoned as not to be likely to shrink more; but it would be improved by allowing the rider to take a bearing in a notch like that to No. 1 before the dovetail commenced, as at No. 3, for in the ordinary mode it is weakened in a point of great importance.

Tenoning implies mortising also, as a matter of course. They are the names of the two operations necessary to one result,-that of producing a connection between two pieces by inserting part of the end of one into a hole of similar size cut in the side or face of the other. A tenon is formed by cutting in on each side or edge of a piece of timber, near its end, transversely, to a certain depth, or rather, leaving a certain part of the breadth or depth uncut, and then cutting in longitudinally from the ends as far from each edge as the transverse cuts have been made in depth, thus removing two square prisms and leaving a third undivided. This is the tenon. An excavation in the side of a piece of timber, of a certain depth, in the direction of its thickness, parallel to its edges, and bounded lengthwise by lines at right angles to them, is a mortise. Tenons and mortises are made of exactly corresponding size, and are most frequently at equal distances from one or the other side or edge of the two pieces to be conjoined; and for the most part, too, every angle formed in the process of tenoning, both internal and external, is a right angle. Tenons are called joggles in some situations, when they are not intended to be borne upon; and their use is merely to keep the piece of timber to which they belong steadily in its place, without being liable to slight accidents from lateral pressure or violence. In combining timbers by means of mortises and tenons, to produce as great a degree of strength as possible, it must be obvious that the object to be kept in view is to maintain the end or tenon of the one as large and efficient as it may be, and weaken the other as little as possible in forming the mortise. For the efficiency of the mortised piece in a horizontal bearing, it is clear that as much of its thickness should be below the mortise as possible, as at a, fig. 23; for if it be put low, as at b, the superincumbent weight on the tenon would more readily split or rend it in the direction of the grain, as indicated; but the case is inverted with the tenoned pieces. With the mortise at  $\alpha$  the tenon could only have the efficacy of so much of the piece to which it belongs as there is of it above its under surface, which is a very small part of its depth; whereas with the tenon at b it would command the power of the greatest part of the depth. To guard as much as possible against the danger of too great a mortise and too small a tenon on one side and the other, and to obviate the difficulty arising from the efficiency of one or the other of the two pieces being affected by putting the tenon too high or too low, a compound, called a tusk tenon, is used for almost all horizontal bearings of any importance, especially to joists and binders, to trimmers, beams, girders, brestsummers, &c. The body of the tenon in this is a little above the middle of the end, and it runs out two, three, or four inches, or more, as the case may require. Below it the tusk protrudes, and above it the shoulder is cut down at an obtuse angle with the horizontal line, giving the strength of the whole depth of the timber above the under tusk to the

Building tailing joists and beams on wall and tem-plates, and the tenon, and giving it a bearing in a shallow mortise, whilst a Building. greater depth of the mortised piece than the tusk rests on receives the body of the tenon, and so protects its comparatively narrow margin from undue pressure. The diagram No. 1, fig. 24, shows the tusk tenon, with the section of a beam into which it is mortised; and No. 2 indicates perspectively the appearance of the mortise in front. See also CARPENTRY.

> Pinning is the insertion of nearly cylindrical pieces of wood or iron through a tenon, to detain it in the mortise, or prevent it from being drawn out by any ordinary force. For this purpose the pin is inserted either in the body, or beyond the thickness, of the mortised piece, as indicated at a, fig. 24, or at a, fig. 25. Wedging (see bb, No. 2, fig. 25) is the insertion of triangular prisms, whose converging sides are under an extremely acute angle, into or by the end of a tenon, to make it fill the mortise so completely, or bind it so tightly, that it cannot be easily withdrawn. The wedging of tenons also assists in restoring to the mortised piece of timber much of the strength it had lost by the excision of so much of its mass, which indeed the tenon itself does if it fit closely in every direction; but the assistance of the wedge renders the restoration more perfect than the tenon could be made to do of itself, by compressing the fibres of both, longitudinally to those of the one, and transversely to those of the other, thus removing the tendency of the mortised piece to yield in any degree in the weakened part, though it cannot make up the loss in its tenacity occasioned by the scission of its fibres.

> In scarfing, cogging, and notching, the shoulders are always cut in with the saw; but the cheek is for the most part struck out with the mallet and chisel, or adze, as may be most convenient. Tenons should be made entirely with the saw: mortises are generally bored at the ends with an auger whose diameter equals their thickness; the intervening part is taken out with a wide chisel, cutting in the direction of the fibre; and the ends are squared down with a chisel whose breadth just equals the thickness of the mortise. Wood pins must be rent to insure the equal tenacity of their whole mass. Wedges are cut with the saw, but straight-grained stuff is always preferred for them.

> Bond-timbers and wall-plates should be carefully notched together at every angle and return, and scarfed at every longitudinal joint. The scarf shown at fig. 20 is sufficient for the purpose; and the notch at No. 3, fig. 21, may be preferred where notching is required; neither pinning nor nailing, however, can be of great use to either the notch or the scarf. Bond-timbers are passed along and through all openings, and are not cut out until such openings are to be permanently occupied, that is, windows with their sashframes, &c., because they assist in preventing irregular settlements, by helping to carry the weight of a heavy part along the substruction generally, instead of allowing it to press unduly upon the part immediately under it.

> Whatever notches and cogs for beams and joists are required in wall and tem-plates, should be made before they are set on or in a wall; for, as they are always bedded in mortar, anything that may break the set must be avoided.

> It is the duty of the carpenter to supply the bricklayer or mason with wood bricks in sufficient quantity, and to direct him where they should be placed to receive the joiner's fittings, or the battening, which the carpenter himself may have

to put up for the plasterer.

The framed quartering partitions which may be required should be set up in every story before the beams and joists of the floors are laid, that their horizontal timbers may be notched on to the wall-plates, and that the joists or binders may be notched on to them if occasion require it; but they should be fixed rather below than above the level of the wall-plates, because they are not liable to settle down so much as the walls, though even that will depend in a great Plate CL.

Building. degree on the nature of the walling, __ 's liability to ノ yield.

The carpenter makes and fixes or sets centres or an kinds, whether for single arches, or niches. The striking out of the centres, in the first instance, is necessarily contingent on the arches to be turned on them, for the forms of which the carpenter must look to the bricklayer or mason, whose instructions for describing arches will be found under the head STONE-MASONEY. Large centres are framed in distinct ribs, and are connected by horizontal ties; whilst small ones are made of mere boards cut to the required sweep, nailed together, and connected by battens notched into or nailed on their edges. Precision and stability are nevertheless equally and absolutely necessary, as it is impossible for an arch to be turned or set correctly on an incorrect or unstable centre. The timbers or frame-work of floors is called naked floor-

ing, and it is distinguished as single, double, and framed.

Of these the first, under ordinary circumstances, is the strongest. Single flooring (See No. 1 and 2, fig. 29) consists of one row or tier of joists alone, bearing from one wall or partition to another, without any intermediate support, receiving the flooring boards on the upper surface or edges of the joists, and the ceiling, if there be one, on the lower. Joists in single floors should never be less than two inches in thickness, because of their liability to be split by the brads or nails of the boards if they are thinner; and they should never be much more, because of the keying of the ceiling, which is injuriously affected by great thickness of the joists. Twelve inches from joist to joist is the distance generally allowed; that dimension, however, from centre to centre of the joists would be better. Strength to

almost any extent may be given by adding to the depth of the joists, and diminishing the distance between them; and

they may be made firm, and be prevented from buckling or

twisting, by putting struts between them. These struts are short pieces of batten, which should not be less than an inch, and need not be more than an inch and a half thick, and three or four inches wide,

placed diagonally between the joists, to which they are nailed, in a double series, or crossing, as indicated by the full and dotted lines in the diagram, fig. 26; and they should be made to range in a right line, that none of their effect may be lost; and these ranges or rows should be repeated at intervals not exceeding five or six feet. The struts should be cut at the ends with exactly the same inclination or bevel, to fit closely. Great care should be taken, too, not to split the struts in nailing; but the trouble of boring with a gimlet is saved by making a slight nick or incision with a wide-set saw for each nail, of which there should not be less than two at each end; and the nails used

should be clasp-nails. If the struts were notched into the joists, it would add very materially to their efficiency, but perhaps not in proportion to the additional labour it would involve. This strutting should be done to



single flooring under any circumstances, as it adds materially to its firmness, and indeed to its strength, by making the joists transmit any stress or pressure from one to another. The efficiency of single flooring is materially affected by the necessity which constantly occurs in practice of trimming round fire-places and flues, and across vacuities. Trimming is a mode of supporting the end of a joist by tenoning it into a piece of timber crossing it, and called a trimmer, instead of running it on or into the wall which supports the ends of the other joists generally. A trimmer requires for the most part to be carried or supported at one or both of its ends by some of the joists, which are called trimming joists, and are necessarily made stouter than if they had to bear no more than their own share of the stress. Commonly it is found enough to make the trimmers and

trimming joists from half an inch . n inch thicker than Building. common joists. In trimming, tusk tenons should be used; and the long tongue or main body of the tenon should run not less than two inches through, and be draw-pinned, and wedged, moreover, if it do not completely fill the mortise in the direction of the length of the latter. The principal objection, however, to single flooring is, that sound readily passes through, the attachment of the boards above and of the ceiling below being to the same joints throughout. Another objection, and one already referred to, is the necessity of making the joists so thin, not to injure the ceilings, that they with difficulty receive the flooring brads in their upper edges without splitting. A partial remedy for both these disadvantages is found in a mode sometimes adopted of making every third or fourth joist an inch or an inch and a half deeper than the intervening joists; and to these, ceiling joists are notched and nailed, or nailed alone, as shown in the diagram, fig. 26. This, by diminishing the number of points of contact between the upper and lower surface, for the ceiling joists must be carefully kept from touching the shallower joists of the floor, is less apt to convey sound from one story to another, and allows conveniently thin joists to be used for the ceiling without affecting those of the floor.

Double flooring (see sections No. 1 and 2, fig. 27, and plan No. 3, fig. 29) consists of three distinct series of joists, which are called binding, bridging, and ceiling joists. The binders in this are the real support of the floor; they run from wall to wall, and carry the bridging joists above and the ceiling joists below them. Binders need not be less and should not be much more than six feet apart, that is, if the bridging or flooring joists are not inordinately weak. The bridging joists form the upper tier, and are notched down on the binders with the notch shown at No. 5, fig. 21. The ceiling joists range under the binders, and are notched and nailed as shown at No. 1, fig. 27; but the notch must be taken entirely out of the ceiling joists, for the lower face or edge of the binder may not be wounded by any means or on any account, and moreover no good would be gained in any other respect by doing so. When it is an object to save height in the depth or thickness of this species of floor, the ceiling joists may be tenoned into the binders, instead of being nailed on to them; in this case the latter must be chase-mortised on one side, for the convenience of receiving the former when they are themselves set and fixed. A chase is a long wedge-formed groove of the breadth or thickness of the mortise, of which it is indeed an elonga-

tion, so that the tenon at one end of a ceiling joist being inserted in the regular mortise in the binder prepared for it, that



at the other end is driven along the chase up to its place in the mortise in the next binder. When ceiling joists are thus chase-mortised, their lower or under faces are allowed to come a little below the under face of the binders, and the space across is firred down by slips not wider than the ceiling joists are thick. No. 2, fig. 27, shows a transverse compartment, or bay, of a floor in this manner; but it is not so good a one as the preceding; for, besides weakening the binders, by cutting so many mortises and chases in them, it is almost impossible to give the ceiling floor the degree of firmness and consistency it possesses in the other way, besides requiring the firring down on the binders. The same space would be better gained by cutting the bridging joists so much lower down; as they may, with the sort of notch indicated above, be let down fully half their depth without great injury to either bridging joists or binder, for they can always be made to fit tightly or firmly, and very little more labour is involved in notching deeply than slightly.

Flooring is said to be framed when girders are used to-

Building, gether with binding, bridging, and ceiling joists. (See sec- the tendency the part or thing to be supported has in one Building. tions No. 1 and 2, fig. 28, and plan No. 4, fig. 29.) Girders are large beams, in one or more pieces, according to the length required, and the size and strength of which timber can be procured. They are intended for longer bearings than mere binders may be trusted at, and may be strengthened to almost any extent by trussing; but to be efficient, the height of the truss must always be greater than the depth of the beam itself, and the strength is increased by extending that height as the space or bearing increases. A truss is indeed a wooden arch, whose lateral thrust will of course be greater the smaller the angle subtended by it, and vice versa. It has been a commonly received opinion, that a truss within the depth of a girder adds materially to its strength; but experiments have proved that very little advantage is gained by such a one when executed in the best manner, and that, badly executed, the beam or girder is weaker with the truss than without it. Binders are made dependent on the girders by means of double tusk tenons, and on and to them the bridging and ceiling joists are attached in the manner before described. No. 1, fig. 28, shows the transverse section of a compartment or bay of a framed floor; No. 2 the same longitudinally of the girder, and of the bridging and ceiling joists, and transversely of the binders. No. 1, fig. 29, is the plan of a single floor of joists tailing in on wall-plates with two chains of struts, and trimmed to a fire-place. No. 2 is a floor similar to No. 1, with ceiling joists nailed to deeper flooring joists at intervals, as shown in fig. 26. No. 3 is the plan of a double floor; and No. 4 is that of a framed floor of joists, bays of which are shown in section at figs. 27 and 28. It is to be observed, however, with reference to the diagram No. 1, fig. 28, that binders ought not to be framed into the girders opposite to one another, as they are here shown to be as a matter of convenience, since the girder is unduly weakened by being mortised on both sides at the same place. Castiron shoes render mortising the one forming a tenon upon the other almost unnecessary; and in like manner cast-iron shoes laid into a wall upon stone tem-plates give a good and safe bearing to the girders; but it is not everywhere that cast-iron shoes are attainable, and mortises and tenons may be made anywhere.

Partitions of timber are called quartering partitions, and they are generally framed. Common quartering partitions which rest on a wall or floor, and have nothing to carry, consist merely of a sill, a head, and common uprights to receive the lath for plastering: these last may be simply joggled or tenoned into the head and sill, in the manner shown at c, fig. 23, and stiffened by struts or stretching pieces put between them and nailed. When, however, a quartering partition is over a vacuity, or rests only on certain points, and has, moreover, to sustain a weight, a floor perchance, it is framed and trussed with king or queen posts and trussing picces as to the tie beam of a roof; and the filling in of common uprights or quarters for the laths is generally performed by joggling them at one end into either head or sill, and nailing them securely to the trussing pieces. In the diagram No. 1, fig. 30, it is supposed that an opening or doorway is to be made in the partition, so that the timbers of the truss are placed around it with queen-posts, and a small internal truss is put over the door-head to prevent it from sagging, and to carry the long part of the partition, which we supposed required to bear a floor, so that the partition acts also, in fact, the part of a trussed girder in the most available form. No. 2 presents another method of framing a similar partition.

Shoring or propping up walls or floors, or it may be a whole building, is done by the carpenter. In appearance it is a simple operation, and under ordinary circumstances it really is so; but nevertheless it often demands the exercise

direction or another.

Pugging floors, firring down joists, and bracketing and cradling for plastering, and some other things, are operations performed indifferently by the carpenter or the joiner, as less or greater precision is required in the performance.

The labour of carpenter's work is valued by the square of one hundred superficial feet whenever it will admit of being so measured, and the timber is as generally valued by the cubic foot. It is customary for the carpenter's work to be measured at the same time with the walls and roof covering, or when the carcass of a building is completed, and before the joiner and plasterer commence their operations; for then the work is still exposed, and may be fully and correctly ascertained, whereas much must be taken on trust if the measurement be deferred until the works are completely finished.

Bond timber, wood bricks, and wall and tem-plates, are taken under the same head, and are reduced to cubic feet of timber at so much per foot, including the labour of every kind on it. The naked flooring is taken on the surface from wall to wall, with a description of the nature of it, whether it be single, double, or framed-if trimmed to chimneys, party walls, stairs, or anything else—if notched or cogged to wall-plates and partition heads—the number and size of the large timbers, ceiling joists as notched and nailed to wall-plates, and as framed or notched and nailed to binders or common joists; and everything indeed that affects the quantity of labour required in forming it. The superficial feet are reduced to squares for the labour and nails involved and used in forming and fixing or setting the floors. The timbers of which the flooring is composed are then taken in detail and in cubic quantities, and are said to be without labour, or with no labour. Roofing is measured in the same manner, by the superficial square, for labour and nails, taken on the common rafters from ridge to heel; the length of a rafter by the length of the roof for one side of a common span, and repeated or doubled for the other, noting also a description of the roof, whether it be lean-to or shed roofing, if on purlines and with struts; common span-roofing; curb roofing; span roofing with purlines and collar beams, strutted or otherwise, from walls or partitions; span roofing with framed principals, tie-beams, king-posts or queen-posts, straining beam, straining sill, struts, purlines, pole-plates, and so on or as the case may be, and this too for labour and nails. All the timbers are then taken, measuring every one to the extent of any tenon or tenons at its ends, in cubic quantities also, and as without labour. Bolts, bars, straps, stirrups, &c. are taken separately, and their dimensions noted from which to ascertain their weight. Gutter-boards and bearers are measured and valued by the foot superficial, according to thickness of the former. Rough boarding for lead on flats, and sound boarding for slates or lead, are taken superficially, and reduced into squares. Centring to vaults is measured on the periphery of the arch, or round back of the centre, for the breadth, by the length, and is valued by the square; to apertures in the thickness of walls, by the foot, and to camber-arches, by number, so much a piece. Quartering partitions are measured by the square for labour and nails, and the material is taken by the cubic foot. Battening to walls is also measured by the square, but the stuff is generally included with the labour, as in boarding. Cradling and bracketing is valued by the foot superficial, and with reference to the quantity of stuff required or worked up. Any planing that may have been necessary, and it will happen at times on beams, joists, &c. when it is not intended to have a ceiling under the floor, is charged by the foot on the surface, and any beading or other moulding by the foot

It sometimes happens that a superficial quantity for labour of considerable skill and tact to determine and to counteract and nails on framed timber cannot be obtained; in that case

Building. the timoer is measured by the cubic foot as framed, or with the labour of framing included with its own cost, &c. In this case, however, it is necessary to make a distinction between one quantity and another, as the labour employed upon an equal quantity of stuff in framing some parts of a roof is much greater than is required in most floors. Many things, such as strong door and window frames, that are to be worked into the walls, story-posts, brestsummers, &c. are always taken as framed timber, with any addition that may occur of wrought, rebated, beaded, &c., as the case may be.

> The price or value to be attached to the varieties of carpenter's work depends almost as much on the degree of hardness of the timber employed, as on its cost. What the timber itself should be charged at may be thus determined. To its price in the gross at the timber merchant's must be added the cost of carriage to the spot where it is to be employed, which will be so much the load of fifty cubic feet, or so much per foot; then to the cost of each cubic foot of timber add the price of four superficial feet of sawing, which will form a fair average for the variously sized scantlings, and one-eighth of the increased amount to it as an allowance for waste in cutting up and working. This gives the actual cost, to the builder, of the timber as it is worked up; and if it is to be charged as with no labour, his profit and remuneration for his own labour of superintending, &c., alone remain to be included. If, however, labour of any kind is to be charged with the stuff, it should be added first, and the builder's profit, &c., taken on both, or on the increased amount for the price per foot. The cost of labour depends so much upon such a variety of circumstances, that it is impossible to aid the inquirer materially in apportioning prices for the various operations. In this, as in other things, it is well, when the parties are not otherwise qualified to determine a scale of charges, to observe the time a man or a certain number of men are employed in executing so much work of a certain description, and compare the quantity by measurement with the time employed in executing it, or rather with the wages of the workmen for the time. In fixing a price for labour in carpenter's work, the size of the timbers, and the heights they have to be hoisted, together with such scaffolding and machinery for hoisting as may be found necessary, if the timbers be heavy, and the height and expense great, must be considered. As the timber used in shoring is not consumed, a charge is made for use and waste to the amount of one-third of its value if it be much cut up, and one-fourth if but little, in addition to the labour of setting up and taking down, whatever that may be.

> Joiner.—The principles of joinery also will be found in an article under that head in another part of this work; here we have merely to do with the modes of operation, and the tools employed by the workman, together with the manner of estimating or ascertaining the value of his work.

> The distinction between the operations of the carpenter and the joiner is shown at the beginning of the preceding section on the trade of the former. A man may be a good carpenter without being a joiner at all; but he cannot be a joiner without being competent, at least, to all the operations required in carpentry. It is, indeed, very truly remarked in the article Joinery, "that the rough labour of the carpenter renders him in some degree unfit to produce that accurate and neat work-manship which is expected from a modern joiner;" but it is no less true that the habit of neatness and the great precision of the joiner, make him a much slower and less profitable workman than the practised carpenter, in works of carpentry.

The joiner operates on battens, boards, and planks, with saws, planes, chisels, gouges, hatchet, adze, gimblets, and other boring instruments, which are aided and directed by chalked lines, gauges, squares, hammers, mallets, and a great many other less important tools: and his operations are principally sawing and planing in all their extensive varieties, setting out, mortising, dovetailing, &c. A great range of other operations, none of which can be called unimportant, such as paring,

gluing up, wedging, pinning, fixing, fitting, and hanging, and Building, many things besides which depend on nailing, &c., such as laying floors, boarding ceilings, wainscotting walls, bracketing, cradling, flering, and the like. In addition to the wood on which the joiner works, he requires also glue, nails, brads, screws, and hinges, and accessorily he applies bolts, locks, bars, and other fastenings, together with pulleys, lines, weights, white-lead, hold-fasts, wall-hooks, &c. &c.

Battens are narrow boards running from half an inch to an inch and a half or two inches thick, and from three to six or seven inches wide. A piece of stuff of too small a scantling to be a batten is called a fillet. The term board is applied to sawed stuff when its width exceeds that of a batten, and its thickness does not exceed two inches or two inches and a half. The term plank is applied to large pieces of stuff whose width is great in proportion to their thickness, and whose thickness nevertheless does not exceed three or four In London these terms are used in much more restricted senses than they are here described to mean, because of the fixed and regular sizes and forms in which stuff for the joiner's use is for the most part brought to market there. A batten, to a London joiner, is a fine flooring board from an inch to an inch and a half in thickness, and just seven inches wide. A board is a piece cut from the thickness of a deal whose width is exactly nine inches; and everything, almost above that width, and not large enough to be called a scantling of timber, is a plank.

The joiners' work for a house is for the most part prepared at the shop, where every convenience may be supposed to exist for doing everything in the best and readiest manner; so that little remains to be done when the carcass is ready, but fit, fix, and hang, that is, after the floors are laid. The sashes and frames, the shutters, back flaps, backs, backs and elbows, soffits, grounds, doors, &c., are all framed and put together, that is, wedged up and cleaned off, at the shop; the flooring boards are prepared, that is, faced, shot, and gauged with a fillister rebate; and all the architraves, pilasters, jamb linings, skirtings, mouldings, &c., are all got out, that is, tried up, re-

bated, and moulded, at the shop.

When the carcass of a building is ready for the joiner, the first thing to be done is to cut the bond timber out of the openings, set the sash frames, and fill them with old sashes or with oiled paper on frames, to exclude the weather, but admit light. The flooring joists are then proved with straight-edges, and any inequalities in them are removed with the adze; the flooring boards are next cut down to their places, and they are turned with their faces downwards until the ceilings are done; but first the pugging floors, if any are intended, are formed, and the pugged clay is put in on them. Floors are in ordinary cases either straight joint or folding, and are edge or face nailed. Folding floors are those in which three, four, or five boards are laid at a time, with their heading joints all on the same joist, and of course in the same straight line. In laying them, one board being firmly nailed to the joists at the extremity of the floor, another is laid parallel to it at the distance of the width of three or four others, or rather within their width, and these are then forced down and nailed, the forcing having brought all the joints up close. This is a bad mode, however, and should never been used. Straight joint flooring is when every board is laid separately, or one at a time, the heading joint or joints being broken or covered regularly in every case. Straight joint flooring may be with square joints, when it is entirely face nailed, or it may be dowelled or tongued, when it is side or edge nailed only. Dowelling is the driving pins of wood or iron half their length, into the edge of the last laid board, the outer edge of which has been skew-nailed, their other ends running into holes prepared for them in the inner edge of the next board, in the way the head of a cask is held together, and then its outer edge is skew-nailed in the same manner, and so on. Tongueing is effected by grooving both edges of every board, and fitting thin slips and tongues into them, as described in the article Joinery. The boards are forced together by pressure applied to the outer edge. The nail used in face-nailing floors is called a flooring brad; it has no head, but a mere tongue projecting on one side of the top of the nail, which is put in the direction of the grain, that it may admit of being punched in below the surface level, otherwise the superficial inequalities could not be reduced when the floor was completed, because of the proBuilding. jecting heads of the nails. For side or edge nailing, however, clasp-nails, nails whose heads extend across on two of the opposite sides, are used.

Another early operation the joiner has to attend to, is the fixing of the framed door and window and the narrow skirting Plate CXI. grounds (see fig. 35) to which the plasterers may float their work. The skirting grounds are generally dovetailed at the angles, and are well blocked out, so that they may not vibrate on being struck, or yield to pressure when the plasterer's straight-edge passes roughly over their surface; they must also be set with the utmost truth and precision. When the floors are cut down and the grounds fixed, the joiner's operations in a building should be suspended until the plasterers have finished, or nearly so, and then the floors may be laid. By deferring this operation until that period, the workmen of the two different trades are prevented from interrupting each other, and indeed injuring each other's work; and joiners always find employment in the shop preparing, as before intimated.

The preparation flooring boards receive, is planing on the face, shooting on the edges, and gauging to a thickness; the common fillister, or stop rebate plane, being used to work down to the gauge mark, from the back of every board, and about half an inch in on each edge. When a board is to be laid, it is turned on its face in the place it is to occupy, and the workman with his adze cuts away from the back over every joist down to the gauge rebate, so that on being turned over it falls exactly into its place, and takes the same level with all its fellows, which have been brought to the same gauge; then follows the process of laying as before described, and the result must, if the work be done well, be a perfectly even and level surface. The slight inequalities of surface which may occur are reduced with a smoothing-plane, the brads being previously punched below the surface if the floor be face-nailed. See the article Joinery, sections 35 and 36.

In getting out skirtings, if the work be of a superior description, the boards should be tried up as if for framing in every particular except bringing to a width, which need not be done. The face edges, however, must be worked with great precision, and moulded or rebated as the case may require. Rebating or tongueing will be necessary when the skirting consists of more than one piece, that the different pieces may be made to fit neatly and firmly together; and all but the lowest piece must of necessity be brought to a width, as well as tried up in other particulars. A skirting in a single width is called by that term; but when it is made up of more than one part it is designated a base: the lowest board is then called the skirting board, and the upper the base moulding or mouldings. (Figs. 31 and 35.) The reason why the skirting board is not brought to a width is, that the labour would be lost according to the ordinary mode of fixing it. The board is applied to its place with its lower edge touching the floor; but as the most perfectly wrought floors are found to have some slight unevenness of surface so close to the wall, a straight edge would not fit closely down to it in every part. The board is therefore propped up at one end or the other until the upper or faced edge is perfectly parallel with the average line of the floor, or rather to be perfectly level. A pair of strong compasses, such as those used by the carpenter, is taken, and opened to the greatest distance the lower edge of the skirting board is from the floor throughout its length; the outer edge, near the point of one leg of the compasses, is then drawn along the floor, whilst the point of the other, being kept vertically above it, is pressed against the face of the board, on which it marks a line exactly parallel to the surface of the floor, indicating, of course, every, even the slightest irregularity there may be in it. If the floor be not a very uneven one, the excluded part may be ripped off with the hand or the panel saw, which may generally be made to follow the traced or inscribed line exactly; if, however, the line be a very irregular one, having quick turns in it, the hatchet must be used. This operation is called *scribing*, and the result of it is evidently to make the skirting fit down on the floor with the utmost precision. Care must be taken, in performing the operation, that the upper edges of the skirtings be not only level, but that all which are in immediate connection be scribed to the same height, that their upper edges may exactly correspond. Sometimes skirtings are let into a groove in the floor, as indicated in the diagram, fig. 35, and thus a slight degree

of shrinking is made of less importance, and scribing rendered Building. unnecessary. Before skirtings are fixed, vertical blocks are put at short intervals, extending from the floor to the narrow grounds, and made exactly flush with and true to the latter, and are firmly nailed. These form a sound backing, to which the skirtings may be bradded or nailed; and so prevent them from warping or bending in any manner. If, however, the skirting be not very wide, and be sufficiently stout to stand without a backing, a fillet only is nailed along the floor as a stop for its lower edge; but this is rendered unnecessary if the skirting be tongued into the floor, as the tongue will answer every purpose of a stop. The ends of skirtings should be tongued into each other when it is necessary to piece them in length; and on returns or angles the end of one should be tongued into the returned face of the other in the square parts, and mitred in the oblique-angled or moulded

When a chair-rail or surbase is required, grounds similar to those for the base are fixed to range like them with the face of the plastering; the surbase itself must be wide enough to cover the grounds and the joints formed by them and the plastering, completely; it is in effect a cornice to the stereobate and the space intervening it and the base is generally understood to be wainscotted, though it is more frequently plastered.

In framing or framed work, the outer vertical bars which are mortised are called styles; and the transverse, those on whose ends the tenons are formed, are called rails. (Fig. 32.) In doors, particularly, the open spaces or squares formed internally by the rails and styles are divided in the width by bars parallel to the styles. These are tenoned into the rails, and are called mountings, or, vulgarly, muntins. The frame being formed by trying up, setting up, mortising, and tenoning, the inner or face edges of the styles, and of the highest and lowest rails, and both edges of the muntins and of the inner rails, are grooved with the plough to receive the edges and ends of the filling-in parts, or panels of the frame-work. Panels are either flat, raised, or flush. (Fig. 33.) Flat panels are no thicker than the grooves into which they are fitted, and consequently their faces are as much below the surface of the framing as the groove is in from each side of the styles and rails. Raised panels are thicker than the groove in the framing, but are not so thick as to reach the surface; nor is the panel thickened through its whole extent. It fits exactly into the groove, and thickens gradually for an inch or two, and then sets off at a right angle with the surface, increasing suddenly three or four sixteenths of an inch. A panel may be raised on one side only, or on both sides. Flush panels are rebated down from one face to the distance the plough groove is in from the surface of the framing; and the back of a panel thus rebated on one side is worked down to be even with the other edge of the groove. leaving a tongue to fit it exactly; for if it be required to make panels flush on both sides, it is generally effected by filling in on the back or flattened side with an extraneous piece. Framing is not, however, often finished in the manner above described, especially with raised and flush panels; mouldings are generally introduced, and are either struck or worked in the solid substance of the framing, or in separate pieces or slips, and laid in with brads. If a moulding be struck or laid in on one side only, and the other is left plain, the framing is described as moulded and square, a flat panel being in that case understood; if the panel be raised the framing will be described as moulded with a raised panel on one side, and square or flush on the other. It may be moulded with a flat panel, or moulded with a raised panel, on both sides; and the moulding may, as before intimated, be either struck in the solid, or laid in any of the preceding cases. Mouldings which are laid in round the panels of framing are neatly mitred at the angles, and bradded, to appear as much as possible as if they were struck in the solid. In nailing or bradding the mouldings, the brads should be driven into the frame-work, and not into the panels. With a flush panel, however, the moulding is always either a bead, or a series of beads called reeds: and is, in the case of a single bead, which is most common, always struck on the solid frame, and the work is called bead-flush; but reeds are generally struck on the panel in the direction of the grain, and laid in on the panel across it, or along the ends; this is termed reed-flush. Flush panels in inferior works have a single bead struck on their

Building. sides in the direction of the grain alone, the ends abutting plainly, as in the first diagram of a flush panel, and this is termed bead-butt, the fact that the panels are flush being in-The plainest quality of framing, in which it is square on both sides, is used in the fittings of inferior bed-rooms, inner closets, and the plainer domestic offices, but always internally; framing moulded on one or both sides, in rooms and places of a greater degree of importance, and in places where the work may be more generally seen; in some cases a flat panel may be enriched by a small moulding laid on its surface, leaving a margin between it and the larger moulding at its extremities; this may be done in drawing-rooms and apartments of that class, especially if they be in an upper story; and raised panels should be confined to the framed fittings of dining-rooms and other apartments on a ground or principal story. Framing with flush panels is almost restricted to external doors, &c., one side of a door being bead-flush, and the other flat and moulded, perhaps, or the face may be moulded with a raised panel, and the back-bead flush; and this for principal entrances. Bead-butt framing is found in external doors to offices, &c. Doors are made four-panelled for the most part when the panels are flat and the framing square, six-panelled when the latter is moulded. and six, eight, or even ten panelled when the framing is of the superior descriptions. Doors which are hung in two equal widths to occupy the doorway, and are hung to the opposite side posts or jambs of the frame, are said to be double-margined; that is, the styles or margins are repeated necessarily in the middle where they meet. Doorways are fitted with jamb linings, and architraves or pilasters. Jamb linings may be framed to correspond with the door on the outer faces; and when they exceed nine or ten inches in width they should always be so, or they may be solid. Narrow and plain jamb linings to inferior rooms are rebated on one side only, and the rebate forms the frame into which the door is fitted. To superior work they are rebated on both sides, as if it were intended to put a door on each side. The jambs are fixed to the inner edges of the grounds; and if they are wide, and not framed, backings are put across to stiffen them; and these backings are dovetailed into the edges of the grounds. Architraves and pilasters are variously sunk and moulded, according to the fancy of the designer. They are fixed to the grounds with their internal edges exactly fitting to the rebates in the jambs, and they form the enriched margin or moulding of the frame in which the door is set. Architraves are mitred at the upper angle, but pilasters have generally a console or an enriched block or cap resting on them, to which they fit with a square joint; both the one and the other either run down and are scribed to the floor, or rest on squared blocks or bases, which may be the height of the skirting board, or of the whole base.

The parts of the outside frame of a sash are distinguished by the terms applied to the similar parts of common framing. The upright sides are styles, and the transverse or horizontal ones, which are tenoned into the ends of the styles, are rails; but the inner frame-work or divisions for the panes are called merely upright and cross bars; the upright being the mortised, and the cross bars the tenoned, nevertheless, as with the outer frame-work. (Fig. 31.) Sashes are got out like common framing; the parts are tried up, set out, mortised and tenoned, exactly in the same manner, allowance being made in the length of the rails and all tenoned pieces, in the setting out, as in common framing also, for the portions of the mortised styles and upright bars, which are worked away in forming the moulding and rebate. The meeting rails of sashes which are in pairs, to be hung with lines, are made thicker than the other parts by the thickness of the parting bead, and they are bevelled or splayed off, the one from above and the other from below, that they may meet and fit closely. When the framework is completed, although it cannot be put together because of what has just been referred to, the rebate is formed by the sash fillister on the further part of the face edge, and the moulding struck on its hither angle. These things being done, the moulded edges are either mitred or scribed at the shoulders and haunches, and the sash may be put together. If sash bars are mitred at the joints, they require dowels in the cross bars to act as tenons; but if they can be scribed, dowelling is not necessary. Sashes are either hung upon hinges or hung with lines, pulleys, and weights. Fixed sashes are put into frames, of which every part may be solid but the stop, which must be

put in behind the sash to detain it. Sashes hung with hinges Building. require solid rebated frames; but there can be no stops to them except their own moveable fastenings, and the outer stop, which of course the rebate furnishes. Sashes hung with lines require cased frames to receive the pulleys and weights. The sill of the frame is made, as in the former cases, solid, is sunk and weathered, and is generally made of a more durable material than the rest of the frame; the sides in the direction of the thickness of the frame are of one and a quarter or one and a half inch board, very truly tried up, and grooved to receive a parting bead; for it must be obvious that sashes hung with lines to run vertically up and down within the height of the frame must be themselves in two heights, and must pass each other in two separate and distinct channels. The ends of these boards are fixed into the upper face of the solid sill below, and into a similar board parallel to the sill which forms a head above; and they are called pulley pieces, or styles, because they receive the pulleys, which are let into them near their upper ends. Linings from four to six inches in width, and from three-fourths of an inch to an inch in thickness, are nailed on to the edges of the pulley pieces, and to the sill and head above and below, inside and outside in the direction of the breadth of the sash frame, and are returned along the head in the direction of its length. The outside linings are made to extend within the pulley pieces about half an inch, to form a stop for the upper and outer sash; and the inside linings are made exactly flush with their inner faces. The casing is completed by fixing thin linings on to the outer edges of the outside and inside linings, parallel to the pulley pieces, to prevent any thing from impeding the weights. Thin slips called parting beads are fitted tightly into the grooves previously noticed in the pulley pieces, but they are not fixed, as the upper sash can be put in or taken out only by the temporary removal of the parting bead. An inner or stop bead is mitred round on the inside to complete the groove or channel for the lower sash; the stop bead covers the edge of the inside linings on the sides and head, and is fixed by means of screws, which may be removed without violence when it is required to put in or take out the sashes. A hole covered with a moveable piece, large enough to allow the lead or iron weight to pass in and out, is made in each of the pulley pieces, so that the sashes may be hung after the frames are set, and to repair any accident that may occur to the hangings in after-use. (Fig. 34.) It may be here remarked, that sash-frames require greater truth and precision from the workman than anything else in the joiners' work of a building; and unless the stuff employed be quite sound and perfectly seasoned, all the workman's care in operating will be thrown away. The fittings of a window which has boxed shutters consist of back linings, grounds, back, elbows and soffit, together with shutters and back flaps, and architraves or pilasters round on the inside to form a moulded frame. (Figs. 31 and 34.) Backlinings are generally framed with flush panels; they fit in between the inside lining of the sash frame and the framed ground, to both of which they are attached, and form the back of the boxing into which the shutters fall back. They are tongued into the inside lining by their inner edge, and on their outer edge the ground is nailed, and they are set at right angles to the sash-frame, or obtusely outwards, as the shutters may be splayed or not. The back is the continuation of the window fittings from the sash-sill to the floor on the inside; the elbows are its returns on either side under the shutters, and the soffit is the piece of framing which extends from one side of the window to the other, across the head, or from back lining to back lining. These are all framed to correspond with the shutters on the face; but, as they are fixed, their backs are left unwrought. Window shutters are framed in correspondence with the door and other framed work of the room to which they belong, in front, and generally with a flush panel behind: the back flaps are in one or two separate breadths to each shutter, according to the width of the window and the depth of the recess; they are made lighter than the shutters themselves; and they should, when shut to, present faces exactly corresponding with those of the shutters, both internally and externally. The shutters are hung to the sash-frame with butt hinges, and the back flaps are hung to their outer styles with a hinge called a back-flap, from its use. The shutters and their back flaps are hung in one, two, or more heights, as may be found convenient. moulded margin round the boxings of a window on the inner

Building. face are made to harmonize generally with the similar parts of the doors of the room or place to which it belongs. The fixing and hanging of window fittings or dressings are hardly less important, for the accuracy required, than the making and fixing of the sash-frame itself; the slightest infirmity or inaccuracy in any part will be likely to derange some essential operation. Sashes, it may be remarked, are never fitted until the frames are immoveably fixed, so that if there be any inaccuracy in the latter, the sashes are cut away or pieced out to make them fit; but, as they are intended to traverse, the fitting in that case can only apply to one particular position, and in every one but that there must be something wrong. Any incorrectness in the sash-frame, again, must throw the shutters and their back flaps out; indeed the sash-frame, though apparently a secondary part of the arrangement, is that which affects all the rest beyond anything else. When sashes have been fitted, a plough groove, wide and deep enough to receive the sash-line, is made in the outer edges of the styles, for about two-thirds of their length, at their upper ends. They are then primed and glazed, and when the putty is sufficiently set the joiner hangs them. He is furnished with sash-line, tacks, and iron or lead weights, which are generally made cylindrical, with a ring at one end, to which the line may be attached. A sash is weighed, and two weights are selected which together amount to within a few ounces of a counterpoise. The line is then passed through the pulley, which was previously fixed in the pulley style; the end is knotted to a weight which is passed in at the hole left for the purpose, and at a sufficient distance, which a common degree of intelligence will readily determine; the line is cut off and the end tacked into the groove in the style of the sash.

Glue is used principally in putting framed work together, but not at all in fixing; and even for the former purpose it is much less used by good workmen than by bungling hands. When the stuff is well seasoned, and the trying up, setting out, mortising, and tenoning, are well and accurately executed, there is no necessity for glue on the tenons and shoulders; the wedges alone need be glued, to attach them to the sides of the tenons, that their effect may not depend on mere compression. Joiners are generally furnished with a cramp, with which to force the joints of framing into close contact; it is either of wood acting by means of wedges, or of iron with a screw. too, is unnecessary with good work, every joint of which may be brought perfectly close without great violence of any kind. The cramp will sometimes give bad work the semblance of good, but it cannot make it really so. If any cracking and starting be heard in the joiner's work of a new building, it generally indicates one of two things; either the cramp has been required in putting the framing together, or, having been put together, it has been forced out of winding in fixing, and the constrained fibres are seeking to regain their natural position. A good workman does not require a cramp, nor will his work, if he has been supplied with seasoned stuff, ever require to be strained; and consequently the cracking and starting of joiner's work indicates unfit stuff or bad work, or perhaps both. It is true that glued joints will sometimes fly; but when they do, there need be no hesitation in determining the presence of both bad work, and stuff in an improper state.

Floors are measured and valued by the square of a hundred superficial feet; but anything beyond the mere flooring, such as the mitred borders generally put as a margin to the stone slab of a fire-place, is taken extra by the foot superficial, or running, as the additional work may be above or below three inches in width. The first important thing to note in measuring a floor is the thickness of the boards, by which to determine the cost of the principal material. A floor of boards unplaned on the face, and shot on the edges, laid folding, is the roughest that can be supposed; with the boards wrought or planed on the face, and laid in the same manner, will be the next in advance; and straight-joint flooring, in all its varieties, is the most troublesome, and consequently the most expensive in common and general use. Whether the boards be wide or narrow is a consideration to be noted, an equal surface being of course more rapidly covered with wide than with narrow boards; whether they be gauged, and if brought to a thickness throughout, or only rebate gauged, and cut down on the joints with the adze; in what manner the heading joints are formed and secured; how the longitudinal joints are executed, whether square, ploughed and tongued, or dowelled;

and whether the boards are face or edge nailed. Solid frames, Building as for outside doors, &c., are measured and valued by the cubic foot, labour being calculated upon the stuff according to the nature and extent of what may have been applied to it.

With trifling and unimportant exceptions, everything else in joiners' work that exceeds three inches in width is taken by the superficial foot; and the dimensions are taken on the finished and fixed work, so that allowances must be made for whatever waste may have been of necessity made. The stuff worked up by the joiner is always supposed to have been in planks and boards a certain number of quarters of an inch in thickness, so that whatever the finished work may stand, it is taken as of the thickness which in quarters of an inch it is next below; thus, if the styles of a door stand at even less than an inch and seven-eighths, it is taken as a two-inch door; for a piece of framing is always considered to be of the thickness of its outer frame-work, the description determining the substance of the panels. Framed grounds are measured round on the outside for the length; their width is not that of the frame, but of the styles and head as they actually are; and their thickness that of the stuff before it was planed at all. Narrow grounds are taken by the foot running, their width being noted in the description of them. Jamb linings are measured to the full length they may be of by their width, the thickness being noted, together with a description of the work on them,-if they are single or double rebated, if framed, and in what manner, &c.

The dimensions of a door are generally taken within the rebates in which it is to hang, with its thickness and description noted,-as of four, six, or eight panels, moulded on one or both sides, with flat or raised panels, &c.; if it be doublemargined, that is stated, and the amount of the lap or rebate in their meeting styles is added to the width, to increase the superficies by so much. The hinges with which a door is hung, and the lock or other fastenings which may be on it, are taken, with a description of their sizes and qualities, immediately after the door itself. If sashes are in a solid frame they are taken alone, but sashes in cased frames are measured in and with the frames. To the clear height between the sill and the head, three inches are added for the thickness of the sill, and four inches for the depth of the case at the head, for the height; and to the width between the pulley-styles is added eight, nine, or ten inches, as the case may be, for the breadth of the casing on each side, for the width; these give the superficies of the sashes and frame. The sashes and frame are described, with the thickness of the former, which determines that of the latter; the sill is described as sunk or merely weathered; the pulley-styles as of such a thickness; the pulleys, line, and stuff employed in the different parts of the frame, as of such and such qualities and sorts; and whether the sashes be single or double hung, with what fastenings, &c. The boxings for the shutters are taken in a superficial quantity, as square or splayed, if circular on plan, whether with a flat or quick sweep, or if circular-headed, and straight on plan. The back linings, the backs, elbows, and soffits, the shutters and the back flaps, are all measured by the superficial foot, according to their thicknesses and descriptions, the hinges and fastenings of the shutters and back flaps being numbered and noted independently of them. The capping to backs is taken by the running foot; and elbow cappings are numbered. Moulded architraves are taken superficially, the length by their girt, or by the run at such a girt. Skirtings are measured superficially at such a thickness, as scribed or tongued, as square or moulded, or rebated for base moulding, as the case may be. Base and surbase, and indeed all other moulding which girds at four inches and above, should be taken superficially; and mouldings which are of less girt may be taken by the run if they be taken independently of the other work, or that to which they belong, at all. A moulding projecting from the face of the work to which it belongs may be assumed as independent of it; whereas a receding one, if it be small, will merely add the character of moulded to the work, and if large will qualify all in immediate connection with it to be taken as a superficial quantity of moulding. All circular work, or work which diverges from a straight line, is noted and charged proportionally to the additional labour and waste of stuff involved; the shorter the radius of the arc, or quicker the sweep, the higher must be the proportioned charge. Things which have been bent to their flected form are less costly in proportion than

Stairs are measured by the superficial foot, the length of one step being taken by the breadth of a step and riser, increased by once the thickness of the former for a quantity, and this multiplied by the number of steps there may be of the same kind; that is, when the steps are flyers; for in winding steps the treads and risers are taken in separate dimensions, for greater accuracy. The thicknesses of the steps and risers are noted, as well as the mode in which they are worked; they have either rounded or moulded nosings, are housed into the string, or have returned nosings, the riser being mitred to the string or to cut brackets on the ends of the steps. Curtail ends to steps are numbered. The frame-work or bearers on which the stairs rest is included with the stairs themselves. Stringboards are taken according to their thickness and the quantity of work on them; the grooves or housings in them are numbered. The capping on a close string is taken by the run; but when the nosings of the steps are returned, the strings are said to be cut; and if there are any cut and mitred blocks, they are numbered. Stair skirting is taken as raking and scribed, and as straight, circular, ramped, or wreathed, by the foot superficial; wooden balusters are taken by the run, and the mortises or dovetails in which they are set are numbered; newels are taken by the run for the stuff and the fixing, and the turnings on them are numbered. Hand-rails are said to be merely rounded, or moulded; they are measured by the running foot; and a distinction is kept up between the straight, the circular, the ramps, the wreaths, and the scroll; nuts and screws in their joints are numbered.

All sorts of framing, whether it be fixed or hung-all linings above three inches in width—all sorts of ledged work, such as plain doors and shutters, partitions in lofts and stables, bracketing, cradling, &c.—must be measured superficially. All narrow linings, very narrow skirtings, staff beads, fillets, water trunks and spouts, legs, rails, and runners to dressers, groovings, flutings, reedings, cappings, &c., and any work on superficial quantities that does not pervade the whole, but is in itself peculiar, should be taken lineally, or by the running foot. Insulated parts, such as short, interrupted grooves, blocks, pateras, brackets, trusses, cantilevers, holes, mortises for articles taken lineally, mitres to cornices, heads and feet to flutes and reeds, &c., are numbered and charged at so much a piece. Ironmongery goods employed by the joiner are numbered under their different heads, and charged as fixed; that is, to the price of a lock is added a charge for the labour employed in fitting and fixing it, and whatever accessories it may have required which are not included in its own cost, such as screws, &c., to a rim or dead lock. To the price of hinges, however, only the cost of screws should be added, as the fixing of them is usually included in hanging the work to which they are attached.

The cost at which joiners' work can be executed can only be determined by calculation and observation. The cost of the materials employed may be readily determined by dissecting a piece of work and reckoning its contents; but the labour depends on so many contingencies, that very accurate observa-tion indeed is necessary to determine the quantity that may have been required to produce a certain result. In carpenters' work, the material forms the principal part of the charge; but in joiners' work the materials are for the most part of far less importance than the labour which has been expended on them. The stuff employed in a sash must be costly indeed to amount to as much as the labour of making the sash; whereas, in most doors, under ordinary circumstances, the materials may cost as much as the labour.

Sawyer.—The labour of the sawyer is applied to the division of large pieces of timber or logs into forms and sizes to suit the purposes of the carpenter and joiner. His working place is called a saw-pit, and his almost only important tool a pit-saw. A cross-cut saw, axes, dogs, files, compasses, lines, lamp-black, black-lead, chalk, and a rule, are all accessories which may be considered necessary to him.

Unlike most other artificers, the sawyer can do absolutely nothing alone: sawyers are therefore always in pairs; one of the two stands on the work, and the other in the pit under it. The log or baulk of timber being carefully and firmly fixed on the pit, and lined for the cuts which are to be made in it, the top-man standing on it, and the pit-man below or off from its end, a cut is commenced, the former holding the saw with his

Building. those which must have been worked in the solid or glued up in thicknesses.

Stairs are measured by the superficial foot, the length of one

Stairs are measured by the superficial foot, the length of one winding with the line to be cut upon, and that of the pit-man to cut down in a truly vertical line. The saw being correctly to cut down in a truly vertical line. The saw being correctly entered, very little more is required than steadiness of hand and eye in keeping it correctly on throughout the whole length. It is the custom to project so much of the log over the first transverse bearer as can be done without rendering it liable to vibrate or be insecure; and when all the cuts proposed are advanced up to that bearer, the end is slightly raised to allow the bearer to be passed out beyond the termination of the advanced cuts. The advantage of, or rather the necessity for, the moveable handle at the lower end of the saw is now evident, the top-man removing the saw readily from cut to cut from above, his mate having merely to strike the wedge in the box one way or the other, to fix or loosen it.

It is absolutely necessary that the top-man should stand in such a manner on the log or piece operated on, that a line down the centre of his body should fall exactly upon the line of the cut he is to work on, and be as exactly perpendicular to it and to the plane of the horizon. He must, therefore, when the cut is near the outer edge, be provided with a board or plank, one end of which may rest on something firm at a short distance from the log, and the other on or against it, to put the outer foot on, and so keep himself in such a position that he may always, and without constraint, see his saw out of winding, and so that a spectator standing on the fore-end of the pit may see the saw an imaginary line passing down the centre of the work-man's body, and the line of the cut in exactly the same vertical plane. The labour of the top-sawyer should consist solely in lifting the saw up by the handle as high as his arms can carry it, and that of the pit-man in drawing it down with a slight pressure or tendency onward, sufficient to make it bite into the timber as much as his strength will enable him to make it out away. The only assistance the pit-man should give in lifting the saw, is in holding it back that the teeth may not drag against the cut in the ascent; and all the top-man should do in cutting downward is to keep the teeth steadily and firmly in contact with the part to be eroded. Good workmen may work with a narrower or closer set to their saw than bad ones can, though the wider or more open set saw is more liable to make bad work. It works more slowly and consumes more stuff than the close set; but it is not so likely to hang in the cut with unnecessary pushing up of the pit-man and jerking down of the other, as if it were set more closely. A good top-man, nevertheless, is of much more importance, though he be badly mated, than the converse. Indeed the best possible pit-man could not work satisfactorily with a bad top-man, and therefore the latter is always considered the superior workman, and on him devolves the care of sharpening and setting the saw, &c. In the operations of the carpenter and joiner much depends on the manner in which the sawyers have performed their part. The best work on the part of the carpenter cannot retrieve the radical defects in his materials from bad sawing; and although the joiner need not allow his work to suffer, bad sawing causes him great loss of stuff and immense additional and otherwise unnecessary labour. Planks or boards, and scantlings, on coming from the saw-pit, should be as straight and true in every particular, except mere smoothness of surface, as if they had been tried upon the joiner's bench; and good workmen actually produce them so. Saw-mills, too, by the truth and beauty with which they operate, show the sawyer what may be effected; for though he can hardly hope to equal their effect, he may seek to approach it.

Sawyers' work is valued at so much the hundred superficial feet; the sawing on a board or squared scantling being once its length, by a side and an edge, or half the amount of its four sides. In squared timber, however, it is generally valued at so much per load of fifty cubic feet, four cuts to the load, any cuts exceeding that number being paid for at so much per hundred feet; in this case the length of the cut by its depth rives the superficial quantity of sawing in it. Pieces again of determined and equal length and breadth, such as the deals and planks commonly used for joiners' work in this country, admitting of a regulated scale, the sawing that may be required in them is valued at so much the dozen cuts.

Modeller.—The modeller copies, in a solid material, the drawings of designs which may have been prepared for enrichments, in whatever material they are to be cast, whether in

Building. plaster, in metals, or in composition of any kind, for the plasterer, smith. or decorator. The model is made in a finely tempered and plastic clay, or in wax; and the modeller works with his fingers, assisted by a few ivory or bone tools for finishing off neatly and sharply, and for working in parts which he cannot reach with his fingers. He is generally the best workman who can do most towards producing the required forms with his fingers unassisted by artificial tools, as a greater degree of ease and freedom almost always results from the use of the hands alone. The model being completed, it is moulded, that is, moulds are made fitting it exactly in every part, and fitting exactly to each other at the edges, and in these, casts are made to any extent that may be required.

The modeller having some pretensions to be considered an artist rather than a mere artificer, is for the most part paid according to his merits as such, rather than for so much time, according to the ordinary mode of determining the value of

artificers' works.

Carver and Gilder .- The carver is strictly an independent artist, whose business it is to cut ornaments and enrichments in solid and durable material, such as wood and stone, so that, like the modeller, he must be paid according to the taste and power he may exhibit in his works, rather than as a common artificer. Carving has, however, been in a great measure superseded by modelling and casting, so that the carver is hardly known in economic building except in connection with the gilder. Gilding may indeed be applied to castings as well as to carvings; but the former being, almost as a matter of course, less sharp and spirited in their flexures and details, as well as less firm in substance than the latter, castings can less bear to be further subdued by the application of foreign matters to their surfaces than carvings may.

Gilding is the application of gold leaf to surfaces, which require, however, to be previously prepared for its reception. The work is first primed with a solution of boiled linseed oil and carbonate of lead, and then covered with a fine glutinous composition called gold size, on which, when it is nearly dry, the gold leaf is laid in narrow slips with a fine brush, and pressed down with a piece of cotton wool held in the fingers. As the slips must be made to overlap each other slightly, to insure the complete covering of the whole surface, the loose edges will remain unattached; these are readily struck off with a large sable or camel-hair brush, fitted for the purpose; and the joints, if the work be dexterously executed, will be invisible. This is called oil gilding, and it is by far the best fitted for the enrichment of surfaces in architecture, because it is durable, and is easily cleaned, and does not destroy or derange the forms under it so much as burnished gilding does. This latter requires the work to be covered with various laminæ of gluten, plaster, and bole, which last is mixed with gold size, to procure the adhesion of the leaf. The most durable mode of gilding metals in common use is by amalgamation.

The surfaces generally operated on by the gilder are so diverse, that the real value of his work can be determined satisfactorily only by taking his time and the materials employed

and consumed in executing a piece of work.

Plumber.—Lead, as the name imports, is the material in and with which the plumber operates. The previous preparation, casting and milling of lead into sheets, pipes, &c., and the composition and uses of solder, will be found described under the head Plumbery.

The principal operations of the plumber are directed to the covering of roofs and flats, laying gutters, covering hips, ridges, and valleys, fixing water trunks, making cisterns and reservoirs, and laying on the requisite pipes and cocks to them, fixing water-closet apparatus, setting up pumps, and applying indeed all the hydraulic machinery required in economic building. His tools are knives, chisels, and gouges for cutting and trimming, rasps or files and planes for fitting and jointing, a dressing and flatting tool for the purposes its name expresses, iron hammers and wooden mallets for driving and fixing, ladles in which to melt solder, grozing irons to assist in soldering, a hand-grate or stove which may be conveniently moved from place to place, for melting solder and heating the grozing irons, a stock and bits for boring holes, and a rule, compasses, lines and chalk for setting out and marking, together with weighing apparatus, as the quantities of most of the materials used by the plumber must be either proved or determined by weight. A plumber is always attended by a labourer, who does the more

laborious work of carrying the materials from place to place, Building. helps to move them when they are under operation, melts the solder and heats the grozing irons, attends to hold the one or the other, as neither may be set down or put out of hand when in use, and assists in some of the minor and coarser operations. In boarding roofs, flats, and gutters for lead, clasp-nails or flooring brads should be used; and the first care of the plumber should be to punch them all in from an eighth to a quarter of an inch below the surface, and stop the holes carefully and completely with putty, or a chemical process will ensue on the slightest access of moisture if the iron heads of the nails come in contact with the lead, and the latter will, in the course of no long period, be completely perforated over every one of them. Neither should lead in surfaces of any extent be soldered, or in any manner fastened at the edges, without being turned up so as to make sufficient allowance for the expansion and contraction which it is constantly undergoing during the various changes in the temperature of the atmosphere. It may be taken, indeed, as a general rule, that solder should be dispensed with as much as possible. Like glue to the joiner, it is indispensable in many cases; but like glue also, it is in common practice made to cover many defects, and much bad work, that ought not to exist.

Sheet lead, whether cast or milled, is supplied of various weight or thickness; and it is always described as of such a weight in pounds to the superficial foot. This varies from four to ten or twelve, so that the weight to the foot being ascertained, the whole weight of any quantity of the same thickness may be determined by admeasurement. There are very few purposes, indeed, in building, in which lead of less than six pounds to the foot should be used, and very few in which the weight need to exceed ten. For roofs, flats, and gutters, under ordinary circumstances, eight pounds lead is a very fair and sufficient average; for hips and ridges, lead of six pounds to the foot is thick enough; and for flashings five-pound lead need not be objected to. Cast lead has been preferred for the former purposes, because its surface is harder, but milled lead is of more even thickness throughout, it bends without cracking, which is not always the case with cast lead, and it makes neater work. Sheets of cast lead run from sixteen to eighteen feet long and six feet wide; milled sheets are made of about the same width, and six or eight feet longer than cast sheets. Neither the one nor the other may be safely used on flats, or in gutters exposed to the wide range of temperature of our climate, in pieces of more than half the length and half the breadth of a sheet; that is to say, from eight to twelve feet long, and three feet wide, are the limits within which sheet lead will expand and contract without puckering and cracking, and to allow it to move freely it is laid with rolls and drips in such a manner that any extent of surface may be covered with the effect of continuity, though the pieces of lead forming the covering be of such small sizes as above stated. But all fixing, whether by soldering, or otherwise, is to be carefully avoided. A roll is a piece of wood made about two inches thick and two and a half inches wide, rounded on one edge, and fixed with that edge uppermost, so as to come four inches within half the width of a sheet, that the edges may be turned up and folded round and over it, being lapped by, or lapping the similar edge of the adjoining sheet (fig. 37). Lead sufficiently stout, dressed neatly and closely down to the boards under it, and over the rolls at its edges, will require no fastening of any kind, unless it be so light as to be moveable by the wind. Rolls occur for the most part in roofs and flats, and drips principally in gutters. The drip is formed in the first instance by the carpenter in laying the gutter boards a ca cording to an arrangement with the plumber. It is a difference made in the height of the gutter of two or three inches, where one sheet terminates in length, and meets another in continuation. The end of the lower is turned up against the drip, and that of the upper is dressed down over it, so as effectually to prevent the water from driving up under it. Gutters should have a current of at least an eighth of an inch to the foot, and in flats it should be rather more; ends and sides which are against a wall should turn up against it from five to seven inches, according to circumstances; and the turning up under the slates, tiles, or other roof covering, to a gutter, should be to the level of that against the wall at the least. The turning up against the wall should be covered by a flashing. is a piece of lead let into one of the joints of the wall above the edge of the gutter lead, and dressed neatly down over, to prevent water from getting in behind it. (Fig. 36.) Lead on

its own weight, must be held down by nails.

In making cisterns and reservoirs, unless they be cast, the sheets of lead must of necessity be joined by soldering; but the water they are intended to contain protects the lead from the frequent and sudden changes to which in other and more exposed situations it is exposed.

Water trunks and pipes are made of a certain number of pounds weight to the yard in length, to every variety of bore or calibre that can be required. Water trunks or pipes are fitted with large case heads above, to receive the water from the gutter spouts, and with shoes to deliver the water below; they are fixed or attached to the walls of buildings with flanges of lead, which are secured by means of spike nails. Service and waste pipes to cisterns, &c., are generally supported and

attached by means of iron holdfasts.

Plumbers' work is for the most part estimated by the hundredweight of a hundred and twelve pounds, though there are of course many things which must be taken in detail, by the pound weight, by number, and even by size. It has been already shown in what manner the quantity of lead consumed may be determined, whether it be in sheets or in pipes; the weight per superficial foot of the one, and per lineal foot or yard of the other, being known, and it is always ascertainable, the dimensions of the various parts or portions of the work readily give the total amount in hundredweights or tons. The waste of lead in working is very trifling, as cuttings all go to the melting pot again with little or no loss but that of refounding or casting; and even old lead is taken by the lead merchant in exchange for new, at a very trifling allowance for tare and the cost of reworking. Water-closet apparatus, pumps, cocks, bosses, ferules, washers, valves, balls, grates, traps, funnels, &c., can all readily be counted and noted according to their sizes and peculiarities; and so may the various requisite joints in pipes, and attachments of cocks, &c., to the pipes, which must also be taken in addition to the articles themselves. The prices of all these goods, from the sheets of lead and the pipes, to the smallest articles used by the plumber, may be ascertained from the wholesale merchants and manufacturers; an addition of thirty per cent. to these prime costs will, under ordinary circumstances, afford the builder or tradesman an ample profit, and payment with sufficient profit on them also, for labour, solder, and nails, excepting cost of carriage, and any other contingent expense, which must be added to the gross. materials may, however, be taken with a recognised profit added to the prime costs and the actual labour expended; and solder and nails worked up may be reckoned from observation, or account kept of the workman's time, &c.

These things are mentioned more particularly, because a nefarious custom has obtained in this country, and is still allowed to a very great extent, by which the plumber is permitted to take not only an extortionate profit on his goods, but actually to charge twice for labour and the accessories. There is nothing more common than to find in a plumber's account a charge for lead (meaning sheet-lead) and labour, at so much per hundredweight,-charges for pipe of a certain bore or diameter at so much per foot,—for so many joints in pipe of such a size,—that is, for the labour and solder consumed and expended in making them,—and so on through all sorts of things, the account winding up at length, or being interspersed from time to time, with so many pounds or hundredweights of solder, and so many days' work of plumber and labourer! The now prevalent custom of artificers' work being done by general builders by tender and contract, has considerably lessened the injury to the public from this abuse, and proved it to be really so by the moderate profits the same men will content themselves with if they make a tender, who would persist in charging at the old rate if they were instructed to do the work without being bound by a contract. Such too is the effect of custom on the courts of justice in England, that the abuse referred to has been protected by them, and probably would be so still, because it was the custom and had been allowed!

Smith and Founder.—The goods supplied by the smith are charged by the pound according to the quantity of labour on them, and the founder has generally an average charge for iron castings at so much per hundredweight or per ton. The working up or fitting and fixing of smiths'-work devolves for the most part on the carpenter in whose favour it is taken, generally, however, in combination with some of his own pecu-

Building. ridges and hips not being in sufficient masses to be secured by liar works; but founders' work commonly requires to be fitted Building.

and fixed by the smith.

Glazier.—The business of the glazier may be confined to the mere fitting and setting of glass; even the cutting of the plates up into squares being generally an independent art, requiring a degree of tact and judgment not necessarily possessed by the building artificer. (See the articles Glass, Manufacture of, and GLASS-CUTTING.) The glazier is supplied with a diamond cutting tool, laths, or straight-edges of various lengths, a square, a glazing-knife, a hacking-knife, hammer, duster, sash-tool, and rule; and his materials are simply glass,

putty, and priming or paint.

The glass is supplied by the glass-cutter in squares or plates, of the sizes and qualities required for the particular work to be executed. The putty is made by the glazier himself or by a labourer, of fine clean powdered chalk or whitening, and linseed oil, well mixed and combined, and kneaded to the consistence of dough. No more putty should be made at once than is likely to be worked up in the course of a day, as, the oil drying out, it becomes hard and partially set, and is there-fore less available for its purposes. Priming is a thin solution of white, with a little red, lead in linseed oil. When the sashes come to the glazier from the joiner, they have been fitted into their places, and only require to be glazed before they may be permanently set or hung. Supposing that no preliminary process is required, such as stopping (the result of bad joiners' work) and knotting (and knotty stuff should not be admitted in sashes), the sashes require to be primed. The priming is laid on every part of the sash except the outer edges of the styles and of the bottom and top rails, with the sash tool or painting brush, that is, if the sashes are intended to be painted; for if not, the rebates only must be primed. The object of this is to prepare the material of which the sash is composed for the reception of the putty, which would not otherwise attach itself so firmly as it does after this preparation. The priming being sufficiently dry, the workman cuts the panes of glass down into their places, making every one fall readily into the rebates without binding in any part; indeed the glass should fit so nicely as not to touch the wood with its edges any where, and yet hardly allow a fine point to pass between it and the sash-bar or rebate, the object being to encase it completely in putty, and yet that the putty should not be in greater quantity than is absolutely necessary. The glass being fitted or cut down, the workman takes the glazing-knife in his right hand, and a lump of putty in the palm of his left, the sash being laid on its face, that is, with the rebates upward, before him; with the knife he lays a complete bedding of putty on the returning narrow stops of the rebates, all round to every pane. This being done, the panes of glass are put in on it as they have been fitted, and every one is carefully rubbed down with the fingers, forcing the putty out below and around the edges of the glass, until they are nearly brought into contact with the wood or other material of the The rebates are then filled in with putty behind, the mass forming exactly a right-angled triangle, its base being the extent of the stop of the rebate, and its perpendicular the depth from the glass to the outer edge of the rebate; the third side or hypothenuse is neatly smoothed off, and the sash being then turned on its edge and held uprightly by the left hand, the protruded putty of the bedding is struck off with the knife, and the section of it neatly drawn. The sashes are now deposited on their faces, to allow the putty to set, and then they may be hung and painted. To very large squares, and to plate-glass, small nails called sprigs are used to retain the glass securely while the putty is still soft and yielding.

Lead-work, as it is termed, is the glazing of frames rather than of sashes with small squares or quarries of glass, which are held together by reticulations of lead; and these are secured to stout metal bars, which are fixed to the window frames. The leaden reticulating bars are grooved on their edges to receive the quarries, and are tied by means of leaden ribands or wires to the saddle bars, which, in their turn, are affixed to the stouter bars before mentioned, if the bay or

frame be so large as to require both.

Glazing is valued by the superficial foot, the squares or panes being measured between the rebates in which they are set. The value of plate-glass is very much effected by the sizes of the panes, every additional inch in extent of surface adding materially to the cost of production of the whole piece

Bukhara.

Building or plate; it must therefore be carefully noted according to its Common window glass is divided into best, magnitude. Builth. seconds, and thirds, and is charged higher as the panes increase in size, because for large panes the table cuts to waste more than in cutting small ones. In ordinary practice, panes containing two superficial feet and under are classed together; then from two feet to two feet six inches, and so on; and according to the quality of the article. Flatting, bending, grinding, staining, &c., are all subjects of separate and independent charge.

Lead lights are taken by the superficies generally of a hundred feet, lead and glass being included in the same charge, which, however, depends on the size of the quarries. Stay and saddle bars are taken separately, according to their num-

ber and magnitude.

Painter.—The processes of economical painting will be found described in an article under the head PAINTING. The real object of painting is to protect wood, metals, and stuccoes from being readily acted upon by the atmosphere, by covering their surfaces with a material which is capable of resisting it. A continued succession of moisture and dryness, and of heat and frost, soon effects the decomposition of woods, causes oxidation in most of the metals used for economical purposes, and destroys the generality of stuccoes if their surfaces be exposed nakedly to it. A solution of ceruse or white lead in linseed oil spread over them prevents these injuries in a great measure, and for a considerable period of time; and as the application of such an unction can be repeated without much trouble or expense as often as occasion may require, it may be said to furnish a protection against the cited contingencies. In addition to the utility of painting, it is also available as an ornament, by bringing disagreeably or diversely coloured surfaces to a pleasing and uniform tint, or by diversifying a disagreeable monotony of tint, to suit the taste and fancy; and this is done in a great measure by the addition of various pigments to the solution before mentioned.

The painter works with hog's-bristle brushes of various sizes, which, with the exception of pots to hold his colours, a grinding-stone and grinder or muller for grinding or triturating them, a pallet and a pallet knife, are almost his only implements. His materials are comparatively few also; but for some purposes these require a great variety of ingredients, the preparation and combination of which, however, devolves principally on the manufacturer or colourman, and not on the painter himself.

The first thing the workman has to attend to in painting wood-work, is to prepare its surface for the reception of paint, by counteracting the effect of anything that may tend to prevent it from becoming identified with the material. Thus, in painting pine-woods of any kind, the resin contained in the knots which appear on the surface must be neutralized, or a blemish will appear in the finished work over every resinous part. Inequalities or unevennesses of surface, too, must be reduced with sand-paper or pumice-stone, or made up with The necessary process for killing knots, just referred to, will generally leave a film, which must be rubbed down; and the heads of nails and brads having been punched in, will present indentations, which should be stopped. In painting or laying on the colour, the brush must be constantly at right angles to the face of the work, only the ends of the hairs, in fact, touching it. for in this manner the paint is at the same time forced into the pores of the wood and distributed equally over the surface; for if the brush be held obliquely to the work, it will leave the paint in thick masses wherever it is first applied after being dipped for a fresh supply into the pot, and the surface will be daubed but not painted. Painting, when Building properly executed, will not present a shining, smooth, and glossy appearance, as if it formed a film or skin, but will show a fine and regular grain, as if the surface were natural, or had received a mere stain without destroying the original texture. Imitative grainings, however, and the varnishes which are intended to protect them, and make them bear out, necessarily produce a new and artificial texture; and for this reason they are all to a greater or less extent disagreeable, how well soever the imitations may be effected.

As it must be presumed that all the wood submitted to the operations of the painter, which has passed through the hands of the joiner, was already well seasoned and properly dry, it is only necessary to say generally, that work should be free from moisture of any and every kind before paint is applied to it, or it will at the least prove useless, and probably injurious rather than beneficial. This remark applies alike to wood and to plastered work, both internal and external; that is, whether they be subjected to the more violent changes of the weather or not. Dampness or moisture in woods, and stopped in or covered up with paint, will, under ordinary circumstances, tend to their destruction; and in stuccoes it will spoil the paint, and most probably injure the plastering itself

Painters' work, on extended surfaces, is valued by the yard superficial, according to the number of coats, or the number of times the paint has been applied to the surface, and to the manner in which, and matter with which, it is finished. On skirtings, surbases, narrow cornices, reveals, single mouldings, sills, string courses, &c., it is measured by the foot run; sash-frames and the squares or panes of sashes, are numbered, the latter by the dozen; and so are other things which do not readily admit of being measured. Rich cornices, expensive imitations, &c., are taken by the foot superficial; and preparations before the work can be commenced are most fairly charged for by the time they occupy and the materials they consume. The work is taken, as one, two, three, four, or more times in oil, common colour; or so many times finished of a certain colour that is more expensive than what is called common; or as so many times, and flatted of such a colour, the flatting being an extra coat; or as painted so many times, and grained and varnished. Common colours are those which are produced by the addition of lamp-black, red-lead, or any of the common ochres to white-lead and oil; blues, greens, rich reds, pinks, and yellows, &c., being more costly, are taken as such. Unflatted white is a common colour; flatted, it classes with the rich colours. If the same surface be painted of two different tints, it is said to be in party colours, and an allowance is made in the price for the additional trouble of finishing in that manner. Carved mouldings and other enrichments having to be picked in with a pencil or small brush, that the quirks, &c., be not choked up, must be taken extra, by the run or by number; and if the picking in be in party colours, the labour is necessarily greater than if the work be plain.

What is termed decorating, is divided between the painter and the paper-hanger. Decorations must necessarily depend upon the taste and skill required or employed in producing them; and the remuneration must also of course be contingent. Decorative papers are paid for by the piece or yard, a piece being made in this country twelve yards long and twenty inches wide, and the hanging is charged at so much the piece. Borders are charged by the yard for the material, and by the dozen for hanging. Sizing and otherwise preparing the walls are considered beyond the charges for hanging. (W. H-G.)

BUILTH, or BUALT, a market-town of South Wales, county of Brecknock, 12 miles S.W. of New Radnor, pleasantly situated on the Wye, here crossed by an excellent bridge of six arches. It consists of two narrow, ill-formed streets, running nearly parallel to each other, and forming irregular terraces on the side of an acclivity rising from the river. On account, however, of its fine situation, and the salubrity of its air, it is much frequented. At the east end of the town are some remains of a castle, said to have been erected in the eleventh century by Bernard Newmarch,

lord of Builth. About a mile and a half N.W. of the town are three mineral springs—a saline, a sulphurous, and a chalybeate. Market-day Monday. Pop. (1851) 1158.

BUKHARA, BOKHARA, or BUKHARIA, a country and khanat of Asia, in Tookistan or Independent Tartary, lying between Lat. 34° and 41° N. and Long. 63° and 70° E. It is bounded on the north by Khokan, west by the khanat of Khiva, east by Koondooz, and on the south its boundary first follows the course of the Oxus, and afterwards proceeds along the sands on the left bank of that river. Its area is estimated at

Bukhara. 235,000 square miles; but, like the other states of Central Asia, the limits and extent of Bukhara cannot well be determined,-since they expand or contract according to the strength or weakness of its rulers. The cultivated parts of the country, however, are small in proportion to its extent: they lie chiefly along the banks of the rivers, and are separated by sandy plains unfit for culture, and only offering an asylum to the wandering tribes, who, to escape starvation, are continually obliged to shift their encampments. Bukhara may be generally described as a level country, with few elevations except on its eastern and southern frontiers. The mountains in the eastern part of the country are spurs of the Hindu-Koh, and are supposed by Burnes to attain the height of at least 18,000 feet. Those on the southern frontier seem to belong to the Paropamisan range. The principal rivers of Bukhara are the Amu or Oxus, the Zeraffshan, and the Kurshee. The Amu takes its rise, according to Lieut. Wood (an account of whose expedition to its source will be found in the Royal Geographical Society's Journal for 1840), from a crescent-shaped lake in Lat. 37. 30. N. and Long. 73. 50. E. This lake is 14 miles in length, with an average breadth of one mile, and is 15,600 feet above the level of the sea. The Amu flows from S.E. to N.W., and varies in width from 300 to upwards of 800 yards. The second river of the khanat is the Zer-affshan, which, though inferior to the Amu in the volume of its waters, is superior to it in the populousness and cultivation of its banks. It rises in the high lands east of Samarcand, and, passing north of that city and of Bukhara, forms a lake in the province of Karakool. This lake is about 25 miles in length, and surrounded on all sides by sand-hills. The Kurshee rises in the same high lands as the Zer-affshan, and passes through Shuhr-Subz and Kurshee, below which it is lost in the desert.

North of the Oxus, and from the base of the mountains of Bukhara, there is a succession of low, rounded ridges of limestone, oolite, and gravel, thinly overgrown with verdure, alternating with vast and hardened plains of argillaceous clay. There are no gold mines in Bukhara, but that metal is found among the sands of the Oxus in greater abundance, perhaps, than in any of the other rivers which flow from the Hindu-Koh. Sal-ammoniac is found among the hills near Juzzak, and salt is very plentiful. In the mountains to the east, near Sarvadi, are copious mines of fine coal and copper ore. The climate of Bukhara, at least in the cultivated parts, is salubrious and pleasant. In summer the thermometer seldom rises above 90°, and the nights are always cool. The frosts commence about the end of November, and continue till towards the end of April. The Amu is generally frozen over for some weeks in winter so as to be passable for caravans. In the desert the heat in summer exceeds 100° Fahr. Thunder-storms and earthquakes are not unfrequent, especially in the spring; and there are sometimes violent tornadoes, generally blowing from the N.W.

The population of Bukhara is composed of Tadjiks, Arabs, Uzbeks, Turkomans, Persians, Jews, &c. The population may be estimated at 2,000,000. Meyendorff estimates it at 2,478,000; Khanikoff at from 2,000,000 to 2,500,000; Burnes at less than 1,000,000; and Wolff at 1,200,000. The Tadjiks are the aborigines of the country, and are said to have come from the west, and settled on the banks of the Zer-affshan at a time when the country was uninhabited, and a jungle of reeds covered the place where the town of Bukhara now stands. Except in the town of Bukhara, where they constitute the majority of the population, there are few Tadjiks now in the khanat. They are mostly engaged in commerce, are peaceful or even cowardly in their disposition, and characterized by avarice, faithlessness, and deceit. They are usually tall, with handsome and regular features, fair complexion, and black eyes and hair. The number of Arabs, though inconsiderable, exceeds that of the

Tadjiks. They were the first intruders upon the aborigines, Bukhara. having conquered the country about the beginning of the eighth century, and compelled the inhabitants to adopt the Mohammedan faith. They inhabit the northern part of the khanat, and like their ancestors still continue to lead a wandering life, their chief occupation being the tending of their flocks. Their moral qualities seem to be of a higher character than those of the Tadjiks. The Uzbeks, the last people that conquered this country, are the most numerous, and are at present the dominant race in the khanat. They are divided into a number of tribes, of which the principal is that of Manghit. To it the reigning dynasty belongs. Some of the Uzbeks are nomadic in their habits, others are engaged in agriculture, or live in towns. They are more bold and straightforward in their manners than the Tadjiks, but, like them, avaricious and deceitful. There are a considerable number of Persians in Bukhara, most of whom have been brought captive from their native country. They are readily distinguished by the regularity of their features, and their bushy black hair. Although outwardly conforming to the faith and manners of the country, they cordially hate the Bukharians, and are ready to hail with joy any political revolution which might shake the power of the Uzbeks. The Jews, though long established in the country, form but a very inconsiderable part of its inhabitants. They are chiefly to be found in Bukhara, Samarcand, and some of the larger towns, where they have separate quarters assigned to them. Their privileges are very restricted. The Turkoman part of the population is wholly nomadic, and is chiefly to be found in the region south of the Oxus. The orchards in the neighbourhood of the larger towns are numerous, and highly cultivated. They produce grapes, figs, peaches, pomegranates, apricots, prunes, apples, pears, quinces, cherries, and almonds. The cultivation of cotton, tobacco, and lucerne, is extensively carried on, as is also that of the mulberry, beet, cabbage, carrots, radishes, onions, cucumbers, pease, beans, lentils, melons, and pumpkins. being of a saline nature, requires to be cultivated with some care, so that it is found to be much more profitably laid out in gardens than in fields; indeed, the returns from the former exceed by seven-fold the returns from the same quantity of the latter. Wheat, rice, barley, millet, and jowaree (Holcus saccharatus), are the principal kinds of grain grown here. This last is one of the most useful productions of the khanat, and as it is cheap and nutritious, it forms the chief subsistence of the poor.

The horses of Bukhara are numerous, but are more remarkable for strength and bottom than for symmetry or beauty. Asses are also very plentiful, and are large and sturdy. They are not only used for riding by the less wealthy, but also as beasts of burden. The camels, by means of which the entire traffic of Bukhara is carried on, are reared chiefly by the wandering tribes, particularly the Turkomans. They have a sleek coat as fine as that of a horse, and shed their hair in summer, from which a fine waterproof cloth of close and rather heavy texture is manufactured. The goats are about the common size, of a dark colour, and yield a shawl wool inferior only to that of Cashmere. The bulls and cows are miserably small, and in a very wretched condition. The rearing of sheep is much attended to, particularly by the Arabs. There is a peculiar breed, producing a jet-black Arabs. There is a peculiar breed, producing a jet-black curly fleece in much repute, and which is said to thrive only in the district of Karapul. The wild animals are few. Tigers of a diminutive species are found in the valley of the Oxus; wild hogs, herds of deer, antelope, and the wild ass, roam on the plains; and foxes, wolves, jackals, ounces, and occasionally tigers, are found in some parts. The scorpion is common, but its sting is seldom very virulent. All kinds of game are scarce. The most valuable insect is the silkworm, which is reared in all parts of the khanat where

Bukhara, there is water; every stream or rivulet being lined with spects beyond the performance of its prayers; but they have Bukhara, the mulberry. Each student purgreat pretensions and greater show." Each student purgreater show."

Bukhara owes its importance to its central position. Lying on the route between Europe and the richest part of Asia, it is the seat of a considerable trade. The government has established custom-houses, built caravanserais, and constructed cisterns along such caravan roads as are insufficiently supplied with water, but otherwise does nothing to encourage traffic; and the roads are, generally speaking, in a wretched condition. There are no privileges in favour of the merchants of one nation to the prejudice of those of another, except that Mussulmans payonly  $2\frac{1}{2}$  per cent., while all others pay 5 per cent. on the goods they import. Bukhara carries on an extensive trade with Russia by means of caravans, which travel by the following routes, viz., by the route of Khiva to the shores of and across the Caspian from and to Astrakan; by the route to and from Orenburg by land in 60 days, through Orghenje in Khiva; to and from Troidska in Tobolsk, by the route east of the sea of Aral in 49 days; and to and from Petropavslok in 90 days. From 5000 to 6000 camels are annually employed in this trade. Bukhara exports to Russia, besides cotton, which is the principal item, dried fruits, rice, raw and dyed silks, indigo, silk sashes, turquoises, shawls, and furs. It imports muslins, calicoes, chintzes, some silk stuffs, broad-cloth, brocades, hides, iron and other metals. The trade with Khiva employs only from 1000 to 1500 camels, and consists chiefly in exporting to Bukhara Russian goods, of which there is always an available surplus in the markets of Khiva. Three, and occasionally four caravans arrive annually from Meshid, in Persia, bringing cotton and silk stuffs, calicoes, chintzes, muslins, carpets, shawls, and turquoises; and receiving in return lamb-skins, cotton, rice, &c. From Herat and Cashmere it imports a considerable quantity of shawls; and Indian produce and English manufactures from Cabul. A brisk traffic is also carried on with Khohand, Tashkand, Kashgar, and Yarkand. The greater part of the goods brought into Bukhara are not consumed there, but are immediately exported to other countries. The central points of commerce are Bukhara, Samarcand, and Kurshee; and trade is principally conducted at the marts and fairs that are held in various parts of the country. Almost the only manufactures carried on in Bukhara are those of cotton goods, silks, leather, hardware, and jewellery. There is but one manufactory of castiron articles.

Bukhara has for ages been reckoned the centre of Mussulman erudition; and if we look at the number of its schools and the state of education among its people, we cannot but admit, that in that respect it ranks first among the states of Central Asia. About one-fourth of the population is said to be able to read and write. The primary schools are numerous in the capital, as well as in the other cities, and even villages. In Bukhara there is one in almost every street. They are founded either by private donations, or by the joint contributions of the inhabitants of the street by order of the emir. The course in these schools extends over about seven years. Those wishing to continue their studies then enter the medressehs or seminaries, in which they pursue a higher course of studies under one or two professors who have acquired the right to give lectures. Each establishment has a fixed number of students, according to the extent of the building. Fifteen, or even twenty years, are reckoned insufficient to go through a complete course in these institutions. They are principally exercised in subtle disputations upon theological subjects, which only tend to strengthen fanaticism and religious bigotry. Burnes says, "The students are entirely occupied with theology, which has superseded all other points; they are quite ignorant even of the historical annals of their country. A more perfect set of drones were never assembled together; and they are a body of men regardless of their religion in most re-

spects beyond the performance of its prayers; but they have great pretensions and greater show." Each student purchases the right to inhabit the *medresseh* from him whose place he takes, and receives a fixed annual allowance during his attendance. The number of *medressehs* is estimated by Khanikoff at not more than from 180 to 200, the elementary schools at ten times that number, and the number attending these institutions at between 150,000 and 160,000, or about one-sixteenth of the entire population.

The people are very superstitious, believing in witchcraft,

omens, spirits, the evil eye, &c.

The government is a hereditary despotism, the khan having the power of life and death over his subjects. The civil administration is in the hands of the clergy, and is founded on the Koran and the commentaries upon it. "When we place the vices of Bukhara in juxtaposition with its laws and justice, we have still much to condemn; but the people are happy, the country is flourishing, trade prospers, and property is protected." "There is no place in the whole of Asia where such universal protection is extended to all classes." So says Burnes; but it is impossible to peruse the accounts of other travellers without arriving at an opposite conclusion. Burnes himself narrates that the present khan paved his way to power by the murder of four of his own brothers. He afterwards murdered his vizier Kooshbeghi, with most of his relatives, though it was chiefly through their means that he had secured the throne. He also put to death the two English travellers Stoddart and Conolly, and evidently intended that Dr Wolff should share the like fate. These and numerous other cruelties show him to be a tyrant and a despot of the worst kind; and Meyendorff says that the principles of government are hypocrisy and extortion. The troops of the khan are estimated at about 40,000 men, but of these not more than one-third are completely armed. The languages in use are the Persian and Turkoman; the latter is spoken by the Uzbeks, and the wandering tribes south of the Oxus.

Bukhara was known to the ancients under the name of Sogdiana; and was too far removed to the east ever to be brought under the wide-spreading dominion of Rome. But it has shared deeply in all the various and bloody revolutions of Asia. It is mentioned by the earliest historical writers of Persia; and, about the year 856, Yacoob-bin-Leis is said to have been invested with the government of that province by the caliph. About twenty years later, it was conquered by Ismael, the first sovereign of the Sassanean dynasty, whose successors held it until the renowned Malek Shah, third of the Seljuk dynasty of Persia, passed the Oxus about the end of the eleventh century, and subdued the whole country watered by that river and the Jaxartes. In the year of the Hejira 594, A.D. 1216, Bukhara was again subdued by the celebrated Mahomed Shah Khauresme, who enjoyed his conquest but a short time ere it was wrested from him by the irresistible power of Ghenghis Khan in A.D. 1220. The country was wasted by the fury of this savage conqueror; but recovered some share of its former prosperity under Octai Khan, his son, whose disposition was humane and benevolent. His posterity retained the dominion of this country until about the year 1400, when Tamerlane with his mighty host bore down everything before him, and spread far and wide the terror of his arms. His descendants ruled in the country until about the year 1500, when it was overrun by the Usbeck Tartars, in whose possession it still remains.

BUKHARA, or Bokhara, the capital of the khanat of the same name, is situated at the distance of 6 or 7 miles from the left bank of the Zer-affshan in Lat. 39. 48. N. Long. 64. 26. E. It is 8 miles in circumference, of a triangular shape, and surrounded by a wall of earth about 20 feet high, which is pierced by 11 gates. It lies embosomed among gardens and trees, and few great buildings are to be seen from the

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Bukkur || Bulgaria.

exterior; but when the traveller passes its gates he winds his way among lofty and arched bazaars, and sees each trade in its separate quarter of the city. Everywhere he meets with ponderous and massy buildings, colleges, mosques, and lofty minarets. About twenty caravanserais give accommodation to the merchants of different nations, and about 100 ponds and fountains, constructed of squared stone, furnish its numerous population with water. The city is intersected with canals shaded by mulberry trees, which serve to bring water from the river, but in summer are sometimes dry for months. The streets are so narrow that a laden camel fills up even the largest, and in the smaller ones two persons have difficulty in passing each other; they are extremely dirty and always crowded with camels, horses, and asses. With the exception of its public buildings, most of its houses are small and of only one story; yet there are many buildings of a superior class in the city. The common houses are built of sun-dried bricks on a framework of wood, and are all flat-roofed. The greatest of the public buildings is a mosque, which occupies a square of 300 feet, and is surmounted by a dome rising to one-third of that height. Attached to this mosque is a lofty minaret built of bricks, distributed in most ingenious patterns. The handsomest building of Buckhara is a college of the king Abdalla. There are 360 streets and lanes in the city, most of them unpaved, and all in a very wretched condition. There are likewise 360 mosques. The number of medressehs or colleges in Bukhara is estimated by Khanikoff at 103, but by Burnes at 366. The baths are numerous. The population is estimated by Meyendorff at about 70,000, and this estimate corresponds with those of Moorcroft and Khanikoff. Burnes, however, estimates it at 150,000, and Wolff at 180,000. About 4000 of the population are Jews.

BUKKUR, an island and fort of Scinde in the Indus, between the towns of Roree on the eastern, and Sukkur on the western bank. The island is a rock of limestone of an oval shape, 800 yards long, 300 wide, 1875 in circuit, and about 25 feet high. It is almost entirely covered by the fortress, the walls of which are double, and from 30 to 35 feet high. In the beginning of 1839 the British army crossed here on a bridge of boats. Lat. 27. 41. N. Long. 68. 52. E.

BUL (Sept. Baál), the name applied, in 1 Kings vi. 38, to the Hebrew month *Marcheshoûn*, which was the eighth of the ecclesiastical, and the second of the civil year of the Jews, and began with the new moon of our November.

BULAK. See CAIRO.

BULAM, or Bulama. See Bissagos.

BULARCHUS, a Lydian painter, the first who introduced, among the Greeks at least, different colours in the same picture. He flourished about B.C. 740. See PLINY.

BULB, that protuberant part of a plant which usually lies below the ground, emitting roots from its base, and producing a stem or leaf from its apex. It consists of imbricated scales, or of concentric layers, as in the onion, hyacinth, lily, &c. A tuber, properly speaking, differs from a bulb in being solid, as the potato.

BULGARIA, a province of European Turkey, extending from the mouth of the Danube, along that river till it meets the Timok above Widdin, on the borders of Servia. The Danube forms the whole of its northern, and the parallel chain of the Balkan its southern boundary. It is about 350 miles long, by from 60 to 100 broad. It has an area of about 33,000 square miles, and an estimated population of about 3,000,000.

This province was the *Mæsia Inferior* of the Romans, and derives its present name from the Bulgarii or Bulgares, one of the northern hordes who abandoned their dreary plains to seek a more propitious climate in the south. They left the Volga in the sixth century, and crossing the Danube near its mouth, established themselves in the inviting

country which lies between that river and the mountains, extending westward from the shore of the Euxine. Here they defied all the efforts of the Greeks of the lower empire to dispossess them; and their various and sanguinary conflicts form a considerable portion of the history of that period. They carried on many contests with the emperors of the East; but in the eleventh century they were at length confined within certain limits, and the country was reduced to the state of a province. On the decline of the Greek empire, however, it was finally brought under the Turkish yoke by Bajazet, when the Turks had established themselves in the neighbouring province of Rumelia, the ancient Thrace.

The country, except in the neighbourhood of the Danube and the Euxine, is mountainous; but the sides of the smaller hills afford excellent pasture, and the soil is exceedingly rich and fertile. It is irrigated by a number of rivers and streams, tributaries of the Danube. The climate is mild, and the productions are various and abundant, consisting of corn, hemp, flax, tobacco, &c. The vine is very extensively cultivated. The people have entirely laid aside the warlike character which distinguished their ancestors. The avocations of the greater number of them are pastoral, and their character corresponds with this mode of life.

The Bulgarians fabricate to a great extent several articles which are famous in Turkey; one is a coarse woollen cloth, and another rifle gun-barrels. But the employment most congenial to their rural habits is the preparation of the otto or attar of roses, much of which comes to England. Rose trees are very plentiful, and gardens are laid out for the purpose of cultivating them. Cattle, tallow, timber, hides, wine, and the other productions of the country, constitute their principal exports. The language of the people is a dialect of the Sclavonian, and bears a resemblance to the Russian. Only a few elementary books have been printed in this language, and it has never been reduced to grammatical rules. The books introduced are in Greek, but that language has made no progress amongst the people, who are consequently very illiterate. Their religion is Christianity, which they embraced on their arrival in the district. They belong to the Greek Church, subject to the Greek patriarch of Constantinople, who appoints their bishops. There is generally attached to every two or three villages a priest, who performs the duties of his vocation in each alternately; but, unless in a very few places, they are destitute of churches, schools, and books. The principal towns, such as Sophia, Shumla, Ternevo, &c., will be described as they occur alphabetically.

The Bulgarians have extended themselves beyond the limits which they originally occupied. They have crossed the chain of mountains, and now occupy almost exclusively a considerable portion of Rumelia.

BULK OF A Ship, the whole space in the hold for the stowage of goods.

BULK-Heads are partitions made athwart the ship with boards, by which one part is divided from the other; as the great cabin, gun-room, bread-room, &c.

BULL. See MAMMALIA, and AGRICULTURE.

Bull (Italian bolla, Latin bulla), among ecclesiastics, a letter written on parchment, sealed with lead, and issued by order of the pope, from the Roman rota or chancery. It is a kind of apostolical rescript or edict, and is chiefly in use in matters of justice or grace. If the former be the intention of the bull, the lead is hung by a hempen cord; if the latter, by a silken thread. It is this pendent lead or seal which is, properly speaking, the bull, and which is impressed on the one side with the heads of St Peter and St Paul, and on the other with the name of the pope and the year of his pontificate. The bull is written in an old round Gothic character, and is divided into five parts, the narrative of the fact, the conception, the clause, the date, and the salutation,

Bull

Bulleyn.

Bull.

in which the pope styles himself episcopus, servus servorum, or the servant of servants. This instrument has about it a cross, with some text of Scripture, or religious motto. Bulls are granted for the consecration of bishops, the promotion to benefices, the celebration of jubilees, &c., &c.

Bull in Cona Domini, a particular bull read in the pope's presence every year, on the day of the Lord's Supper, or Maundy Thursday, and containing excommunications and anathemas against heretics, and all who disturb or oppose the jurisdiction of the holy see. After the reading of the bull, the pope throws a burning torch in the public place, to denote the thunder of this anathema.

Golden Bull, a statute or enactment published A.D. 1356, by the Emperor Charles IV., and hence called Caroline, reputed to be the magna charta or the fundamental law of the German empire. It is called golden because it has a golden seal, in the form of a pope's bull, tied with yellow and red cords of silk; while on one side the emperor is represented sitting on his throne, and on the other the capitol of Rome. Till the publication of the golden bull, the form and ceremony of the election of an emperor were unsettled, and the number of the electors was not fixed. This solemn edict regulated the functions, rights, privileges, and precedence of the electors. The original, which is in Latin, on vellum, is preserved at Frankfort. This ordonnance, containing thirty articles or chapters, was approved by all the princes of the empire.

Silver Bulls were not usual, though instances of them

Leaden Bulls were sent by the emperors of Constantinople to patriarchs and princes; and they were also used by the grandees of the imperial court, as well as by the kings of France, Sicily, and other countries; and by bishops, patriarchs, and popes. It is to be observed that the leaden bulls of these last had, on one side, the name of the pope or bishop inscribed. According to Polydore Virgil, Pope Stephen III. was the first who used leaden bulls, about the year 772; but instances of them are to be met with as early as the times of Silvester, Leo I., and Gregory the Great. The latter popes, besides their own names, strike the figures of St Peter and St Paul on their bulls, a practice first introduced by Pope Paschal II. But why, in these bulls, the figure of St Paul is on the right, and that of St Peter on the left side, is a question which has occasioned many conjectures and disputes.

Waxen Bulls are said to have been first brought into England by the Normans. They were of two sorts, red and green, and were frequently used by the Greek emperors, who thus sealed letters to their relations.

Bull, George, bishop of St David's, was born at Wells in 1634, and educated at Exeter College, Oxford. The first benefice he enjoyed was that of St George's near Bristol, from which he rose successively to be rector of Suddington in Gloucestershire, prebendary of Gloucester, archdeacon of Llandaff, and in 1705 bishop of St David's. He died Feb. 17, 1710. During the time of the Commonwealth he adhered steadily, though with great prudence, to the forms of the Church of England; and in the reign of James II. preached very strenuously against the errors of Popery. His principal works are, A Defence of the Nicene Faith; Apostolical Harmony; Primitive Apostolical Tradition; besides which he wrote many others. His collected works were published in 1703 by the learned Dr Grabe, in 1 vol. folio.

Bull, John, a distinguished English composer and organist, was born in Somersetshire about 1563. In 1591 he was appointed organist in the Queen's chapel; in 1592 received his degree of Doctor of Music at Cambridge University; and in 1596 was made music-professor to Gresham College, London. As he was unable to lecture in Latin, according to the foundation-rules of that college, the executor.

tors of Sir Thomas Gresham made a dispensation in his favour by permitting him to lecture in English. He gave his first lecture on 6th October 1597. He afterwards visited France and Germany, and was everywhere received with the respect due to his talents. The absurd story told by Anthony Wood of Dr Bull's feat in composition at St Omer, is simply impossible. Honourable employments were offered to him by various continental princes; but he declined them, and returned to England, where he was appointed organist to James I. in 1607, and in the same year resigned his Gresham professorship. In 1613, he again went to the continent on account of his health; and, in the Netherlands, entered into the service of the archduke. According to some writers, he died in 1623 at Hamburg; according to others, at Lubeck. Little of his music has been published, and the opinions of critics differ much as to its (G. F. G.)

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Bull-fight, a favourite amusement among the Spaniards and Portuguese, consisting in a kind of combat between an armed man or torreador and a wild bull, either on foot or on horseback. This sport the Spaniards received from the Moors, among whom it was celebrated with great pomp. Some think that the Moors might have received the custom from the Romans, and the latter from the Greeks. Dr Plot is of opinion that the Taupokaθαψίων ἡμέραι among the Thessalians, who first instituted this game, and of whom Julius Cæsar learned and brought it to Rome, were the origin both of the Spanish and Portuguese bull-fighting, and of the English bull-running. See Spain.

BULL-HEAD. See ICHTHYOLOGY, Index.

BULLA, a kind of ornament worn about the neck, much in use among the ancient Romans. Whittaker, in his History of Manchester (vol. i. p. 79), is of opinion that bullæ were originally formed of leather among all ranks of people; and it is certain that they continued so to the last among the commonalty. He also imagines that at first the bulla was intended as an amulet rather than an ornament. Pliny refers the origin of the bulla to the elder Tarquin, who gave one along with the prætexta to his son, because at the age of fourteen he had killed an enemy; and in imitation of him it was afterwards assumed by other patricians. Some, however, affirm that the bulla was given by that king to the sons of all the patricians who had borne civil offices; whilst others allege that Romulus first introduced the bulla, and gave it to Tullus Hostilius, the first child born after the rape of the Sabines. The form of the bulla was generally circular. As the wealth of the state and the riches of individuals increased, the young patrician distinguished himself by a bulla of gold, whilst the common people wore the amulet of their ancestors. The bulla was laid aside at the same time as the prætexta, and consecrated to the Lares. Bullæ were not only hung round the necks of young men, but also on the foreheads of horses, and were sometimes allowed even to statues; whence the phrase statuæ

Bulla was also the denomination given to divers other metallic ornaments made after the same form. Such were the decorations used by the ancients on their doors and girdles. The bullæ of doors were large-headed nails or studs, carefully brightened or polished. The doors of temples were sometimes adorned with golden bullæ. By such door-studs were indicated which days were fasti and which nefasti.

BULLEYN, William, a learned physician and botanist, born in the Isle of Ely about A.D. 1500, and educated at Cambridge. He travelled through various parts of England, Scotland, and Germany, chiefly with a view to improve his knowledge of plants; and on his return, in 1550, he was made rector of Blaxhall in Suffolk; but he afterwards removed to Durham, where he practised physic with considerable success. Here he contracted a great in-

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Bumpkin.

Bullfinch timacy with Sir Thomas Hilton, governor of Tinmouth Fort. In 1560 he went to London, and soon after his arrival was accused by the brother of Sir Thomas of having murdered his friend and patron, who had died of a malignant fever while under Bulleyn's care. He was arraigned before the Duke of Norfolk, but honourably acquitted. This Hilton afterwards hired some villains to assassinate him; but failing in the attempt, he arrested him on an action for debt, and sent him to prison. During his confinement Dr Bulleyn composed several of those works which established his reputation as a medical writer. He died in 1576. Dr Bulleyn was well acquainted with the works of the ancient Greek, Roman, and Arabian physicians. He wrote, The Government of Health, 1558-59, 8vo, republished in 1595; A regimen against the Pleurisy, 8vo, Lond. 1562; Bulwark of Defence against all Sickness, Soreness, and Wounds, London, 1562, 1579, folio; A Dialogue both pleasant and pitiefull, wherein is a goodlie regimen against the fever pestilence, Lond. 1564, 8vo, 1569,

BULLFINCH. See Ornithology. BULL-FROG. See REPTILIA.

BULLIALDUS (the Latinized form of BOULLIAU, or BOUILLAUD), ISMAEL, an eminent astronomer, born at Loudun in France in 1605. He travelled in his youth for the sake of improvement; and afterwards published several works, among which are the following, viz.:-

1. De Natura Lucis, 1638, 8vo; 2. Philolaus, 1639, 4to; 3. Astronomia Philolaica, opus novum, in quo motus planetarum per novam et veram hypothesin demonstrantur, Loudun, 1645, folio; 4. Astronomiæ Philolaicæ Fundamenta clarius explicata et asserta adversus Zethi Wardi impugnationem, 1657, 4to; 5. De Lineis Spiralibus Demonstrationes, 1657, 4to; 6. Ad Astronomos Monita duo, 1667; 7. Ptolemmi Tractatus de Judicandi Facultate, 1667, 4to; 8. Opus Novum ad Arithmeticam Infinitorum, 1682, folio. Afterwards he became a presbyter at Paris, and died there in 1694.

BULLINGER, HEINRICH, born at Bremgarten in Switzerland in 1504, was an eminent Zuinglian minister, a great supporter of the Reformation, and employed in many ecclesiastical negotiations. His printed works are very numerous, and many of them were translated into English. They form ten vols. folio. Bullinger died at Zurich in

BULLION, uncoined gold or silver in the mass. The precious metals are so called either when smelted and not perfectly refined, or when refined and melted down in bars or ingots, or in any form uncoined, as in plate.

BULTI or BULTISTAN (called also LITTLE THIBET), a small state of Central Asia, north of Kashmir, lying between Lat. 34. 40. and 35. 30. N. and Long. 74. 40. and 76. 20. E., having an area of about 12,000 square miles, and an estimated population of 75,000. It is bounded on the north by Chinese Tartary, east by Ladakh or Middle Thibet, south by Deotsuh and other elevated desert tracts, and on the west by Astor and other small independent states. It consists chiefly of a valley having an average elevation of 6000 or 7000 feet above the sea, and through which flows the Indus in a north-westerly direction. It is surrounded by bare, rugged, and nearly inaccessible mountains, rising to the height of 6000 or 8000 feet. In winter the cold in the higher parts is intense. The soil is not fertile, but is carefully cultivated, and produces wheat, barley, millet, buckwheat, turnips, fruits, and some rice. The capital is

Iskardoh. (See Thornton's Gazetteer.)
BUMM, a town of Persia, in the province of Kirman, and 115 miles E.S.E. from the town of that name. It was formerly of great importance and magnificence, and is still a place of considerable strength, having a citadel, and being surrounded by a high and thick mud wall and a deep

BUMPKIN, a piece of timber projecting from each bow

of a ship to extend the clue of the fore-sail to windward; Bundeland also from each quarter, for the main brace-blocks.

BUNDELCUND, or the country of the Bundelas, an extensive province of Hindustan, bounded on the W. and N.W. by the dominions of Scindia; on the N.E. by the Jumna, dividing it from the Doab; on the E. by Rewa or Baghelcund; and on the S. by the Saugor and Nerbudda territories. It lies between Lat. 23. 52. and 26. 26. Long. 77. 53. and 81. 39., and contains an area of 18,089 square miles. The plains of Bundelcund are intersected by three mountain ranges, named respectively the Bindachal, Punna, and Bandair chains, the highest having an elevation in no place exceeding 2000 feet above the level of the sea. Beyond these ranges the country is further diversified by isolated hills of a remarkable character, rising abruptly from a common level, and presenting from their steep and nearly inaccessible scarps eligible sites for castles and strongholds, whence the mountaineers of Bundelcund have frequently set at defiance the most powerful of the native states of India.

The general slope of the country is towards the N.E., as indicated by the course of the rivers which traverse or bound the territory, and finally discharge themselves into the Jumna. The Sindh, rising near Sironj in Malwa, marks the frontier line of Bundelcund on the side of Gwalior. Parallel to this river, but more to the eastward, is the course of the Betwa. Still further to the east flows the Cane, followed in succession by the Baighin, Paisuni, and Tons. The province is further intersected by the tributaries of these rivers, but notwithstanding the large number of these streams, the depression of their channels, and height of their banks render them for the most part unsuitable for the purposes of irrigation,—recourse for which is constantly had to jheels and tanks. These artificial lakes are usually formed by throwing an embankment across the lower extremities of valleys, and thus arresting and accumulating the waters flowing through them. Some of these tanks are of great capacity; as, for instance, the Burwa Sagur, which is two miles and a half in diameter.

The mineral resources of this tract appear to be considerable. The most valuable of all fossils, diamonds, have been found, particularly near the town of Punna. The mines producing them are situated in a range of hills called by the natives Bund-Ahill, extending above twenty miles in length by between two and three in breadth, and are said to be partitioned into twenty-one divisions. Of these, the mines of Maharajepoor, Rajepoor, Kimmerah, and Guddaseah, contain the finest diamonds; and one dug from the last has been reputed the largest in the world. It was kept in the fort of Callinger, among other treasures of Rajah Himmut Bahadur. Several different rajahs are proprietors of the mines, each having the charge of his own, without any interest in the produce of the rest. In the reign of the emperor Acbar, the mines of Punna produced to the amount of L.100,000 annually, and were then a considerable source of revenue; but for many years they have not been nearly so profitable.

As already intimated, the country at a distance from the mountains is agreeably diversified with clusters of eminences or small hills, separate from each other, exhibiting a picturesque appearance; and the inhabitants invariably build their villages at the bottom of a hill. The arboreous vegetation consists rather of jungle or copse than forest, within which game abounds, and is preserved by the native chiefs. There are also within these coverts several varieties of wild animals, among which may be enumerated the tiger, leopard, hyena, wolf, wild boar, nilgaw (Antelope picta), and jackal.

The population is of various lineage. The Bundelasthe race who are always found in the capacity of chiefs, and who disdain to cultivate the soil—are represented

Bundel-

or morality. Among the Rajpoot Bundelas, rare examples of self-devotion are not indeed wanting, as instanced at Adjyghur upon its evacuation by the garrison, when besieged by the British. The removal of the family of the refractory zemindar who had occasioned hostilities having been directed, his father-in-law was desired to prepare the females of the family for it. Instead of doing so, however, he murdered the whole with their children, eight in number, and then put an end to his own life; and what was more extraordinary, the massacre to all appearance had been perpetrated with the consent of the victims; since those who watched without heard no noise to indicate that the sufferers had made resistance. Still, however, the Bundelas are stated to be infamous for treachery and cheating, and an Indian proverb avers, that "one native of Bundelcund commits as much fraud as a hundred Dhundees" (weighers of grain and notorious rogues). About Dhuttea and Jhansi they are a stout and handsome race of men, exhibiting an appearance of opulence and contentment. They commonly go armed with a bow and spear, both of which are of excellent quality; and they know very well how to use them. They testify no apprehension in engaging veteran troops. Owing to the intestine commotions which long pervaded this district, every man carried arms; and many, availing themselves of superior force, attacked and plundered travellers, or levied contributions from them on pretence of guarding the passes which they had necessarily to traverse among the hills. Besides the Rajpoots, there are the Brahminical Bundelas. The prevailing religion is Brahminism. One of its revolting observances, the practice of Suttee, formerly so prevalent, has at length been absolutely prohibited by the paramount power throughout the native states of Bundelcund.

Bundelcund is partly British and partly native territory. The British portion consists of the districts of Banda, Hummerpoor and Calpee, Jaloun, Jeitpore, Churgaon, and the ceded Pergunnalis of Duboi and Gurota, and comprises an area of 7181 square miles. The remainder, containing an area of 10,918 square miles, is distributed among thirty-three petty native states, the chief of which are Adjyghur, Bijawur, Churkaree, Chutterpoor, Dutteeah, Jhansi, Oorcha or Terree, Punnah, and Sumpthur. With these principalities the British government has entered into engagements, in which its supremacy is recognised by all. Some are tributary, others are exempt from pecuniary payment. The total population of the country, British and native, is returned at 2,260,714.

Chandra Varma, chief of the Chundel Rajpoots, appears to have established the earliest paramount power in Bundelcund towards the close of the ninth century. Under this dynasty the country attained its greatest splendour in the early part of the eleventh century, where its rajah, whose dominions extended from the Jumna to the Nerbudda, marched at the head of 36,000 horse and 45,000 foot, with 640 elephants, to oppose the invasion of Mahmood of Ghizni. In the year 1183, Parmal Deo, the twentieth ruler in succession from Chandra Varma, was overthrown by Pirthi Rajah, the ruler of Ajmere and Delhi; after which the country remained in ruinous anarchy until the close of the fourteenth century, when the Bundelas, a spurious offset of the Garwha tribe of Rajpoots, established themselves on the right bank of the Jumna. Early in the sixteenth century it is said that a Bundela, living in Benares, removed to a fort in the district of Oorcha, then governed by a rajah, whose confidence he speedily obtained. This Bundela had a daughter of exquisite beauty, of whom the rajah became enamoured, and demanded her in marriage. But her father, considering the proposal as a grievous insult from one whom certain circumstances now unknown prompted him to regard as his inferior in rank, he, in concert with his daughter, plotted a diabolical revenge. Acquiescence was given on the part

Bundel- as by no means conspicuous for lofty sentiments of honour of both; and the rajah was invited by his bride to the house of the Bundela, where the ceremony was to be performed. Here a magnificent entertainment was prepared, of which he partook plentifully along with his attendants; but it was soon succeeded by excruciating tortures; poison had been treacherously administered; and when the victims became incapable of defence, they were barbarously massacred. The Bundela then placed himself on the musnud of the rajah, which he enjoyed peaceably until his death. His great grandson, Birsing Deo, succeeded in further aggrandising the Bundela state, but he is represented to have been a notorious plunderer; and his character is further stained by the assassination of the celebrated Abul-Fazl, prime minister of Akbar, which is said to have been committed in compliance with the wishes of Jehangeer, the emperor's son, who was jealous of the Abul-Fazl's influence over his father. Jajhar Singh, the successor of Birsing Deo, having revolted against the court of Delhi, was driven into exile, and his country became incorporated with the empire. This arrangement, however, was merely temporary, and the struggles of the Bundelas for independence resulted in the withdrawal of the royal forces, and the admission of several petty states among the feudatories of the empire, on condition of military service. Descending to a later period, we find that this territory was invaded during the government of the rajah Chattersaul, about the middle of last century, by the chief of Furruckabad; and the rajah, to aid him in repelling the enemy, applied for support to the peishwa Sewai Bajerow. Success having attended them, he adopted Sewai Bajerow as his son, and partitioned Bundelcund between him and his own sons, allotting him a third of his dominions, the land revenue of which was estimated at about L.1,300,000 sterling; but under an express stipulation that his posterity should be protected by the peishwa in independent possession of the remainder. The rest of his male issue, said to exceed fifty, were in a state of dependence on their two brothers. In time this division opened the way to dissensions, a civil war ensued, and the consequent weakness of the chiefs afforded an opportunity for other invasions. Ali Bahauder, an illegitimate grandson of Bajerow, held a command in the army of Scindia, the noted Mahratta chief; and in the same army was the rajah Himmut Bahauder, who not only commanded a great body of cavalry, but was the spiritual head and military leader of a numerous sect of devotees, called Gosseins. In 1792 these two chiefs attempted the subjugation of Bundelcund. Their purpose, however, was but partially effected. An arrangement had been made with the peishwa, whereby he was acknowledged lord paramount of all the conquests effected in Bundelcund by Ali Bahauder, who engaged to obey him as his sovereign, and to pay him tribute. But the latter contrived to evade both conditions; and, after being occupied fourteen years in endeavouring to subjugate the country, died in 1802, during the blockade of Callinger, which, during ten years, he had fruitlessly endeavoured to capture. Ali was succeeded by his eldest son, Shumshere Bahauder, then absent at Poonah; and Himmut Bahauder, who, to retain his own influence, had for years been exciting disaffection among the different chiefs, now appointed a relation of Shumshere, the young rajah, regent of Bundelcund until his return. Almost immediately after the death of Ali Bahauder, the state of affairs assumed a totally different aspect by the flight of the peishwa from his capital to Bassein, and the treaty there concluded between that prince and the British government, by which the Bundelcund districts of Banda and Hummerpoor were transferred to the latter. Of the two chiefs who, while ostensibly yielding obedience to the peishwa, substantially held the ceded districts, Himmut Bahauder promoted the views of the British, while Shumshere made common cause with the Mahrattas against them. In September 1803, Colonel Powell crossed the river Jumna for the purpose of entering Bundelcund. Bunder
Abbas

Bunting.

and was joined by Himmut, with a body of thirteen or fourteen thousand men. The united forces, arriving on the banks of the river Cane, which passes the fort of Callinger and falls into the Jumna near the town of Oorcha, found the army of Shumshere on the opposite side. It was numerous, occupied a great extent, and was strongly posted; but after a short cannonade on both sides it precipitately retreated. Since this period military operations have occasionally been deemed indispensable to the firm establishment of the British power in Budelcund. In 1809 the fortress of Adjyghur was besieged by a British force. Three years later, the chief of the celebrated hill fort of Callinger having set the British authorities at defiance, it became necessary to invest the stronghold. This fort is built on a lofty rock, of great extent, and was formerly deemed by the natives to be impregnable. The walls are said to be six or seven miles in circuit; 170 pieces of cannon have been mounted on them; and a garrison of 5000 men was necessary for their defence. Nevertheless, its natural strength has enabled a smaller number to sustain long sieges; and the earlier invaders of Bundelcund have been compelled to retire, after unsuccessful blockades protracted during several years. The British force in attempting to take it by storm, was repulsed with great slaughter; but the garrison probably dreading a repetition of the assault, surrendered the place a few days afterwards. In 1817, by the treaty of Poonah, the British government acquired from the peishwa all his rights, interests, and pretensions, feudal, territorial, or pecuniary, in Bundelcuad. In carrying out the provisions of the treaty, an assurance was given by the British government that the rights of those interested in the transfer should be scrupulously respected; and the host of petty native principalities, by which the province is interlaced, is the best proof of the sincerity and good faith in which it

BÜNDER ABBAS. See Gombroon.

BUNEL, PIERRE, one of the most elegant writers of his time, was born at Toulouse in 1499, and died at Turin in 1546. He left behind him some Latin epistles, Epistolæ Ciceroniano Stylo Scriptæ, remarkable for the elegance and purity with which they are written. "Bunel," says Bayle, "was an honest man, the very person whom Diogenes wanted. His letters are written with the greatest purity, and contain curious facts." They were first published by Charles Stevens in 1551, and afterwards by Henry Stevens in 1581, a scarce edition. Another, but less correct edition, appeared at Toulouse in 1687, by J. Graverol.

BUNGALOW, the name given in India to a house or villa of a single floor. *Dah-Bungalows* are thatched houses constructed at the public expense, and placed at intervals, in many parts of India, for the accommodation of

travellers.

BUNGAY, a market-town in the county of Suffolk, 109 miles from London. It is a well-built town, comprising two parishes with their churches, and the ruins of an ancient monastery and of a castle. A considerable trade is carried on in corn, malt, flour, coal, lime, &c. by means of the river Waveney, which almost surrounds the town and common in the form of a horse-shoe, and which is navigable to the sea at Yarmouth. It has an octagonal market-house and cross, assembly rooms, savings-bank, baths, dispensary, alms-houses, and grammar-school with 4 scholarships at Emmanuel College, Cambridge. Market-day Thursday. Pop. (1851) 3841.

BUNKER HILL, a small elevation 110 feet high in the town of Charlestown, one mile north of Boston, in Massachusetts. One of the most celebrated battles in the war of American Independence was fought here on the 17th of June 1775. The British remained masters of the field after a long and bloody contest.

BUNTING. See Ornithology, Index.

Bunting, or Buntine, a thin woollen stuff used for the Bunting flags and signals of ships.  $\parallel$ 

grammar-school with 4 exhibitions of L.12 each at Christ's

flags and signals of ships.

BUNTINGFORD, a small market-town, with only a few hundred inhabitants, in the hundred of Edwinstree, county of Hertford, 31 miles north of London. It has a

College, Cambridge.

BUNYAN, JOHN, the most popular religious writer in the English language, was born at Elstow, about a mile from Bedford, in the year 1628. He may be said to have been born a tinker. The tinkers then formed a hereditary caste, which was held in no high estimation. They were generally vagrants and pilferers, and were often confounded with the gipsies, whom in truth they nearly resembled. Bunyan's father was more respectable than most of the tribe. He had a fixed residence, and was able to send his son to a village school where reading and writing were taught.

The years of John's boyhood were those during which the puritan spirit was in the highest vigour all over England; and nowhere had that spirit more influence than in Bedfordshire. It is not wonderful, therefore, that a lad to whom nature had given a powerful imagination and sensibility which amounted to a disease, should have been early haunted by religious terrors. Before he was ten, his sports were interrupted by fits of remorse and despair; and his sleep was disturbed by dreams of fiends trying to fly away with him. As he grew older, his mental conflicts became still more violent. The strong language in which he described them has strangely misled all his biographers except Mr Southey. It has long been an ordinary practice with pious writers to cite Bunyan as an instance of the supernatural power of divine grace to rescue the numan soul from the lowest depths of wickedness. He is called in one book the most notorious of profligates; in another, the brand plucked from the burning. He is designated in Mr Iviniey's History of the Baptists as the depraved Bunyan, the wicked tinker of Elstow. Mr Ryland, a man once of great note among the Dissenters, breaks out into the following rhapsody:-" No man of common sense and common integrity can deny that Bunyan was a practical atheist, a worthless contemptible infidel, a vile rebel to God and goodness, a common profligate, a soul-despising, a soul-murdering, a soul-damning, thoughtless wretch as could exist on the face of the earth. Now be astonished, O heavens, to eternity! and wonder, O earth and hell! while time endures. Behold this very man become a miracle of mercy, a mirror of wisdom, goodness, holiness, truth, and love." But whoever takes the trouble to examine the evidence will find that the good men who wrote this had been deceived by a phraseology which, as they had been hearing it and using it all their lives, they ought to have understood better. There cannot be a greater mistake than to infer from the strong expressions in which a devout man bemoans his exceeding sinfulness, that he has led a worse life than his neighbours. Many excellent persons, whose moral character from boyhood to old age has been free from any stain discernible to their fellow creatures, have, in their autobiographies and diaries, applied to themselves, and doubtless with sincerity, epithets as severe as could be applied to Titus Oates or Mrs Brownrigg. It is quite certain that Bunyan was, at eighteen, what, in any but the most austerely puritanical circles, would have been considered as a young man of singular gravity and innocence. Indeed, it may be remarked that he, like many other penitents who, in general terms, acknowledge themselves to have been the worst of mankind, fired up, and stood vigorously on his defence, whenever any particular charge was brought against him by others. He declares, it is true, that he had let loose the reins on the neck of his lusts, that he had delighted in all transgressions against the divine law, and that he had been the ringleade. of the youth of Elstow in all manner of vice. But when

Bunyan. those who wished him ill accused him of licentious amours, ✓ he called on God and the angels to attest his purity. No woman, he said, in heaven, earth, or hell, could charge him with having ever made any improper advances to her. Not only had he been strictly faithful to his wife; but he had, even before his marriage, been perfectly spotless. It does not appear from his own confessions, or from the railings of his enemies, that he ever was drunk in his life. One bad habit he contracted, that of using profane language; but he tells us that a single reproof cured him so effectually that he never offended again. The worst that can be laid to the charge of this poor youth, whom it has been the fashion to represent as the most desperate of reprobates, as a village Rochester, is that he had a great liking for some diversions, quite harmless in themselves, but condemned by the rigid precisians among whom he lived, and for whose opinion he had a great respect. The four chief sins of which he was guilty were dancing, ringing the bells of the parish church, playing at tipcat, and reading the History of Sir Bevis of Southampton. A Rector of the school of Laud would have held such a young man up to the whole parish as a model. But Bunyan's notions of good and evil had been learned in a very different school; and he was made miserable by the conflict between his tastes and his scruples.

When he was about seventeen, the ordinary course of his life was interrupted by an event which gave a lasting colour to his thoughts. He enlisted in the parliamentary army, and served during the decisive campaign of 1645. All that we know of his military career is that, at the siege of Leicester, one of his comrades, who had taken his post, was killed by a shot from the town. Bunyan ever after considered himself as having been saved from death by the special interference of Providence. It may be observed, that his imagination was strongly impressed by the glimpse which he had caught of the pomp of war. To the last he loved to draw his illustrations of sacred things from camps and fortresses, from guns, drums, trumpets, flags of truce, and regiments arrayed, each under its own banner. His Greatheart, his Captain Boanerges, and his Captain Credence, are evidently portraits, of which the originals were among those martial saints who fought and expounded in Fairfax's army.

In a few months Bunyan returned home, and married. His wife had some pious relations, and brought him as her only portion some pious books. And now his mind, excitable by nature, very imperfectly disciplined by education, and exposed, without any protection, to the infectious virulence of the enthusiasm which was then epidemic in England, began to be fearfully disordered. In outward things he soon became a strict Pharisee. He was constant in attendance at prayers and sermons. His favourite amusements were, one after another, relinquished, though not without many painful struggles. In the middle of a game at tipcat he paused, and stood staring wildly upwards with his stick in his hand. He had heard a voice asking him whether he would leave his sins and go to heaven, or keep his sins and go to hell; and he had seen an awful countenance frowning on him from the sky. The odious vice of bell-ringing he renounced; but he still for a time ventured to go to the church tower and look on while others pulled the ropes. But soon the thought struck him that, if he persisted in such wickedness, the steeple would fall on his head; and he fled in terror from the accursed place. To give up dancing on the village green was still harder; and some months elapsed before he had the fortitude to part with this darling sin. When this last sacrifice had been made, he was, even when tried by the maxims of that austere time, faultless. All Elstow talked of him as an eminently pious youth. But his own mind was more unquiet than ever. Having nothing more to do in the way of visible reformation, yet finding in religion no pleasures to supply the place of the juvenile amusements which he had relinquished, he began to apprehend that he

lay under some special malediction; and he was tormented Bunyanby a succession of fantasies which seemed likely to drive him to suicide or to Bedlam.

At one time he took it into his head that all persons of Israelite blood would be saved, and tried to make out that he partook of that blood; but his hopes were speedily destroyed by his father, who seems to have had no ambition to be regarded as a Jew.

At another time Bunyan was disturbed by a strange dilemma: "If I have not faith, I am lost; if I have faith, I can work miracles." He was tempted to cry to the puddles between Elstow and Bedford, "Be ye dry," and to stake his eternal hopes on the event.

Then he took up a notion that the day of grace for Bedford and the neighbouring villages was passed; that all who were to be saved in that part of England were already converted; and that he had begun to pray and strive some months too late.

Then he was harassed by doubts whether the Turks were not in the right, and the Christians in the wrong. Then he was troubled by a maniacal impulse which prompted him to pray to the trees, to a broomstick, to the parish bull. As vet, however, he was only entering the Valley of the Shadow of Death. Soon the darkness grew thicker. Hideous forms floated before him. Sounds of cursing and wailing were in his ears. His way ran through stench and fire, close to the mouth of the bottomless pit. He began to be haunted by a strange curiosity about the unpardonable sin, and by a morbid longing to commit it. But the most frightful of all the forms which his disease took was a propensity to utter blasphemy, and especially to renounce his share in the benefits of the redemption. Night and day, in bed, at table, at work, evil spirits, as he imagined, were repeating close to his ear the words, "Sell him, sell him." He struck at the hobgoblins; he pushed them from him; but still they were ever at his side. He cried out in answer to them, hour after hour, "Never, never; not for thousands of worlds; not for thousands." At length, worn out by this long agony, he suffered the fatal words to escape him, "Let him go, if he will." Then his misery became more fearful than ever. He had done what could not be forgiven. He had forfeited his part of the great sacrifice. Like Esau, he had sold his birthright; and there was no longer any place for repentance. "None," he afterwards wrote, "knows the terrors of those days but myself." He has described his sufferings with singular energy, simplicity, and pathos. He envied the brutes; he envied the very stones in the street, and the tiles on the houses. The sun seemed to withhold its light and warmth from him. His body, though cast in a sturdy mould, and though still in the highest vigour of youth, trembled whole days together with the fear of death and judgment. He fancied that this trembling was the sign set on the worst reprobates, the sign which God had put on Cain. The unhappy man's emotion destroyed his power of digestion. He had such pains that he expected to burst asunder like Judas, whom he regarded as his prototype.

Neither the books which Bunyan read, nor the advisers whom he consulted, were likely to do much good in a case like his. His small library had received a most unseasonable addition, the account of the lamentable end of Francis Spira. One ancient man of high repute for piety, whom the sufferer consulted, gave an opinion which might well have produced fatal consequences. "I am afraid," said Bunyan, "that I have committed the sin against the Holy Ghost." "Indeed," said the old fanatic, "I am afraid that you have."

At length the clouds broke; the light became clearer and clearer; and the enthusiast, who had imagined that he was branded with the mark of the first murderer, and destined to the end of the arch traitor, enjoyed peace and a cheerful confidence in the mercy of God. Years elapsed, however, before his nerves, which had been so perilously

Bunyan. overstrained, recovered their tone. When he had joined a Baptist society at Bedford, and was for the first time admitted to partake of the Eucharist, it was with difficulty that he could refrain from imprecating destruction on his brethren while the cup was passing from hand to hand. After he had been some time a member of the congregation, he began to preach; and his sermons produced a powerful effect. He was indeed illiterate; but he spoke to illiterate men. The severe training through which he had passed had given him such an experimental knowledge of all the modes of religious melancholy as he could never have gathered from books; and his vigorous genius, animated by a fervent spirit of devotion, enabled him not only to exercise a great influence over the vulgar, but even to extort the half contemptuous admiration of scholars. Yet it was long before he ceased to be tormented by an impulse which urged him to utter words

of horrible impiety in the pulpit.

Counter-irritants are of as great use in moral as in physical diseases. It should seem that Bunyan was finally relieved from the internal sufferings which had embittered his life by sharp persecution from without. He had been five years a preacher, when the Restoration put it in the power of the Cavalier gentlemen and clergymen all over the country to oppress the Dissenters; and, of all the Dissenters whose history is known to us, he was perhaps the most hardly treated. In November 1660, he was flung into Bedford gaol; and there he remained, with some intervals of partial and precarious liberty, during twelve years. His persecutors tried to extort from him a promise that he would abstain from preaching; but he was convinced that he was divinely set apart and commissioned to be a teacher of righteousness, and he was fully determined to obey God rather than man. He was brought before several tribunals, laughed at, caressed, reviled, menaced, but in vain. He was facetiously told that he was quite right in thinking that he ought not to hide his gift; but that his real gift was skill in repairing old kettles. He was compared to Alexander the coppersmith. He was told that, if he would give up preaching, he should be instantly liberated. He was warned that, if he persisted in disobeying the law, he would be liable to banishment, and that, if he were found in England after a certain time, his neck would be stretched. His answer was, "If you let me out to-day, I will preach again to-morrow." Year after year he lay patiently in a dungeon, compared with which the worst prison now to be found in the island is a palace. His fortitude is the more extraordinary, because his domestic feelings were unusually strong. Indeed, he was considered by his stern brethren as somewhat too fond and indulgent a parent. He had several small children, and among them a daughter who was blind, and whom he loved with peculiar tenderness. He could not, he said, bear even to let the wind blow on her; and now she must suffer cold and hunger; she must beg; she must be beaten; "yet," he added, "I must, I must do it." While he lay in prison he could do nothing in the way of his old trade for the support of his family. He determined, therefore to take up a new trade. He learned to make long tagged thread laces; and many thousands of these articles were furnished by him to the hawkers. While his hands were thus busied, he had other employment for his mind and his lips. He gave religious instruction to his fellow-captives, and formed from among them a little flock, of which he was himself the pastor. He studied indefatigably the few books which he possessed. His two chief companions were the Bible and Fox's Book of Martyrs. His knowledge of the Bible was such that he might have been called a living concordance; and on the margin of his copy of the Book of Martyrs are still legible the ill spelt lines of doggrel in which he expressed his reverence for the brave sufferers, and his implacable enmity to the mystical Babylon.

At length he began to write, and, though it was some

time before he discovered where his strength lay, his writ- Bunyan. ings were not unsuccessful. They were coarse, indeed, but they showed a keen mother wit, a great command of the homely mother tongue, an intimate knowledge of the English Bible, and a vast and dearly bought spiritual experience. They therefore, when the corrector of the press had improved the syntax and the spelling, were well received by the humbler class of Dissenters.

Much of Bunyan's time was spent in controversy. He wrote sharply against the Quakers, whom he seems always to have held in utter abhorrence. It is, however, a remarkable fact that he adopted one of their peculiar fashions: his practice was to write, not November or December, but

eleventh month and twelfth month.

He wrote against the liturgy of the Church of England. No two things, according to him, had less affinity than the form of prayer and the spirit of prayer. Those, he said with much point, who have most of the spirit of prayer are all to be found in gaol; and those who have most zeal for the form of prayer are all to be found at the alehouse. The doctrinal articles, on the other hand, he warmly praised, and defended against some Arminian clergymen who had signed them. The most acrimonious of all his works is his answer to Edward Fowler, afterwards bishop of Gloucester, an excellent man, but not free from the taint of Pela-

Bunyan had also a dispute with some of the chiefs of the sect to which he belonged. He doubtless held with perfect sincerity the distinguishing tenet of that sect, but he did not consider that tenet as one of high importance, and willingly joined in communion with pious Presbyterians and Independents. The sterner Baptists, therefore, loudly pronounced him a false brother. A controversy arose which long survived the original combatants. In our own time the cause which Bunyan had defended with rude logic and rhetoric against Kiffin and Danvers was pleaded by Robert Hall with an ingenuity and eloquence such as no polemical writer has ever surpassed.

During the years which immediately followed the Restoration, Bunyan's confinement seems to have been strict. But as the passions of 1660 cooled, as the hatred with which the Puritans had been regarded while their reign was recent gave place to pity, he was less and less harshly treated. The distress of his family, and his own patience, courage, and piety, softened the hearts of his persecutors. Like his own Christian in the cage, he found protectors even among the crowd of Vanity Fair. The Bishop of the diocese, Dr Barlow, is said to have interceded for him. At length the prisoner was suffered to pass most of his time beyond the walls of the gaol, on condition, as it should seem, that he remained within the town of Bedford.

He owed his complete liberation to one of the worst acts of one of the worst governments that England has ever seen. In 1671 the Cabal was in power. Charles II. had concluded the treaty by which he bound himself to set up the Roman Catholic religion in England. The first step which he took towards that end was to annul, by an unconstitutional exercise of his prerogative, all the penal statutes against the Roman Catholics; and, in order to disguise his real design, he annulled at the same time the penal statutes against Protestant nonconformists. Bunyan was consequently set at large. In the first warmth of his gratitude he published a tract in which he compared Charles to that humane and generous Persian king who, though not himself blessed with the light of the true religion, favoured the chosen people, and permitted them, after years of captivity, to rebuild their beloved temple. To candid men, who consider how much Bunyan had suffered, and how little he could guess the secret designs of the court, the unsuspicious thankfulness with which he accepted the precious boon of freedom will not appear to require any apology.

Bunyan.

Before he left his prison he had begun the book which has made his name immortal. The history of that book is remarkable. The author was, as he tells us, writing a treatise, in which he had occasion to speak of the stages of the Christian progress. He compared that progress, as many others had compared it, to a pilgrimage. Soon his quick wit discovered innumerable points of similarity which had escaped his predecessors. Images came crowding on his mind faster than he could put them into words, quagmires and pits, steep hills, dark and horrible glens, soft vales. sunny pastures, a gloomy castle of which the courtyard was strewn with the skulls and bones of murdered prisoners, a town all bustle and splendour, like London on the Lord Mayor's Day, and the narrow path, straight as a rule could make it, running on up hill and down hill, through city and through wilderness, to the Black River and the Shining Gate. He had found out, as most people would have said, by accident, as he would doubtless have said, by the guidance of Providence, where his powers lay. He had no suspicion, indeed, that he was producing a masterpiece. He could not guess what place his allegory would occupy in English literature; for of English literature he knew nothing. Those who suppose him to have studied the Fairy Queen might easily be confuted, if this were the proper place for a detailed examination of the passages in which the two allegories have been thought to resemble each other. The only work of fiction, in all probability, with which he could compare his Pilgrim, was his old favourite, the legend of Sir Bevis of Southampton. He would have thought it a sin to borrow any time from the serious business of his life, from his expositions, his controversies, and his lace tags, for the purpose of amusing himself with what he considered merely as a trifle. It was only, he assures us, at spare moments that he returned to the House Beautiful, the Delectable Mountains, and the Enchanted Ground. He had no assistance. Nobody but himself saw a line till the whole was complete. He then consulted his pious friends. were pleased. Others were much scandalized. It was a vain story, a mere romance, about giants, and lions, and goblins, and warriors, sometimes fighting with monsters, and sometimes regaled by fair ladies in stately palaces. The loose atheistical wits at Will's might write such stuff to divert the painted Jezebels of the court: but did it become a minister of the gospel to copy the evil fashions of the world? There had been a time when the cant of such fools would have made Bunyan miserable. But that time was passed; and his mind was now in a firm and healthy state. He saw that, in employing fiction to make truth clear and goodness attractive, he was only following the example which every Christian ought to propose to himself; and he determined to print.

The Pilgrim's Progress stole silently into the world. Not a single copy of the first edition is known to be in existence. The year of publication has not been ascertained. It is probable that, during some months, the little volume circulated only among poor and obscure sectaries. But soon the irresistible charm of a book which gratified the imagination of the reader with all the action and scenery of a fairy tale, which exercised his ingenuity by setting him to discover a multitude of curious analogies, which interested his feelings for human beings, frail like himself, and struggling with temptations from within and from without, which every moment drew a smile from him by some stroke of quaint yet simple pleasantry, and nevertheless left on his mind a sentiment of reverence for God and of sympathy for man, began to produce its effect. In puritanical circles, from which plays and novels were strictly excluded, that effect was such as no work of genius, though it were superior to the Iliad, to Don Quixote, or to Othello, can ever produce on a mind accustomed to indulge in literary luxury. In 1678 came forth a second edition with additions; and

then the demand became immense. In the four following Bunyan. years the book was reprinted six times. The eighth edition, which contains the last improvements made by the author, was published in 1682, the ninth in 1684, the tenth in 1685. The help of the engraver had early been called in; and tens of thousands of children looked with terror and delight on execrable copperplates, which represented Christian thrusting his sword into Apollyon, or writhing in the grasp of Giant Despair. In Scotland, and in some of the colonies, the Pilgrim was even more popular than in his native country. Bunyan has told us, with very pardonable vanity, that in New England his dream was the daily subject of the conversation of thousands, and was thought worthy to appear in the most superb binding. He had numerous admirers in Holland, and among the Huguenots of France. With the pleasures, however, he experienced some of the pains of eminence. Knavish booksellers put forth volumes of trash under his name, and envious scribblers maintained it to be impossible that the poor ignorant tinker should really be the author of the book which was called his.

He took the best way to confound both those who counterfeited him and those who slandered him. He continued to work the Gold-field which he had discovered, and to draw from it new treasures, not indeed with quite such ease and in quite such abundance as when the precious soil was still virgin, but yet with success which left all competition far behind. In 1684 appeared the second part of the *Pilgrim's Progress*. It was soon followed by the *Holy War*, which, if the *Pilgrim's Progress* did not exist, would be the best allegory that ever was written.

Bunyan's place in society was now very different from what it had been. There had been a time when many Dissenting ministers, who could talk Latin and read Greek, had affected to treat him with scorn. But his fame and influence now far exceeded theirs. He had so great an authority among the Baptists that he was popularly called Bishop Bunyan. His episcopal visitations were annual. From Bedford he rode every year to London, and preached there to large and attentive congregations. From London he went his circuit through the country, animating the zeal of his brethren, collecting and distributing alms, and making up quarrels. The magistrates seem in general to have given him little trouble. But there is reason to believe that, in the year 1685, he was in some danger of again occupying his old quarters in Bedford gaol. In that year the rash and wicked enterprise of Monmouth gave the government a pretext for prosecuting the nonconformists; and scarcely one eminent divine of the Presbyterian, Independent, or Baptist persuasion remained unmolested. Baxter was in prison: Howe was driven into exile: Henry was arrested. Two eminent Baptists, with whom Bunyan had been engaged in controversy, were in great peril and distress. Danvers was in danger of being hanged; and Kiffin's grandsons were actually hanged. The tradition is that, during those evil days, Bunyan was forced to disguise himself as a waggoner, and that he preached to his congregation at Bedford in a smock-frock, with a cart-whip in his hand. But soon a great change took place. James the Second was at open war with the church, and found it necessary to court the Dissenters. Some of the creatures of the government tried to secure the aid of Bunyan. They probably knew that he had written in praise of the indulgence of 1672, and therefore hoped that he might be equally pleased with the indulgence of 1687. But fifteen years of thought, observation, and commerce with the world had made him wiser. Nor were the cases exactly parallel. Charles was a professed Protestant: James was a professed Papist. The object of Charles's indulgence was disguised: the object of James's indulgence was patent. Bunyan was not deceived. He exhorted his hearers to prepare themselves by fasting and prayer for the danger which menaced

Bunyan. their civil and religious liberties, and refused even to speak to the courtier who came down to remodel the corporation of Bedford, and who, as was supposed, had it in charge to offer some municipal dignity to the Bishop of the Baptists.

Bunyan did not live to see the Revolution. In the summer of 1688 he undertook to plead the cause of a son with an angry father, and at length prevailed on the old man not to disinherit the young one. This good work cost the benevolent intercessor his life. He had to ride through heavy rain. He came drenched to his lodgings on Snow Hill, was seized with a violent fever, and died in a few days. He was buried in Bunhill Fields; and the spot where he lies is still regarded by the nonconformists with a feeling which seems scarcely in harmony with the stern spirit of their theology. Many puritans to whom the respect paid by Roman Catholics to the reliques and tombs of saints seemed childish or sinful, are said to have begged with their dying breath that their coffins might be placed as near as possible to the coffin of the author of the Pilgrim's Progress.

The fame of Bunyan during his life, and during the century which followed his death, was indeed great, but was almost entirely confined to religious families of the middle and lower classes. Very seldom was he during that time mentioned with respect by any writer of great literary eminence. Young coupled his prose with the poetry of the wretched D'Urfey. In the Spiritual Quixote, the adventures of Christian are ranked with those of Jack the Giant-Killer and John Hickathrift. Cowper ventured to praise the great allegorist, but did not venture to name him. It is a significant circumstance that, till a recent period, all the numerous editions of the *Pilgrim's Progress* were evidently meant for the cottage and the servant's hall. The paper, the printing, the plates, were all of the meanest description. In general, when the educated minority and the common people differ about the merit of a book, the opinion of the educated minority finally prevails. The Pilgrim's *Progress* is perhaps the only book about which, after the lapse of a hundred years, the educated minority has come

over to the opinion of the common people. The attempts which have been made to improve and to imitate this book are not to be numbered. It has been done into verse: it has been done into modern English. The Pilgrimage of Tender Conscience, the Pilgrimage of Good Intent, the Pilgrimage of Seek Truth, the Pilgrimage of Theophilus, the Infant Pilgrim, the Hindoo Pilgrim, are among the many feeble copies of the great original. But the peculiar glory of Bunyan is that those who most hated his doctrines have tried to borrow the help of his genius. A Catholic version of his parable may be seen with the head of the Virgin in the title page. On the other hand, those Antinomians for whom his Calvinism is not strong enough, may study the pilgrimage of Hephzibah, in which nothing will be found which can be construed into an admission of free agency and universal redemption. But the most extraordinary of all the acts of Vandalism by which a fine work of art was ever defaced was committed so late as the year 1853. It was determined to transform the *Pilgrim's* Progress into a Tractarian book. The task was not easy: for it was necessary to make the two sacraments the most prominent objects in the allegory; and of all Christian theologians, avowed Quakers excepted, Bunyan was the one in whose system the sacraments held the least prominent place. However, the Wicket Gate became a type of baptism, and the House Beautiful of the Eucharist. The effect of this change is such as assuredly the ingenious person who made it never contemplated. For, as not a single pilgrim passes through the Wicket Gate in infancy, and as Faithful hurries past the House Beautiful without stopping, the lesson which the fable in its altered shape teaches, is that none but adults ought to be baptized, and that the Eucha-

rist may safely be neglected. Nobody would have discovered Bunzlau from the original Pilgrim's Progress that the author was not a Pædobaptist. To turn his book into a book against Pædo-Buphonia. baptism was an achievement reserved for an Anglo-Catholic divine. Such blunders must necessarily be committed by every man who mutilates parts of a great work, without taking a comprehensive view of the whole.

BUNZLAU, the capital of a circle of the same name in the government of Liegnitz in Prussian Silesia. It is situated on the Bober, 24 miles W.N.W. of Liegnitz, and in 1849 had 6668 inhabitants. It has a hospital, orphan asylum, several churches and schools, and manufactures of linens, woollens, hosiery, earthenware, &c. In the market-place is a monument to the Russian general Kutusoff, who died there in 1813.

Bunzlau, Jung, or New Bunzlau, the capital of the circle of Bunzlau in Bohemia, stands on the left bank of the Iser, a tributary of the Elbe, 32 miles N.E. of Prague. It has considerable manufactures of cotton and woollen goods, leather, &c., and about 5100 inhabitants.

BUOY, a close empty cask, or a block of wood or cork, fastened by a rope to an anchor, and floating on the water, to show where the anchor is situated. Buoys are of various kinds: as can-buoys, in the form of a cone; nun-buoys, which swell in the middle, and taper to a point at each end; cable-buoys, empty casks, employed to buoy up the cable in rocky anchorage. Buoys are also used to indicate the position of rocks and shoals, or to mark a channel.

The *life-buoy*, of which there are various kinds, is used to throw overboard to preserve a person from drowning. The kind now commonly used in the navy consists of two hollow copper vessels connected together, between which there is fixed a hollow pole, with a port-fire fixed to its top. This apparatus, which is properly ballasted, is suspended so as to be ready for use at a moment's notice; and it is so contrived that by the act of letting it off the port-fire is ignited; thus enabling the person in the water to discern the buoy in the darkest night.

BUPALUS, a celebrated sculptor of the island of Chios, was the son, grandson, and great grandson of sculptors. Bupalus, and his brother Athenis, who was likewise a sculptor, flourished about B.C. 500, being contemporary with the poet Hipponax, whom they caricatured. (Pliny.) Augustus adorned many of the temples at Rome with their works, which were executed in the white marble of Paros. Bupalus is mentioned by Pausanias as a good architect as well as sculptor.

BUPHONIA, or DIPOLEIA, or DIPOLIA, a festival of great antiquity, celebrated annually on the acropolis of Athens, on the 14th of the month Scirophorion (June); on which occasion an ox was sacrificed in honour of Zeus (Jupiter). The origin of the Buphonia is related as follows: -In the reign of Erechtheus, at the celebration of the Dionysia, or according to the Scholiast on Aristophanes at the Diipolia, an ox ate the corn or cakes which had been prepared for the sacrifice; at which one Thaulon, or Baulon (or according to others the βουφόνος, one of the priests thus designated), was so incensed that he killed the animal, and immediately took to flight. The Athenians, dreading the resentment of the gods, and feigning themselves ignorant of the guilty person, brought the bloody axe before the judges, by whom it was solemnly arraigned, tried, found guilty, and condemned. In memory of this event a festival was instituted under the name of Buphonia, in which it was customary for the priest to fly, and judgment to be given respecting the slaughter of the ox. (Porphyrius, De Abstinent. ii.)

It may be observed, that this legend carries us back to that early period of Grecian history when it had not yet become customary to offer up living victims on the altars of the gods.

BURBOT. See ICHTHYOLOGY, Index.

BURCKHARDT, John Ludwig, celebrated for his extensive journeys in the East, was descended from an ancient family in Switzerland, who had been long established at Kirchgarten, near Lausanne. His father, John Rudolph, had been tried by a French military commission on a charge of having delivered up the tête du pont at Hunningen to the Austrians, and, though acquitted, received such treatment from the French republican authorities as made a lasting impression on his mind, and induced him to remove his family from the territories where their power predominated, and to establish them at Basle. He then entered into a Swiss corps in the service of England.

John Ludwig, the eighth son, was born at Lausanne in 1784. Having acquired the usual classical instruction at Neufchâtel, he was placed at the university of Leipzig; and, after a residence there of two years, he concluded his studies at Gottingen. During his residence at the latter seat of learning, his talents, application, and good conduct, had gained him the esteem and respect of the professors, but especially of the celebrated Blumenbach. When he resolved on proceeding to England, Blumenbach gave him a letter of introduction to Sir Joseph Banks, who, with the other members of the African Association to whom he was introduced, accepted his offer of travelling to explore the interior of Africa. After the plan of his journey had been settled, he diligently prepared himself for it by application to those studies which were most appropriate. He passed his time partly in London and partly at Cambridge in acquiring a knowledge of astronomy, chemistry, mineralogy, medicine, and surgery. He suffered his beard to grow, accustomed himself to the dress and manners of the East, inured himself to all kinds of hardships and privations, and diligently learned to read, write, and speak the Arabic language; in all which pursuits he was much assisted by Browne, who during his travels in Africa had acquired a perfect knowledge of the languages and customs of Mahommedan nations.

After these preparations, having received his instructions from the society, he left England, and in April 1809 reached Malta; whence he proceeded, in the following October, to Aleppo. Being determined to acquire the Arabic language in perfection, he appeared there as a Mussulman under the name of Sheihk Ibrahim Ibn Abdallah; and, during more than two years passed in that part of Asia, he had so perfected himself in the language as not to be distinguished from the natives, and acquired such accurate knowledge of the contents of the Koran, and of the commentaries upon its religion and laws, that after a critical examination, the most learned Mussulman entertained no doubt of his being really what he professed to be, a learned doctor of their law.

During his residence in Syria he visited Palmyra, Damascus, Lebanon, and the other parts of that interesting country, and thence repaired to Cairo in Egypt, with the intention of joining a caravan, and travelling to Fezzan, in the north of Africa. In 1812, whilst waiting for the departure of the caravan, he undertook a journey to the Nile, as far up as Mahass; and then, in the character of a poor Syrian merchant, he made a journey through the Nubian desert which Bruce had traversed, passing by Berber and Shendy to Suakim, on the Red Sea; whence he performed the pilgrimage to Mecca by way of Jidda. In this journey he endured privations and sufferings of the severest kind. He returned thence to Cairo in a state of great exhaustion; but in the spring of 1816, he travelled to Mount Sinai, whence he returned to Cairo in June, and there made preparations for his intended journey to Fezzan, and to explore the sources of the Niger. Several hindrances prevented his prosecuting this intention, till at length, in April 1817, when the long-expected caravan prepared to depart, he was

seized with an illness which ended his life. He had trom time to time carefully transmitted his journals and remarks, and a very copious series of letters; so that nothing which appeared to him to be interesting in the various journeys he made has been lost.

The communications from Burckhardt were laid, from time to time, before the public with appropriate maps; and much light has been thrown by them on the geography of the countries he visited, and on the manners, laws, religion, and commerce of their inhabitants. His Journey along the Banks of the Nile from Assouan to Mahass, on the Frontier of Dongola, was published in 1819, in 4to; and the volume also contained a description of a Journey from Upper Egypt through the Deserts of Nubia to Jidda in Arabia. To this is added an Appendix, with an Itinerary from the Frontiers of Bornou and by Bahr el Ghazal and Darfour to Shendy; and notices of the country of Soudan, west of Darfour, with vocabularies of the several languages.

In 1822 a volume was pullished containing a Tour from Damascus in the countries of Libanus and Anti-Libanus; a Journal of an Excursion into the Haouran in 1810; a Journey from Aleppo to Damascus in 1812; a Journey from Damascus into the Haouran in 1811; a Journey from Damascus through the Mountains of Arabia Petræa in 1812; and a Journal of a Tour in the Peninsula of Mount Sinai in 1816. In 1829 was published a posthumous volume of Travels in Arabia, in 4to (2 vols. 8vo); and in 1830 another volume, in 4to, entitled Manners and Customs of the Egyptians. (w. J.)

BURDEN, or BURDON (French bourdon, a drone), in Music, the drone, or bass, and the pipe or string which plays it; hence applied to that part of a song which is repeated at the end of every stanza. A chord which is divided so as to perform the intervals of music, when open and undivided, is also called the burden.

Burden, or Burthen (Saxon byrden, or byrthen), a fixed quantity of any commodity for transit.

BURDEN of a Ship, its contents, or the number of tons it will carry. See Tonnage.

BURDER, George, one of the founders of the London Missionary Society, was born in 1752. He was for twenty years minister of the West Orchard Chapel at Coventry. At the end of this period he removed to London, where for twenty-nine years he officiated at the Fetter Lane Chapel. For many years he performed gratuitously the duties of secretary to the London Missionary Society, and edited with much success the Evangelical Magazine. He is chiefly remembered now as the author of the Village Sermons, which appeared at intervals from 1799 to 1812, and were at last completed in six volumes. He edited many works, and among them the Pilgrim's Progress; Collin's Weaver's Pocket-Book, or Weaving Spiritualized; and Henry's Bible with Improvements. He died at London in 1832 in the eightieth year of his age.

BURDETT, SIR FRANCIS, Baronet, was born January 25, 1770. The rudiments of his education he received at Westminster School, whence he removed in due time to Oxford. He did not wait to graduate at that university, but in 1790 set out on a Continental tour, in the course of which he became strongly imbued with the revolutionary principles then dominant in France and other countries. On his return to England in 1793 he married the youngest daughter of Mr Coutts, a wealthy banker, with whom he received a large fortune. Through the influence of the Duke of Newcastle he was chosen M.P. for Boroughbridge, on which occasion he had as colleague Mr Scott, afterwards Lord Eldon. At the outset of his political career he was a zealous supporter of ultra-liberal measures. In 1802, after a protracted contest, he was elected M.P. for Middlesex, in opposition to the former member Mr Mainwaring. The election however was declared void, and in the subsequent

Burden || Burdett.

Burdwan canvass he was defeated. In 1806 he again stood for Middlesex and was again defeated, but when he stood for Westminster in the same year he was elected by a large majority. The obstinate violence with which he opposed the existing government hurried him into indiscretions, which ended in his committal to the Tower. The mob, with whom his popularity was unbounded, endeavoured to rescue him, and some lives were lost in the unsuccessful attempt. At the prorogation of parliament he was released, and lost no time in prosecuting the Speaker and the Sergeant-at-arms. His action however failed. On the occasion of the Manchester riots in 1809 he wrote a letter to his constituents, for which he was tried for libel, found guilty, and condemned to three months' imprisonment, and to pay a fine of L.1000. In 1837, he ceased to represent Westminster, and when he was returned for North Wiltshire he joined the conservative party, which he supported during the remainder of his political career. He died on the 23d of January 1844.

BURDWAN, a province of Hindustan, presidency of Bengal. It is bounded on the north by the British district of Beerbhoom; on the N.E. and E. by that of Nuddea; on the south by Hooghly and Midnapore; and on the west by Bancoorah. It lies between Lat. 22. 52.—23. 40. Long. 87. 21.—88. 23., is 70 miles in length from N.E. to S.W., and 60 in breadth in the direction of the opposite angles, and contains an area of 2224 square miles. district is perhaps the best cultivated and most productive of any similar extent of territory in India; while it appears like a garden in a wilderness, being surrounded by the jungles of Midnapoor in Orissa, of Pachete, and of Beerbhoom. Its products are grain, cotton, silk, sugar, and indigo, which it yields in great abundance, and of excellent quality. One of the most important objects of manufacture is the refining of sugar. The population has been estimated at 1,854,152. Several rivers traverse the province or form its boundaries, among which are the Hooghly, the Hadjee, the Bhagruttee and the Damooda. It is also intersected by the great trunk line of railroad from Calcutta to Rajmahal on the Ganges; and also by a branch from the main line extending from the town of Burdwan to the collieries at Raneegunge. The tract comprised within the province was acquired by the East India Company, under treaty with Meer Cossim in 1760, and confirmed by Shah Alum, emperor of Delhi in 1765. Burdwan, the principal place of the district, containing a population of upwards of 50,000 inhabitants, is situate in Lat. 23. 12. Long. 87. 56.

BURFORD, a market-town and parish of the hundred of Bampton, in the county of Oxford, on the river Windrush, 76 miles from London. It is celebrated as the place where an ecclesiastical synod was held in 685, to determine the time for celebrating Easter; for a battle between Cuthred, king of the West Saxons, and Ethelbald, king of the Mercians; and for a victory by Fairfax in 1649 over the army of Charles I. The church is a large and handsome fabric, with a lofty spire. The houses are, with few exceptions, irregular and ill built. There is very little trade. Market-day Saturday. Population of parish in 1852, 1819.

BURG, a walled town of Prussian Saxony, the capital of the circle of Jerichow I., in the government of Magdeburg. It stands on the river Ihle, on the railway from Berlin to Magdeburg, 14 miles N.E. of the latter. It has long been noted for its woollen manufactures, which still afford employment to a great part of its population. It has also several dye-works, and tobacco and snuff manufactories. Pop. (1849) 14,673.

BURGAGE is a form of tenure, both in England and Scotland, applicable to the property connected with the old municipal corporations and their privileges. The term is of less practical importance in the English than in the Scottish system, where it still holds an important place in the practice of conveyancing, real property being there gene-

rally divided into feudal-holding and burgage-holding. It is Bürger. usual to speak of the English burgage-tenure as a relic of Saxon freedom resisting the shock of the Norman conquest and its feudalism, but it is perhaps more correct to consider it a local feature of that general exemption from feudality enjoyed by the municipia as a relic of their ancient Roman constitution. The reason for the system preserving its specifically distinct form in Scottish conveyancing, is because burgage-holding was an exception to the system of subinfeudation which remained prevalent in Scotland when it was suppressed in England. While other vassals might hold of a graduated hierarchy of overlords up to the crown, the burgess always held directly of the sovereign. It is curious that while in England the burgage-tenure was deemed a species of soccage to distinguish it from the military holdings, in Scotland it was strictly a military holding, by the service of watching and warding for the defence of the burgh. In England the franchises enjoyed by burgesses, freemen, and other consuetudinary constituencies in burghs, were dependent on the character of the burgage-tenure. (See MUNICIPAL CORPORATIONS.) (J. H. B.)

BURGER, GOTTFRIED AUGUSTUS, a celebrated German poet, born January 1, 1748, at Wolmerswende, a village in the principality of Halberstadt, where his father was Lutheran minister. In his childhood he discovered little inclination to study: the Bible and the Canticles alone had any attraction for him; and his first attempts in versification were imitations of the Psalms. It is to this first direction of his studies that we are to attribute the biblical phrases, and the allusions to Christianity, which we find even in his amatory poetry. He was fond of solitude, and indulged in all the romantic sentiments which deserts and the gloom of forests inspire. From the school of Aschersleben, where his maternal grandfather resided, and which he quitted in consequence of receiving a severe chastisement for composing an epigram, he was sent to the institution at Halle. But at neither of these places did he make much progress, having a taste only for the lessons in prosody and versification. In 1764 Bürger, who was intended for the clerical office, began to attend the course of lectures given by the professors of the university. Klotz, a learned classical scholar, admitted him into the select number of the young men whose talents he took a pleasure in cultivating; but this society appears not to have produced the same favourable effect onthe moral character of Bürger as on his genius. His conduct prejudiced his grandfather Bauer against him; and it was with difficulty that he obtained from him some further assistance, with permission, in the year 1768, to repair to Göttingen to prosecute the study of the law. This change did not make him more regular in his studies; his morals became corrupted; and his grandfather withdrew his protection. Bürger contracted debts; and his situation would have become altogether desperate had not some friends interfered to assist him. An association, memorable in the annals of German literature, and into which Bürger was now admitted, had just been formed at Göttingen: it reckoned among its members Boje, Biester, Sprengel, Hölty, Müller, Voss, the two Counts Stolberg, C. F. Cramer, and Leisewitz. All of these were persons versed in Greek and Roman literature, and, at the same time, they all idolized Shakspeare. Bürger, in a great measure, owed his style to the enthusiasm which he showed, in common with his literary friends, for our great dramatist. The Reliques of Ancient English Poetry, published about this time by Dr Percy, gave an additional impulse to the direction which his mind had taken, and suggested to him some of his most admired productions. Of all his friends, Boje was the one who exercised the greatest influence over him in the choice and treatment of his subjects; and it is to his severe observations that the poetical stanza of Bürger owes a great part of that elegance and roundness which characterize it. To Bürger. the same friend he was indebted also for some improvement in his circumstances. On the recommendation of Boje he was appointed to the collectorship of Alvengleichen, in the principality of Calenberg. The following winter, some fragments of a ghost story, which he heard a peasant girl singing by moonlight, caught his imagination, and suggested his celebrated ballad of *Leonora*. This remarkable production at once established his reputation as a poet. About this time he married a Hanoverian lady, named Leonhart; but this union proved only a source of bitterness, as an unhappy attachment to her younger sister soon after sprung up in his heart. The loss of a sum of money, of which his grandfather had made him a present, was the first commencement of his embarrassments; the taking of a large farm, which he did not know how to manage, increased them. The dismissal from his place, in 1784, in consequence of suspicions (probably ill-founded) raised against the fidelity of his accounts, gave the finishing stroke to his misfortunes. He had a little before lost his wife, whose death was hastened by the culpable passion which Bürger cherished in his heart. Left with two children, and reduced to the inconsiderable emoluments of The Almanack of the Muses, which he had edited since 1779, he removed to Göttingen, with a view to giving private lessons there, and in the hope of obtaining a professor's chair in the department of belles-lettres. Five years later the title was conferred on him, but without a salary; and this was the only public recompense obtained during his whole life by a man who was one of the favourite authors of his nation, and who, while yet young, had achieved the highest reputation. Scarcely were the ashes of his wife cold when he espoused her sister, whose name his poems have made but too famous. She died soon after in childbed in the beginning of 1786. From that moment his own life only lingered on; and the fire of his genius seemed extinguished with the passion which had so long nourished it. He had scarcely strength enough, in the intervals of his dejection, to finish his Song of Songs, a sort of dithyrambic or nuptial hymn, intended to celebrate his second marriage, and which is a strange mixture of frantic passion, religious devotion, and the most bombastic expression. It was the last production of Bürger. Having studied the philosophy of Kant, he had an idea of deriving some advantage from it at Göttingen, where it had not yet been taught. He undertook to explain it in a course of lectures, which were attended by a great number of students. The satisfaction which the university expressed to him for two cantatas which he composed in 1787, on the occasion of the fifty years' jubilee of this illustrious institution, and his appointment to the situation of professor extraordinary, reanimated his spirits. Fortune appearing to smile on him once more, he formed the design of marrying again. During one of the moments when he was most occupied with this idea, he received a letter from Stuttgard, in which a young woman, whose style indicated a cultivated mind, and her sentiments an elevated and feeling heart, after describing to him with enthusiasm the impression which his poetry had made upon her, offered him her hand and heart. The information which he received respecting the character, the fortune, and personal accomplishments of his correspondent having excited his curiosity, he took a journey to Stuttgard, and brought back with him a wife who embittered and dishonoured the rest of his days. In less than three years he saw himself under the necessity of obtaining a divorce from her; and the ruin of his health aggravated the absolute disorder of his finances. Confined to a small chamber, the favourite poet of Germany wasted the remainder of his strength in translations for foreign booksellers; but sickness and grief soon deprived him even of this resource, and he must have died in a state of the most abject poverty, if the government of Hanover had not relieved his necessities. He died on the 8th of June 1794.

Bürger is only remarkable as a lyric poet; for after hav- Burgersdiing tried all the different species of this class of compositions, he has succeeded eminently only in the song and the ballad. We shall perhaps characterize his genius sufficiently by saying that his imagination is more fresh than rich,that he has more sensibility than elevation, more naiveté and good nature than delicacy or taste. His style is striking from its clearness and its energy, and an elegance which is rather the result of labour than of natural grace; he possesses, in short, all the qualities which please the multitude. Allowing the title of poet only to those whose writings were calculated to become popular, he early habituated himself to reject whatever appeared to him not sufficiently intelligible and interesting to all classes of readers. He is always clear and forcible; and if at certain times there appears a want of selection and care in the details, yet the sentiments are uniformly noble, and the moral purpose of the majority of his pieces is irreproachable. Some breathe the loftiest piety and the purest love of virtue. Wieland said of him (German Mercury, 1778), that in composing his poem entitled Mannerheuschheit (on Chastity), Bürger had deserved better of the present and future generations than if he had written the finest treatise of morality. This little piece has been inserted in most of the collections

of hymns for the use of the Lutheran church.

Three editions of Bürger's works have been published at Göttingen. The first two appeared in 1778 and 1789, in 3 vols. 8vo; and the third, after his death, was published by his friend Ch. Reinhard, in 4 vols. 1796. We must confine ourselves to a short notice of those for which their merit or singularity has procured the greatest degree of celebrity. 1. A translation, or rather an imitation, of the Vigil of Venus (Pervigilium Veneris). 2. Leonora, a romance; which belongs to the class which Burger himself called the epic lyric. Leonora was translated into Danish in 1788, six times into English, by Stanley, Pye, Spencer, Taylor, &c., and from English into French by De la Madelaine in 1811. The translation by Mr Spencer is accompanied with engravings after designs by Lady Diana Beauclerc. Two German composers have set it to music. 3. The Minister's Daughter of Taubenhain is the story of the seduction and tragical end of a young girl. 4. The Inhuman Huntsman. 5. The Song of the Brave; in which the heroism of a peasant, who saves a family from the fury of the waves, is related with admirable feeling. 6. The Song of Songs, conceived at the foot of the altar. This is a hymn or ode in praise of his second wife. 7. A Travestie of the Fable of Jupiter and Europa. 8. A translation in iambic verse, of some books of the Iliad. 9. An excellent Translation of Shakspeare's Macbeth. 10. Pieces of Poetry and of Rhetorical Prose. He had begun to write critical observations on his own works; but he has only left some fragments of this work. 11. He was editor of the Gottingen Almanack of the Muses, from 1779 to 1794. Vetterlein, Politz, and Engel, have published a selection of the poetry of Bürger, with notes; and celebrated composers, such as Schulz and Reichhardt, have set a great number of his songs to music. Bürger's third wife, whose name German biography has thought worthy to be associated with her husband's, on account of her taste for literature and particularly poetry, is author of several pieces in verse inserted in the collection. The one having for its title The Raillery of a Mother, is sufficient to prove her poetical

BURGERSDICIUS, or Burgersdyk, Francis, a celebrated Dutch logician, was born at Lier near Delft, in 1590. He studied at the University of Leyden, and after completing his academical career with great distinction there, travelled through Germany and France. On arriving at Saumur in the latter country he began to study theology, and was so successful, that while still a very young man he was appointed professor of philosophy in that town. This office he held for five years, at the end of which period he returned to Leyden, where he accepted the chair of logic and moral philosophy, and afterwards that of natural philosophy. His system of logic was at one time universally received, and even yet has not fallen wholly into disuse. His treatise entitled *Idea Philosophiæ Moralis* issued from the Elzevir press in 1644. Burgersdyk died at Leyden in 1629, in the thirty-ninth year of his age.

BURGESS, a term generally applied to a person holding some of the privileges conferred by the old municipal Burggrave. corporations. It came into peculiar use in England as the term for the parliamentary representation of a burgh. See MUNICIPAL CORPORATIONS.

Burgess, Daniel, a learned and witty dissenting divine of the seventeenth century, born at Staines in Middlesex, of which parish his father was minister. He was educated at Westminster school, and in 1660 was sent to Magdalen Hall, Oxford, but not being able conscientiously to subscribe the necessary formulæ, he quitted that university without taking his degree. In 1667, after taking orders, he was appointed by Lord Orrery to the head-mastership of a school recently established by that nobleman at Charleville in Munster, and soon after became private chaplain to lady Mervin, near Dublin. On his return from Ireland, he openly avowed his Presbyterian principles, and frequently preached in contempt of the severe laws against nonconformity. For these offences he was imprisoned, but soon regaining his liberty, he went to London, where he speedily collected a large congregation, as much by the somewhat fanatical fervour of his piety as by the ludicrous illustrations which he frequently employed in his sermons. Besides preaching, he gave instructions to private pupils, of whom the most distinguished was Henry St John, afterwards Lord Bolingbroke. He died in 1712.

Burgess, Right Rev. Thomas, bishop of Salisbury, was born at Odiham, in Hampshire, in 1756. He was educated at Winchester, and in 1775 he removed to Oxford, where he gained a scholarship at Corpus Christi College. Before graduating, he edited a reprint of Burton's Pentalogia. In 1781 he brought out an edition of Dawe's Miscellanea Critica, with numerous annotations, a work so favourably received on the continent that it was reprinted verbatim at Leipzig in 1800. In 1783 he became a fellow of his college, and two years later undertook a journey to Holland, where he prosecuted his researches for some time. On his return he was appointed chaplain to Shute Barrington, bishop of Salisbury, through whose influence he obtained a prebendal stall in the cathedral of that town. In 1789 he published his Considerations on the Abolition of Slavery, in which he advocated the principle of gradual emancipa-tion. From Salisbury he removed to Durham, where he effected much good among the poorer classes, by publishing and distributing suitable religious works. In 1803, he was promoted by his old schoolfellow Addington, then prime minister, to the vacant see of St David's, which he held for twenty years, and where he gave evidence of his philan-thropic disposition by establishing the Society for the promotion of Christian Knowledge, and founding the college of Lampeter, which he liberally endowed. In 1820 he was appointed first president of the Royal Society of Literature recently founded; and three years later was promoted to the see of Salisbury, over which he presided for twelve years, prosecuting his benevolent designs with unwearied industry. Not the least important among the many services which he rendered to the church, was the establishment of a Church Union Society for the assistance of infirm and distressed clergymen, to which he bequeathed L.3000. In the midst of his useful and laborious career, he was cut off by an attack of dropsy, February 19, 1837. A list of his works, which are very numerous, will be found in his biography by J. S. Harford. In addition to those already referred to, may be mentioned his "Essay on the Study of Antiquities;" "The first Principles of Christian Knowledge;" "Reflections on the Controversial Writings of Dr Priestley;" "Emendationes in Suidam et Hesychium et alios Lexicographos Græcos;" " The Bible, and nothing but the Bible, the Religion of the Church

BURGGRAVE (burg town, and graf or grave count), the hereditary governor of a castle or fortified town, chiefly

in Germany. The burggraves were originally the same as Burghbote castellans or comites castellani; but their dignity was considerably advanced under Rodolph of Hapsburg, when they began to rank with princes.

BURGHBOTE, in Old Laws, signifies contribution towards the building or repairing of castles or walls, for the defence of a borough or city. By a law of King Athelstan, the castles and walls of towns were to be repaired, and burghbote levied every year. No person was exempt from this service, and even the king could not exempt a man from burghbote; yet in after-times exemptions appear to have been frequently granted, insomuch that the word burghbote came to denote, not the service, but the exemption

BURGHBRECH (burgh and break), a fine imposed on a burgh for a breach of the peace.

BURGHMOTE, the court of a borough. By the laws of King Edgar, the burghmote was held thrice a-year; by those of Henry I. twelve times.

BURGKMAIR, Hans or Joun, a very celebrated enraver on wood, and believed to have been a pupil of A. Dürer, was born at Augsburg in 1472. Some of his works are dated as early as 1510. Professor Christ ascribes to him about 700 woodcuts, most of them distinguished by that spirit and freedom that we admire in the works of his supposed master. His principal work is the series of 135 prints, representing the triumphs of the Emperor Maximilian I. They are of large size, executed in *chiar-oscuro*, from two blocks, and convey a high idea of his powers. Several other of his pieces are mentioned by Strutt. Burgkmair was also an excellent painter in fresco and in distemper, specimens of which are in the galleries of Munich and Vienna, carefully and solidly finished in the style of the old German school. He died about 1559.

BURGLARY, or Nocturnal House-Breaking (burgi latrocinium), which by the ancient English law was called hamesucken (a word also used in the law of Scotland, but in a somewhat different sense), has always been looked upon as a very heinous offence. The definition of a burglar, as given by Sir Edward Coke, is, "he that by night breaketh and entereth in a mansion-house with intent to commit a felony." The offence and its punishment are under the provisions of the 7th Will. IV., and 1st Vict., c. 86, which require the night to be reckoned from nine in the evening until six in the morning, and applies the punishment of death where the offence is accompanied by personal violence, long transportation (now liable to be commuted to penal servitude), or imprisonment, being the punishments for the more mitigated form of the offence.

BURGOMASTER, BURGHERMASTER, BURGERMESTER, or BURGMEISTER, the chief magistrate of the great towns in Flanders, Holland, and Germany.

BURGOMASTER. See ORNITHOLOGY, Index.

BURGONET (French bourguignotte), an ancient kind of helmet, with a small visor, and without a gorget. It was first used by the Burgundians, hence its name.

BURGOS, an ancient province of Spain in the kingdom of Old Castile, comprehending the modern provinces of Burgos, Logrono, and Santander, and covering an area of 7644 square miles. The modern province is bounded north by the province of Santander; east by Alava, Navarre, and Soria; west by Palencia and Valladolid; south by Segovia. The territory of Burgos is elevated and mountainous, being intersected by several sierras; the slopes of which, however, are well stocked with game, and afford pasture for large herds of black cattle, horses, mules, sheep, and goats. It abounds in spacious and well-watered valleys, in which wheat, barley, oats, maize, rye, flax, and hemp, are grown for home consumption. The cultivation of the vine is little attended to; but the facilities for rearing bees give rise to a considerable traffic in honey and wax. The climate of

Burgos. Burgos is cold, damp, and variable, and the province from its elevation is exposed to severe storms from the N. and N.E. Pop. (1849) 234,022.

Burgos, the capital of the above province, stands on the slope of a hill the base of which is skirted by the river Arlanzon, in Lat. 42. 21. N. Long. 3. 43. W. It is a considerable town, consisting of about 1400 houses, originally girt into the form of a segment of a circle by a wall, some portions of which still remain. On the opposite bank of the river, and connected with the more ancient part of the town by three stone bridges, are the suburbs (Barrio de la Vega), tastefully laid out in pleasure-grounds; whilst lower down in the midst of the stream is an island furnished with seats and walks as a public promenade. The streets and squares are exceedingly irregular, although spacious and well built. The principal square is the Plaza Mayor, or Plaza de la Constitucion, in the centre of which is a bronze statue of Charles II. The most important public building is the cathedral, begun in 1221, but not completed till 1567. It is built in an irregular florid Gothic style, and contains eight chapels, the most famous of which is the Capilla del Condestable, containing the tombs of several of the Velasco family, the hereditary constables of Castile. Besides the cathedral there is the Hotel de Ville, the Palace of Velasco, the church of St Paul, and a beautiful Doric arch erected in honour of Fernando Gonzalez. There is a fine approach to the city through the massive gate of Santa Maria, surmounted by a statue of the Virgin and Child, with figures of Fernando Gonzalez, Charles I., the Cid, and Diego Porcelos, in the niches. The hospitals of Burgos are seven in number, and well supported; they are the Hospital San Juan (founded in 1479), the Hospital de la Conception, San Julian, San Quirce, Del Rey, Militar, and the Hospicio y Casa de Epositos. The educational wants of the district are supplied by four primary schools, which are liberally endowed from the municipal funds, and afford gratuitous instruction to upwards of 200 pupils. There is also a normal school and a Seminario Conciliar, in which the higher branches are taught. But the most important educational establishment is the Instituto Superior Burgalez, which has a staff of 21 professors, and annually enrols about 250 students. The professors give prelections on language. science, and the fine arts. Burgos is the see of an archbishop, who has for his suffragans the bishops of Pamplona, Palencia, Santander, and Tudela. It has several monasteries, amongst which may be mentioned the Monasterio de Fredesval, San Agustin, &c. About two miles distant from the town stands the Carthusian Convent, de Miraflores, built as a royal burying-place; whilst a little below the promenade of the Isla stands the Real Monasterio de las Huelgas, founded by Alonzo VIII., the abbess of which was invested with almost royal prerogatives, and held unlimited sway over more than 50 villages. Burgos is the official residence of a military staff, and is well provided with barracks and storehouses. The jurisdiction of its courts extends over the whole audienza, including Alava, Guipuscoa, Logrono, Santander, Soria, and Vizcaya.

Besides furnishing a mart for the agricultural produce of the neighbouring districts, it carries on a considerable export trade in linen and woollen stuffs, made in imitation of English goods. The principal articles of manufacture are hats, stockings, and leather goods. Recently a paper-mill has been started, which gives employment to 120 operatives

of both sexes. Pop. (1845) 14,790.

The history of Burgos cannot be carried back beyond the end of the ninth century. There is no trace of its existence during the occupation of Spain by the Romans. We find the nucleus of it existing in 884, when Diego Porcelos, at the command of Alfonso the Great, built a castle on the right bank of the Arlanzon to check the progress of the Moors. From that time forward we find it steadily increasing in importance, reaching the height of its prosperity

in the fifteenth century, when alternately with Toledo it was Burgunoccupied as a royal residence, but rapidly declining when the court was finally removed to Madrid. Being on one of the principal military roads of the kingdom, it suffered severely in the Peninsular War. It was unsuccessfully besieged by Wellington in 1812, but was surrendered to him in the opening of the campaign of the following year.

BURGUNDIONES, Bourgoundiones, Burgundii, a powerful race of Vandals or Goths, whose original territory lay between the Oder and the Vistula. Some of the ancient writers, however, state that they were descendants of the Roman garrisons who had been left in Germany by Drusus and Tiberius. They were driven out of their territory by the Gepidæ, and gradually proceeded westward till they settled in Gaul, where they organized the powerful princi-

pality of Burgundy.

BURGUNDIUS, or Bourgoigne, Nicholas, an eminent jurist, born in 1586 at Enghien in Hainault. In 1627 he was appointed professor of civil law at Ingoldstadt, and honoured with the dignity of Count Palatine. He studied with great care the manners and customs of the feudal times; and on this subject he is still consulted as one of the best authorities. A collective edition of his works appeared at Brussels in 1674. The best of these, the Historia Belgica ab anno 1558 ad annum 1567, is a detailed history of the Low countries for the nine years preceding the arrival of the Duke of Alva.

BURGUNDY, called also Burgundy Proper, or Lower Burgundy, formerly a province in the east of France, lying on the west of Franche-Comté, and on the south of Champagne. It now forms the departments of Côte d'Or, and Saône et Loire, with part of those of Aube, Yonne, and Upper Marne, under which several heads Burgundy will be found

BURHAMPOOR, a town of Hindustan, in the province of Bengal, situated on the east bank of the Bhagirathi or Cossimbazar river, five miles south from Moorshedabad. It is one of the military stations of the British government; and the cantonments, consisting of a grand square inclosing a fine parade-ground, command the notice of the traveller. Formerly the place proved unhealthy to the European constitution, and the extent of mortality which prevailed was painfully brought to view by the crowded state of the European burial-ground. At present, however, owing to the introduction of sanitary measures, the cantonment is represented to be inferior to none in Bengal for its salubrity. An air of grandeur and importance is communicated to the place by a number of stately buildings scattered over the neighbourhood. A government college is about to be established in the town. Lat. 24. 5. Long. 88. 17.

BURHILL, or BURGHILL, Robert, a learned historian and divine, born at Dymock in Gloucestershire in 1572. At the age of fifteen he entered Corpus Christi College, Oxford, of which he afterwards became a fellow. Shortly after taking orders, he received the living of Northwold in Norfolk, where he ultimately died in 1641, just before the outbreak of the civil war. His learning and judgment were deemed worthy of especial notice by the author of the Athence Oxoniensis; and were highly appreciated by Sir Walter Raleigh, who derived much assistance from Burhill, when engaged upon his History of the World, during his confinement in the Tower.

BURIAL, the interment of a deceased person. In almost all countries the rites of sepulture have been looked upon as a debt so sacred, that those who neglected to discharge them were thought infamous. Hence the Romans called them justa, and the Greeks νόμιμα, δίκαια, ὅσια, words implying the inviolable obligation which nature has laid upon the living to perform the obsequies of the dead. The Romans in the most ancient times appear to have buried their dead; but the practice of burning the body was early

diones Burial.

Burke.

Buridan.

Buriats adopted, and both burning and burying continued to be practised more or less until the introduction of Christianity. It is not surprising that the ancient Greeks and Romans were extremely solicitous about the interment of their deceased friends, since they believed that their souls could not be admitted into the Elysian fields till their obsequies had been performed; and that if they did not obtain the rites of burial they were excluded from the happy mansions for the term of a hundred years. For this reason it was considered as a duty incumbent upon all travellers who happened to meet with a dead body in their way, to cast dust or mould upon it three times; and of these, one portion at least was cast upon the head. (Horace, Ode 28, Book I.) The ancients likewise considered it as a great misfortune if they were not laid in the sepulchres of their fathers; for which reason the ashes of those who died in foreign countries were usually brought home and interred with those of their ancestors. But notwithstanding the great care in the burial of the dead, there were some persons whom they thought unworthy of the last office, and to whom therefore they refused it; namely, public or private enemies; such as betrayed or conspired against their country; tyrants, who were always looked upon as enemies to their country; villains guilty of sacrilege; such as died in debt, whose bodies belonged to their creditors; and offenders who had suffered capital punishment.

Of those who were allowed the rites of burial, some were distinguished by particular circumstances attending their interment. Thus persons killed by lightning were buried on the spot where they fell, which was ever after considered sacred. (See BIDENTAL.) Those who wasted their patrimony forfeited the right of being buried in the sepulchres of their fathers; and those who were guilty of self-murder were privately consigned to the earth without the accus-

tomed solemnities.

Among the Jews the privilege of burial was denied only to self-murderers, who were thrown out to rot upon the ground. In the Christian church, though good men always desired the privilege of interment, yet they were not, like the heathens, so concerned for their bodies as to think it any detriment to them if either the barbarity of an enemy or some other accident deprived them of this privilege. The primitive Christian church denied the more solemn rites of burial only to the unbaptized, to self-murderers, and to excommunicated persons who continued obstinate and impenitent in contempt of the censures of the church. See BURYING-PLACE; FUNERAL RITES.

BURIATS, BURATY, or BRATSKY, a tribe of Tartars, now brought under the jurisdiction of Russia, and widely dispersed throughout Siberia, in the government of Irkutsk, wherein their numbers are computed from the capitation tax at about 300,000. Their features are of a genuine Tartar cast, resembling those of the Kalmucks, though they are not quite so flat, the nose being somewhat higher, and the countenance more open. They themselves trace their origin to the Kalmucks, and not to the Moguls. They are pastoral in their habits, and depend for their subsistence chiefly on their flocks, but some of their number devote themselves to agriculture. The principal occupations of the men are riding and hunting; and they are dexterous archers as well as skilful horsemen. They have likewise made considerable progress in the working of iron, and in tanning. Many women of the tribe are occupied in this latter branch of industry, and display much ingenuity and taste in the art. They are esteemed honest and sincere, and both sexes are extremely courteous. They are very ignorant, and debased by the grossest paganism. The residence of this tribe is chiefly around the shores of the lake Baikal, and the rivers Angora and Lena.

BURIDAN, JEAN, a native of Bethune, in Artois, and one of the most celebrated philosophers of the fourteenth

century, flourished between 1338 and 1358. He taught Burigny in the university of Paris with great reputation, and wrote on logic, ethics, and Aristotle's metaphysics. Aventinus relates that he was a disciple of Ockam; and that, being expelled Paris by the intrigues of the realists, who were at that time more influential than the nominalists, he went into Germany, where he founded the university of Vienna; but that writer is clearly in error in attributing to Buridan the founding of this institution. Buridan was the author of the well-known illustration of the doctrine of free-will by the proverb of the ass between two bundles of hay—a sophism that long perplexed the schools.

BURIGNY, JEAN LEVESQUE DE, a learned French writer, was born at Rheims in 1691. In 1713 he went to Paris, and with two elder brothers pursued a systematic course of study extending over almost every department of human knowledge. The result of these labours was embodied in an Encyclopædia in twelve folio volumes, to which Jean contributed about one-half. In 1756 he was elected into the French academy, and in 1785 was rewarded with a pension by the king. His largest work, The Lives of the Popes, is not much esteemed now as an authority; but his biographies of Erasmus, Grotius, and Bossuet, are interesting and valuable. He died at Paris in 1785, aged ninety-

BURIN (French burin), a graver; an instrument of tempered steel, for engraving on copper. It is of a prismatic form, and the end is ground off obliquely so as to produce a sharp point. The expressions soft-burin, brilliant-burin, are used to characterize the manner of the

BURKE, EDMUND, an illustrious writer, orator, and statesman, was born in Dublin on the 1st of January 1730. His father was an attorney, first in Limerick, and afterwards in Dublin. Young Burke received the rudiments of his education at Castletown Roche. He was afterwards put under the tuition of Abraham Shackleton, a Quaker of some celebrity at Ballitore, in the county of Kildare. Committed to the care of a master so well qualified for the business of instruction, he applied to his studies with commendable assiduity, and in this seminary laid the foundation of his knowledge of the ancient languages, and probably also imbibed that love of liberty which so often pointed his oratory, inflamed his passions, animated his sentiments, and in his best days secured him an almost unequalled reputation.

Here several years of his life were spent; and the attachment of the master and the gratitude of the pupil reflect equal honour on both. The former lived to see his scholar attain a considerable degree of reputation; and the latter, on his part, was accustomed to spend a portion of his annual visit to Ireland at Ballitore. He also kept up an epistolary correspondence with him, which lasted till the death of his

tutor.

From this provincial seminary Edmund was sent to the university of Dublin. But here he does not appear to have distinguished himself much either by application or talents: his character as a student was merely negative. He received a degree, however, before he departed, and during this period he commenced author, by writing some political essays.

Mr Burke now addicted himself to other pursuits, particularly logic and metaphysics, and is said to have planned a refutation of the systems of Berkeley and Hume. But whilst thus employed in treasuring up the means of attaining a species of celebrity which far different avocations prevented his afterwards aspiring to, he was not inattentive to the grand object of obtaining a suitable settlement in life. His family was not opulent, and as he already panted after independence, he repaired to the metropolis, and enrolled his name as a student of the Inner Temple.

Burke.

It appears from his speeches, his writings, and his conversation, that he studied the outlines of our municipal jurisprudence with attention; but it may be doubted whether he ever entered deeply into the study of law. The versatility of his talents and his avocations were, indeed, but little calculated for that dull and plodding perseverance which can alone lead to an intimate knowledge of our laws; and even if he had been gifted with the necessary application, both time and opportunity were wanting; for it is well known that at this period of his life the res angusta domi did not permit the student to dedicate his attention solely to this, or indeed to any other single pursuit. The exhausted state of his finances called frequently for a speedy supply; and, instead of perusing the pages of Bracton, Fleta, Littleton, and Coke, he was obliged to write essays, letters, and paragraphs, for the periodical publications of the day. But if these pursuits diverted his attention from graver studies, they acquired him a facility of composition, and a command of style and of lancourse of his future life. About this period he became a candidate for a vacant chair in the university of Glasgow, but he was unsuccessful.

His health, however, became at length impaired, and a nervous fever ensued. This circumstance induced him to call in the aid of Dr Nugent, a countryman of his own, and a man of amiable manners, though not of extensive practice. This gentleman, who was himself an author, readily discovered the source of Mr Burke's malady, and, by removing him from books and business to his own house, soon effected a cure; an event which is said to have been hastened, if not entirely completed, by a physician of another kind, the accomplished daughter of Dr Nugent, whose delicate attentions to the invalid appear to have made a deep impression on his heart. In fact this lady afterwards became Mrs Burke; and the circumstance was particularly fortunate for him, as her disposition was mild and gentle, and she continued throughout a long series of years, and many vicissitudes of fortune, to soothe and tranquillize passions always violent, and often tumultuous.

After some time ostensibly spent in the study of law, Mr Burke seems to have determined once more to endeavour to distinguish himself as an author; and accordingly he took advantage of the death of a celebrated nobleman to compose a work after the manner of that distinguished writer, so that, by exaggerating his principles, he might be enabled to bring them into contempt; but this effort proved unsuccessful, and the treatise in question was for a long time consigned to oblivion, nor would it have ever been heard of, had it not been resuscitated by his future fame. But the success of another performance made ample amends for this disappointment. His Essay on the Sublime and Beautiful attracted a great degree of notice, and acquired him considerable celebrity as a man of letsaid to have received a present of a hundred pounds from his father; but his circumstances must have been greatly embarrassed about this time, as he was obliged to sell his books,-a measure which nothing but the extremity of distress could have forced a man of letters to resort to.

This work having an immediate relation to taste, excited a desire in Sir Joshua Reynolds, even then at the head of his profession, to become acquainted with Mr Burke; and a friendship ensued which continued uninterrupted during the life of the painter, and was unequivocally testified by a handsome bequest in his will. Dr now became the constant frequenter of two clubs, composed of some of the most celebrated men of that day.

Street, and consisted of Dr Johnson, Mr (afterwards Sir Burke. Joshua) Reynolds, Dr Goldsmith, Mr Topham Beauclerc. Dr Nugent, Sir John Hawkins, Mr Bennet Langton, Mr Chamier, Mr Garrick, and Mr Burke. The other assembled at the St James's Coffee-house, and, besides many of the above, included Mr Cumberland, Dr Douglas, bishop of Salisbury, Dr Bernard, dean of Derry, Mr Richard Burke, Mr William Burke, Mr Hickey, and others. Dr Goldsmith, who was Mr Burke's contemporary at Dublin College, was member of both, and wrote the epitaphs of those who composed the latter.

A literary work on a new plan, first suggested in 1750, and by some attributed to the Dodsleys, but by others to Mr Burke, became for some time a considerable source of emolument to him. This was called the Annual Register, a publication which soon obtained considerable celebrity, and of which he had for several years the superintendence.

But Mr Burke was at length called off from his literary guage, which proved eminently serviceable to him in the pursuits by avocations of a far different kind. A gentleman who afterwards obtained the name of Singlespeech Hamilton, having been appointed secretary to the lord-lieutenant of Ireland, invited his friend Mr Burke to accompany him thither, an offer which he readily accepted; and although he acted in no public station, and performed no public service, while he remained in that country, he was rewarded with a pension of three hundred pounds per annum, which the conduct of Mr Hamilton soon afterwards compelled him to throw up.

On his return to England he amused himself, as usual, with literary composition; and a series of essays written by him in a newspaper, which at the time enjoyed great celebrity, attracted the notice of the Marquis of Rockingham; in consequence of which Mr Fitzherbert, father of Lord St Helen's, introduced him to that nobleman. From this moment he became a public man, and dedicated his studies, his eloquence, and his pen, almost exclusively to politics. Meanwhile Lord Rockingham, having proved more compliant than the Earl of Chatham, came into power; and when seated on the treasury bench, he selected Mr Burke as his private secretary,—an office of no power, and very little emolument, but one which naturally leads to both. As it was now necessary that he should have a seat in parliament, although it can scarcely be supposed that he was legally qualified in point of property, he applied to Lord Verney, patron of Wendover, and was returned for that borough, which was then dependent on his lordship, being principally occupied by his tenants.

Having thus obtained a seat in 1765, he prepared to qualify himself for his new situation. He had all the necessary talents, and was only deficient in knowledge of the forms of business, and in facility of expressing his sentiments before a public audience. The first of these he mastered by sedulous attention; and as to the second, In addition to the profits of the publication, he is if we are to credit those who were intimately acquainted with him at this period of his life, he overcame all difficulties by a previous initiation elsewhere. In short, he had acquired celebrity at the Robinhood before he attempted to speak in the British senate, and vanquished an eloquent baker ere he began to cope with the greatest orators this nation has ever produced.

Holding a confidential place under the Rockingham administration, he of course supported all its measures. A former ministry, anxious to increase its influence by means of increased imposts, had conceived the idea of taxing America through the medium of a parliament in which Johnson also sought and obtained his friendship; and he she was not represented, and attempted to carry this into effect by means of the famous stamp act; but the Americans, alarmed at what they conceived to be a flagrant vio-One of these met at the Turk's Head Tavern in Gerrard lation of every principle of the English constitution, made

the repeal. Under the pretext, however, of vindicating the honour of the crown, they unfortunately proposed and carried the declaratory act, by means of which, although the original scheme was abandoned, the principle on which it had been built was asserted anew, and a foundation laid for all the miseries which afterwards ensued. But if the Rockingham administration deserved no great credit on this occasion, it is entitled to considerable praise on account of other parts of its conduct; for it repealed the cider act, procured a declaration of the House of Commons condemning the seizure of papers, and carried a resolution against general warrants. On retiring from office, however, they did not carry much popularity along with them; Lord Chatham and his friends, who in some measure monopolized the public favour, were intrusted with the management of affairs for a short time; and it is exhad not America been driven into open resistance.

It now fell to the lot of Lord North to enforce the scheme which the Grenville party had projected, which the Rockingham administration had by an unaccountable blunder at once recognised and annihilated, and which they afterwards manfully and at length successfully opposed. This forms the most brilliant epoch of Mr Burke's life. He was hostile to the expulsion of Mr Wilkes, an act which the House of Commons afterwards rescinded from its records. On the application of the dissenters for relief, he espoused their cause, and expressed his resentment in very animated terms against that misguided policy which permitted all those not within the pale of the establishment to enjoy liberty less by right than by connivance. But perhaps the noblest part of his conduct consisted in his steady and uniform opposition to the American war, and his marked hostility to the abettors of the struggle. His speech against the Boston Port Bill was one of the most brilliant specimens of oratory that had ever been displayed in the British senate; and on the 19th of April 1774, on a motion for the repeal of the tea duty, he discovered such talents, that an old and respectable member exclaimed, "Good God, what a man is this! How could he acquire such transcendent powers?" And when, in reply to another who had said that the Americans were our children, and it was horrible to revolt against their parent, the orator uttered the following passage, the whole but when children ask for bread, we are not to give them a stone. When those children of ours wish to assimilate with their parent, and to respect the beauteous countenance of British liberty, are we to turn to them the shameful parts of our constitution? Are we to give them our weakness for their strength; our opprobrium for their glory; and the slough of slavery, which we are not able to work off, to serve them for their freedom?'

The city of Bristol, the merchants of which had become rich by the commerce with America, were likely to suffer by its interdiction. This consideration alone rendered many of them hostile to the proceedings of the ministry; but nobler and more exalted motives actuated the bosoms of some, particularly the quakers, dissenters, and other sectaries, who were moved by zeal against oppression, and a love of liberty imprinted on their minds by a constitution which until then had remained inviolate. Gratified by the exertions of Mr Burke in behalf of civil and religious freedom, they put him in nomination for the city, and sent into Yorkshire to request his immediate personal attendance. After consulting with his patron concerning an offer so flattering and unexpected, accompanied at

Burke. such a spirited resistance to the measure, that it was aban- that he should be put to no expense whatever, he im- Burke. doned, and the Rockingham party readily consented to mediately set out for the west of England, and found that no less than three candidates had started before him. The first was Lord Clare, afterwards Lord Nugent, one of the former representatives, whose unpopularity was such that he soon discovered the necessity of resigning all his pretensions; and of the two others, Mr Cruger and Mr Brickdale, who remained in the field, the former, like Mr Burke himself, was averse to a rupture with America.

The new candidate did not appear on the hustings until the afternoon of the sixth day's poll, on which occasion he addressed the electors in a very able speech, admirably calculated for the occasion; expressing a modest diffidence of his own abilities, and a high opinion of the important trust they were assembled to confer; boldly declaring himself hostile to a contest with America; and asserting that England had been rendered flourishing by liberty and commerce, the first of which was dear to his heart, whilst the tremely probable that they would have sunk into neglect latter had been a favourite object of his studies, both in its principles and details. This harangue was well received by the electors; the contest proved propitious to his wishes; and when the sheriffs had notified, at the close of the poll, that he was elected, he delivered the most brilliant address on the occasion that had ever been heard

within the walls of the city.

Mr Burke returned from his new constituents to parliament with increased vigour, reputation, and zeal. The Earl of Chatham, notwithstanding his reputation for wisdom, having failed in an attempt to adjust the troubles of the colonies by means of a conciliatory bill introduced by him into the House of Peers for that purpose, the obstinacy of the ministry now became apparent to every one. But this circumstance, which would have appalled an inferior man, did not, however, discourage the member for Bristol from making a similar attempt in another place; and accordingly, on the 22d March 1775, he brought forward his celebrated thirteen propositions, which were intended to close the fatal breach, and heal all the differences between the mother country and her colonies. His plan, on this occasion, embraced not only immediate conciliation, by a repeal of the late coercive acts, but also the creation of an independent judicature, and the regulation of the courts of admiralty. The whole, however, was quashed by a large majority on the side of the minister who moved the previous question.

Mr Burke had hitherto chiefly distinguished himself in house was electrified: "They are our children, it is true; opposition to the measures of others; but in 1780 he himself stood forth as the original author of a scheme which soon engaged the attention of the public, and actually appeared big with the most important results. When he found ministers obstinately persisting in a disastrous war, and perceived that the people began to bend beneath the weight of the taxes for its support, it struck him as at once advantageous and politically expedient to attempt to diminish the public burdens and the number of adherents of the court. Accordingly, on the 11th of February, he brought in a bill for the regulation of his majesty's civil establishments, and of certain public offices; for the limitation of pensions, and the suppression of sundry useless, expensive, and inconvenient places; and for applying the monies saved thereby to the public service. This scheme was manifestly founded on the late reforms which had taken place in France; for, by an edict of the king, registered in the parliament of Paris, it appeared that he had suppressed no less than four hundred places in his household by one regulation. The orator judiciously adverted to this event, and endeavoured to make use of it as an incitement to a similar attempt here, calling in national rivalship by way of an inducement to consent to this sacrifice the same time with assurances most punctually fulfilled, on the part of the crown. To this bill the minority did

it was at length carried, it was much modified and altered.

Parliament was dissolved in 1780, but Mr Burke was not re-elected for Bristol. This is said to have made a deep impression on the mind of the orator; but it must have been obliterated by the important events which speedily ensued; for the minister now tottered on the treasury bench, being abandoned by many of his staunchest supporters, and but little confident in his own schemes, all of which had proved eminently unsuccessful. Meanwhile the opposition having increased to a considerable degree, unceasingly assailed him, until at length, on the 28th March 1782, Lord North assured the House of Commons that his administration was at an end.

The day had now arrived when the ministry and opposition were to change places, and Mr Burke, whose services had been so conspicuous, was made a privy counsellor, and invested with the lucrative appointment of paymaster-general of the forces. He was thus at length enabled to enforce his plan of political economy, tendered before in vain; and the board of trade, the board of works, the offices of third secretary of state, treasurer of the chamber, cofferer of the household, the lords of police in Scotland, the master of the harriers, the master of the stag-hounds, the six clerks of the board of green cloth, and the paymaster of the pensions, were abolished. But when the reins of government were confided to the hands of the Marquis of Lansdown, then Earl Shelburne, this event gave such offence to those who wished to place the Duke of Portland at the head of affairs, that Mr Fox, Lord John Cavendish, and Mr Burke, immediately resigned.

In the mean time the critical state of the English East India Company had long agitated the public mind, and become occasionally a subject of discussion in parliament. The seizure, imprisonment, and confinement of Lord Pigot, by a faction in the council of Madras—the conduct of Mr Hastings in respect to several of the native powers—and the grand question of sovereignty, relative to the territorial possessions of the Company in Asia—had all at different times excited the attention of the nation. Accordingly, when Mr Fox and his friends came into power, he brought in a bill to remedy the various abuses in the government of British India. Of this bill Mr Burke is well known to have been in a great measure the author; and when it was introduced into parliament, he defended its principles and provisions with all the zeal of a parent. Notwithstanding much opposition both within and without, this celebrated bill was carried triumphantly through the House of Commons; but in the House of Peers it experienced a far different fate, and with it fell the power and consequence of its authors, framers, and supporters.

In the course of the next year, 28th February 1785, he made a splendid speech relative to the nabob of Arcot's debts; and depicted one of his creditors, who had taken an active share in the late elections, "as a criminal who long since ought to have fattened the region kites with his offal; the old betrayer, insulter, oppressor, and scourge of a country (Tanjore), which had for years been an object of an unremitted, but unhappily an unequal struggle, between the bounties of Providence to renovate, and the wickedness of mankind to destroy." But there appeared to Mr Burke to be a still greater delinquent; and accordingly he resolved to sacrifice, if possible, the powerful offender himself at the shrine of national vengeance. This was Mr Hastings; and, soon after his arrival in England, the orator gave notice of his intentions. On the 17th of February 1785 he opened the accusation by a most elo-

Burke. not at first give much opposition; and indeed the mover quent speech, in which he depicted the alleged crimes of Burke. of it contrived to soften those features which appeared the ex-governor-general in the most glowing and animated harsh to them. But notwithstanding this, it did not prove colours. This trial, however, turned out in the event very successful during Lord North's administration; and when different from what had been expected; whilst the length of it failed not to involve both Mr Burke himself and his party in reproach.

During the debate on the commercial treaty with France, 23d January 1787, Mr Burke, then member for Malton, exhibited an undiminished versatility of talents, and pointed his ridicule with no common success at Mr Pitt, who, according to him, contemplated the subject with a narrowness peculiar to limited minds:—" He seems to consider it," said he, " as an affair of two little counting-houses, and not of two great nations. He seems to consider it as a contention between the sign of the fleur-de-lis and the sign of the old red lion, for which should obtain the best custom."

The next public event of importance in which we find Mr Burke engaged, occurred in consequence of his majesty's indisposition. On this occasion he took an active part in the debates of the House of Commons, and is supposed to have penned a letter for one, and a speech for another branch of the royal family. When Mr Pitt moved his declaratory resolutions relative to the provisional exercise of the royal authority, Mr Burke attacked him with much asperity of language, and was particularly severe on the manner in which the royal assent was to be given to all future acts of parliament. The men who held most of the high places under the government were treated as jobbers, old hacks of the court, and the supporters and betrayers of all parties; and he declared that it was a mock crown, a tinsel robe, and a sceptre from the theatre, lackered over and unreal, which were about to be conferred on the prince of Wales.

The opposition, diminished indeed by a few occasional desertions, had hitherto acted as a great public body, supposed to be united in general principles for the common welfare and prosperity of the state; but the French revolution thinned their ranks, dispelled their consequence, and, by sowing jealousy between the chiefs, spread consternation and dismay among their followers. It was on the 2d of March 1790, when Mr Fox moved for leave to bring in a bill to repeal the corporation and test acts, that this disunion became evident; and soon afterwards Mr Burke declared that his honourable friend and he were separated in their politics for ever.

The ministry now seemed anxious to provide for their new associate; and he, on his part, certainly appeared deserving of some remuneration at their hands, for he had abandoned all his old friends, and not a few of his old principles. In addition to this, his Reflections on the Revolution in France had afforded some degree of countenance, and even popularity, to the measures of administration; and, not content with his own exertions, he had enlisted his son on the same side, and even sent him to Coblentz. The royal munificence at length gratified his warmest wishes; for by a warrant, dated 24th September 1795, he received a pension, made to commence from the 5th January 1793, of L.1200 for his own life and that of his wife, on the civil list; whilst two other pensions of L.2500 a year for three lives, payable out of the four and a half per cent. fund, dated 24th October 1795, were made to commence from the 24th July 1793. Honours as well as wealth now seemed to await him, for he was about to be ennobled, when the untimely death of an only child put an end to his dreams of ambition, and contributed not a little to hasten his own, which occurred at his house at Beaconsfield on the 9th of July 1797.

Thus died, in the sixty-eighth year of his age, Edmund Burke, one of the greatest orators, statesmen, and athors

Burkitt of his age; a man whose name will long continue to be celebrated; and one who, had he fallen during the meridian of his fame and character, would have scarcely been considered as second to any man, either of ancient or modern

BURKITT, WILLIAM, a celebrated commentator on the New Testament, was born at Hitcham in Suffolk, July 25, 1650, and educated at Pembroke Hall, Cambridge. He was ordained by Bishop Reynolds; and his first clerical employment was at Milden in Suffolk, where he continued twenty-one years, first as curate, and afterwards as rector. In 1692 he was presented to the vicarage of Dedham in Essex, and there he resided to the time of his death, which happened in October 1703. Besides a Commentary on the New Testament, he wrote a volume entitled The Poor Man's Help and the Rich Man's Guide.

BURLÉIGH. See CECIL.

BURLESQUE, a species of composition, which, though a great engine of ridicule, is not confined to the ridiculous alone; for it is distinguishable into burlesque that excites laughter merely, and burlesque that excites derision or ridicule. A grave subject, in which there is no impropriety, may be brought down by a certain colouring so as to be ridiculous, as in Virgil Travestie; the author laughing at every turn in order to make his readers also laugh. The Lutrin is a burlesque poem of the other sort, laying hold of a low and trifling incident in order to expose the luxury, indolence, and contentious spirit of a set of monks. Boileau, the author, turns the subject into ridicule by dressing it in the heroic style, and affecting to consider it as of the utmost dignity and importance. Though broad ridicule is the poet's aim, he always carries a grave face, and never once betrays a smile. It is the opposition between the subject and the manner of handling that produces the ridicule; and therefore, in a composition of this kind, no image professedly ludicrous ought to be admitted, because such images destroy the contrast.

Though the burlesque that aims at ridicule produces its effects by elevating the style far above the subject, yet the

poet ought to confine himself to such images as are lively Burlington and readily apprehended. A strained elevation, soaring above the ordinary reach of fancy, makes not a pleasant impression. The mind is soon disgusted by being kept long on the stretch. Machinery may be employed in a burlesque poem, such as the Lutrin, Dispensary, or Hudibras, with more success and propriety than in any other species of poetry; for burlesque poems, though they assume the air of history, give entertainment chiefly by their pleasant and ludicrous pictures. It is not the aim of such compositions to raise sympathy, for which reason a strict imitation of nature is not necessary; and hence the more extravagant the machinery in a ludicrous poem the more entertainment it affords.

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BURLINGTON. See Bridlington.

В

BURLINGTON, a city and port, capital of the county of Chittenden, in the state of Vermont, North America, is pleasantly situated on the east side of Lake Champlain, 31 miles W.N.W. of Montpelier. The town is regularly laid out, and contains many elegant houses, generally surrounded by gardens. The scenery in the vicinity is magnificent. Besides the Vermont University (a well-endowed institution, with a medical school and a library of 13,000 vols.), it has a court-house, county buildings, banks, &c. The harbour is protected on the west by a breakwater. In 1849-50, there were 342 vessels of 82,856 tons cleared, and 404 vessels of 99,435 tons entered, in the foreign trade. Burlington is connected by railways with Canada and the western states. Pop. 7505.

BURLINGTON, a city and port of entry, capital of the county of the same name in the state of New Jersey, on the east side of the Delaware, 16 miles N.E. of Philadelphia. It has a city-hall, lyceum, library, and many elegant houses. Pop. 5398. Registered shipping (1850) 7578 tons.

BURLINGTON, the capital of the Des Moines county, in the state of Iowa, North America, stands on the west bank of the Mississippi, 62 miles S.S.E. of Iowa city. It was laid out in 1833, and in 1850 had a population of 5129. It is the largest city in the state, and has a considerable trade.

## BURMAH.

A COUNTRY situated in the S.E. of Asia, in the region beyond the river Brahmapootra. It is possessed by the Burmese, the limits of whose dominions have been greatly contracted by British conquests. On the west, where it is conterminous with the British territories in India, Burmah is bounded by the province of Arracan, surrendered to the British by the treaty concluded with the Burmese in 1826, and by the petty states of Tipperah, Munnepore, and Assam, from which countries it is separated by lofty ridges of mountains; on the south by the newly acquired British province of Pegu; on the north by Assam and Thibet; and on the east by China. Its limits extend from Lat. 19. 25. to 28. 15.; and from Long. 93. 2. to 100. 40.; comprising a territory measuring 540 miles in length from north to south, and 420 in breadth, with an area of 96,000 square miles.

That portion of Asia in which Burmah is situated slopes from the central mountains towards the south; and as it approaches the Indian Ocean, it subsides into an extensive champaign country, which is overflowed in the rainy season by the swelling of the rivers. The Burmese territory is watered by three great streams, namely, the Irrawaddy, the Saluem, and the Kyen-dwen, a tributary of the Irrawaddy. These rivers have their sources in the northern chain of mountains in the interior, some of which are covered with perpetual snow; and they run in a southerly course to the Indian Ocean. The Irrawaddy and the Sa-

luem are large rivers, which overflow the flat country on

their banks during the season of the rains. Burmah, having been despoiled of Pegu, contains neither maritime districts nor alluvial plains, but is altogether an upland territory, bounded at its southern extremity by a frontier line at the distance of about 200 miles from the mouths of the Irrawaddy. From this point the country begins to rise, and thence for about 300 miles farther it may be considered hilly and elevated: beyond this it is wild and mountainous. To the W. and N.W. it is divided from Arracan, Munnepore, and Assam, by mountainous ridges often of great elevation.

Though inferior in point of fertility to the low-lying tracts Natural of which Burmah has been stripped, the upland country is far producfrom being unproductive. The chief crops are rice, maize, tions. millet, wheat, various pulses, palms, the sugar-cane, tobacco, cotton, and indigo. The sugar-cane appears to have been long known to the Burmese; but though the climate and soil are extremely favourable, it is not generally cultivated, and the art of manufacturing sugar is scarcely known. A cheap and coarse sugar is obtained from the juice of the Palmyra palm, which abounds in the tract south of the capital, where numerous groves of this tree are to be seen. The cocoa and areca palms are not common. The tea plant is cultivated in the hills by some of the mountain tribes at the distance of about five days' journey, and by others in still greater perfection at the distance of about ten days' journey, from Ava. The leaves are elliptical, oblong, and serrated, and there is little

Aspect of the country.

Burmah. doubt of its being the genuine tea plant of China. It is been extracted from the earth by the ignorant and lazy in- Burmah. Cotton is grown in every part of the kingdom and its dependencies, but chiefly in the dry lands and climate of the upper provinces. Indigo is an indigenous product, and is universally cultivated, but in a very rude manner. It is still more rudely manufactured, and is wholly unfit for ex-

In the cultivation of fruits the Burmese are careless and unskilful. The most common fruits are the mango, the orange, the pine, the custard apple, the jack, the papaya fig, and the plantain. Most of these fruits grow spontaneously in the congenial soil and climate of the country. In horticulture and gardening the ignorance of the Burmese is remarkable. Though green vegetables and fruits form a great portion of their diet, they are at no pains to cultivate them, but are content with gathering those which grow spontaneously in the forests and marshes, such as the young shoots of the bamboo, wild asparagus, the succulent stems of a variety of aquatic plants, and other shrubs which would not be deemed fit for food in any other country. They are strangers to all the ordinary garden vegetables, such as peas, carrots, cabbages, turnips, mustard, cresses, radishes, &c. Even melons, cucumbers, and the egg-plant, so generally cultivated in India, are here little attended to. yam and the sweet potato are grown, but not extensively; and the common potato is unknown. Onions are produced; and capsicum, which, after salt, is the most ordinary condiment used by the Burmese, is cultivated everywhere.

The forests of Burmah abound in the finest trees. Among these the teak holds a conspicuous place. The finest teak forest is that of Sarawaddy, but many others exist in the provinces, and Ava the capital is supplied from a place distant fifteen days' journey. Almost every description of timber known in India is produced in the Burmese forests.1 Varnish is another useful forest product, which is employed by the Shans and the Burmese in their manufacture of lacquer ware. Stick-lack of an excellent quality is obtained in

the woods.

Minerals.

Burmah is rich in minerals, and produces gold, silver, copper, tin, lead, antimony, amber, coal, petroleum, nitre, natron, salt, limestone, and marble, noble serpentine, sapphire, and other precious stones. Gold, carried down from the higher grounds by the mountain streams, is found in the sands of different rivers; and is also found towards Lao on the eastern frontier. Silver mines, too, are wrought towards the Chinese frontier, at a place called Bor-twang, about twelve days' journey from B'hamo, which is 250 miles north by east from Ava. The mountainous districts of Lao contain almost all the other metals; but such is the rude state of the people, that they are ignorant of their value; and it is doubtful whether the copper, tin, and lead, which are seen in the market of Ava are produced in the Burmese territories, or are imported from China. Iron is found abundantly in the eastern country of Lao, and it is wrought, though with little advantage. Owing to ignorance and the want of proper machinery, about 30 or 40 per cent. of the metal is lost in the process of forging. The mountains near the capital contain lime in great abundance and of remarkable whiteness; and statuary marble, equal to the best Italian specimens, is found about 40 miles from Ava, on the eastern bank of the Irrawaddy. Mines of amber are wrought, and their produce must be abundant, judging from the price of this article, which at Ava does not exceed four shillings per pound. Nitre, natron, and salt are found in the neighbourhood of the capital, and in the upper provinces. Coal has also been discovered, and there is little doubt that it is extensively diffused. It has not, however,

singular, however, that the natives never infuse it as they do habitants, who are content to use in its stead wood, which the Chinese tea, but eat the leaf prepared with oil and garlic. is scarce and dear. Petroleum, which is used by all ranks among the Burmese for burning in lamps, and also for smearing wood as a preservative against insects, is found near the village of Re-nan-gyaong, on the banks of the Irrawaddy. Here are about eight or ten pits or wells, the general depth of which is from 210 to 240 feet; some of them are deeper, and one is sunk to the depth of 300 feet. The shaft is of a square form, about three feet in diameter, and is formed by sinking a wooden frame. The liquid appears to boil up from the bottom like an abundant spring, and is extracted in buckets, and sent to all quarters of the country In those parts where its price is raised by a long land-carriage until it comes into competition with Sesamum oil, the latter is preferred.

The precious stones which are produced in the Burmese territories are chiefly of the sapphire species and the spinelle ruby. They are found at two places, about five days' journey in a S.E. direction from the capital, in the beds of rivulets or small brooks, from which they are separated by washing. The varieties of the sapphire found there are, the blue or oriental sapphire, the red or oriental ruby, the purple or oriental amethyst, the yellow or oriental topaz, besides different varieties of chrysoberyl and spinelle. The crown, as in all despotic countries, lays claim to the produce of these rivers; and all the stones that exceed the value of L.10 are accordingly sent to the treasury. No stranger is ever permitted to approach the spots where these precious stones are found. Noble serpentine is exported in considerable quantities to China, where it is used for rings and amulets.

The country of the Burmese, abounding in forests, affords Animals. extensive shelter to the wild animals. The elephant, and the rhinoceros with a single horn, are found in all the deep forests of the country. The tiger and the leopard are numerous, as are also the wild hog, and several species of deer, such as the Indian roe and the axis. It is remarkable that no species of antelope is seen. It is said there are neither wolves, jackals, foxes, nor hyenas, in any of the tropical countries east of Bengal.

Of birds, the wild cock is common, and is seen in coveys in all the forests of the country. There are also peacocks,

varieties of pheasants, partridges, and quails.

The domestic animals of the Burmese are the ox, the buffalo, and the horse. Oxen are used for draught in the upper country, and buffaloes in the southern parts of Burmah. They are of a good description, and, ranging in the luxuriant pastures of the plains, they commonly appear in high order. The care of these animals is the only point to which much attention is paid in the rural economy of the Burmese. The buffalo is confined to agricultural labour, and the ox alone is used as a beast of burden or of draught. The Burman horses are rarely more than thirteen hands high; the full-sized horse being unknown in the tropical countries of Asia east of Bengal. Horses are never used but for riding, and only in the upper mountainous districts. Elephants are kept for the pleasure of the king, some of them of fine quality, and of a white colour. The dog, as in most other parts of the East, is neglected, and is seen prowling about the streets a prey to famine and disease. Cats are numerous; and about the capital a few goats and sheep, of a puny race, are kept more for curiosity than for use. A few asses are also seen, which are brought from China. The camel is not known even in the upper country, where it would be found extremely useful.

From their resemblance in features and form, the Bur-Population. mese appear to be of the same race as the inhabitants of

Burmah. the countries that lie between Hindustan and China. They may be generally described as of a stout, short, active, but well-proportioned form; of a brown but never of an intensely dark complexion, with black, coarse, lank, and abundant hair, and a little more beard than is possessed by the Siamese. The population of the country has been variously estimated and grossly exaggerated by the ignorance of Europeans, who have raised it to 17,000,000, 19,000,000, and even 33,000,000. There is no enumeration of the inhabitants in any part. Mr Craufurd, on the best data that he could procure, rated the inhabitants at 22 to the square mile, which, under the now contracted limits of the empire. would give a total population of 2,112,000.

Political institutions.

The Burmans appear to be inferior to the Hindus, and and judicial still more to the Chinese, in arts, manufactures, and industry, and in all the institutions of civil life. Their government is a pure despotism, the king dispensing torture, imprisonment, or death, according to his sovereign discretion. One of his customary titles is lord of the life and property of all his subjects; and they frequently find to their cost that this is no vain title. The chief object of government seems to be the personal honour and aggrandizement of the monarch; and the only restraint on the exercise of his prerogative is the fear of an insurrection. He is assisted in his administration by a public and a privy council. All questions, before they are submitted to the public advisers of his majesty, are debated in the privy council, which consists of four, to which are attached deputies, secretaries, and other officers, who carry messages, report from time to time the proceedings of the council to the king, and are in reality privileged spies. The pay-master-general is an officer of high importance; the other officers of distinction are the king's armour-bearer and the master of the elephants, who however have no share in the administration of public affairs. The king may order any of those great officers to be punished at his pleasure; and Mr Craufurd mentions, that during his residence at Ava, the favourite minister, on a complaint from some of the women of the court, was, by an order from the king, seized by the public executioner, and laid at the side of the road for two hours under the burning sun, with a weight upon his breast; and after undergoing this disgraceful punishment, continued to discharge his high functions as before. The country at large is ruled by provincial governors; and is divided into provinces, townships, districts, villages, and hamlets. The civil, military, judicial, and fis-cal administration of the province is vested in the governor, who exercises the power of life and death, though in all civil cases an appeal lies from his sentence to the chief council at the capital. In all the townships and villages there are judges with a subordinate jurisdiction. Each of the three towns composing the capital has a governor, and these governors are assisted by a sort of head constables. known to all strangers "as the busy, corrupt, and mischievous agents of the local authorities." But from a mere dry detail of the provincial administration and judicial institutions of the Burmese, their extreme inefficiency can scarcely be known. No Burmese officer ever receives a fixed salary. The higher class is paid by an assignment either of land or of the labour and industry of a given portion of the inhabitants, and the inferior magistrates by fees, perquisites, and other emoluments; and hence the most shameful extortion and bribery prevails amongst all the functionaries of the Burmese government, from the highest to the lowest. Justice is openly exposed for sale; and the exercise of the judicial functions is found to be so lucrative, that the two executive councils have by their encroachments deprived the regular judge of the greater part of his employment. So notoriously corrupt are all the judges among the Burmese, that a lawsuit is considered by all prudent men as a serious calamity.

The criminal code of the Burmese is barbarous and severe, Burmah, and the punishments inflicted are shocking to humanity. Gang robbery, desertion from the king's service, robbing of temples, and sedition or treason, are considered the most heinous crimes, and are cruelly punished, the criminal being in some cases embowelled, or thrown to wild beasts. In these cases they generally meet death with oriental indifference; and it is related of one woman who was adjudged to the latter punishment, that she deliberately crept into the cage of the tiger, and making an obeisance to the animal, was immediately killed by a single blow of his fore-paw, and dragged into the inner recesses of his den. For minor offences, fines, whipping, and imprisonment are the punishments adjudged. In important cases torture is applied both to principals and witnesses; and the jailors often torture their prisoners in order to extort money from them. The English and Americans who, during the war of 1824, were thrown into prison, were frequently tortured, and were compelled to pay fines to the jailor in order to procure milder treatment. The trial by ordeal is sometimes resorted to, as well as other superstitious modes of procedure, which denote the lowest state of barbarism. But the administration of justice among the Burmese, however vexatious and expensive, is far from efficient; and the police is as bad as can possibly be conceived. Hence the country is overrun with pirates and robbers, and a general laxity, negligence and corruption, pervade every branch of the internal administration.

Among the Burmese, society is distinguished into seven classes, which have each peculiar privileges. These are the royal family, the public officers, the priesthood, the rich men, the cultivators and labourers, slaves and outcasts. There are no hereditary honours under the Burmese government, as all the public functionaries may be dismissed from their offices, and deprived of their rank at the caprice of the sovereign. Any subject, with the exception of a slave or outcast, may, however, aspire to the first offices in the state, to which, in reality, persons of very mean origin do frequently attain. The Burmese are extremely punctilious and strict in maintaining the various orders and distinctions of society. The great officers of government hold the first rank after the king and the princes of the blood, and are distinguished by a chain or badge, which is the order of nobility, and of which there are different degrees, distinguished by the number of strings or small chains which compose the ornament. Three of open chain work mark the lowest rank; three of neatly-twisted wire the next; there are then six, nine, twelve, and finally twenty-four, which the king alone is entitled to wear. But every article possessed by a Burman for use or ornament—his ear-rings, cap of ceremony, horse-furniture, the material of his drinking-cup, if it be of gold or any other metal, the colour and quality of his umbrella (an article in general use, and one of the principal insignia of rank), whether it be of brown varnished paper, red, green, gilded, or plain white, the royal colour, all indicate the rank of the person; and if any of the lower orders usurp the insignia of a higher class, he may be slain with impunity by the first person who meets him; and so exclusive is the aristocratical spirit of the higher orders, that such a usurpation would be sure of punishment.

When a merchant acquires property he is registered by a royal edict under the name of Thuthé, or "rich man," which gives him a title to the protection of the court, while it exposes him also to regular extortion. The priesthood form a separate order, who are interdicted from all other employment, and are supported by voluntary contributions. They are distinguished by the yellow colours in their dress, which it would be reckoned sacrilege in any other person to wear; and a formal complaint was made, during the conferences with the British previous to peace, because some of their camp followers were seen dressed in yellow clothes.

vow of chastity, but may at any time quit their order. The free labouring population consist of proprietors or common labourers; and they are all considered the slaves of the king, who may at all times call for their services as soldiers, artizans, or common labourers. Hence a Burman, being the property of the king, can never quit the country without his especial permission, which is only granted for a limited time, and never to women on any pretence. The British and others who had children by Burmese women during a residence in the country experienced the greatest difficulty, even with the aid of heavy douceurs, in taking them along with them. There are two classes of slaves; namely, those who have mortgaged their services for a debt, and who are used as slaves until the debt is paid; and prisoners of war, who are always reduced to slavery. The class of outcasts consists of the slaves of the pagodas, the burners of the dead, the jailers and executioners, who are generally condemned criminals, lepers, and other incurables, who are held in great abhorrence, and treated with singular caprice and cruelty. They are condemned to dwell alone, and in a state of disgrace; and any man who is infected with leprosy, however high his rank, is forced, by continual bribes to the officers of justice, to purchase an exemption from the penalties which attach to him. Prostitutes are also considered as outcasts, but not women of loose character, chastity not being in any repute among the Burmans. The women in Ava are not shut up as in many other parts of the East, and excluded from the sight of men: on the contrary, they are suffered to appear openly in society as in Europe. In many other respects, however, they are exposed to the most degrading treatment. They are sold for a time to strangers; and the practice is not considered shameful, nor the female in any respect dishonoured. They are seldom unfaithful to their new master; and many of them have proved essentially useful to strangers in the Burmese dominions, being generally of industrious and domestic habits, and not addicted to vice.

Finance and taxes.

Manufac-

tures and

commerce.

The taxes from which the public revenue arises are in general rude and ill-contrived expedients for extortion, and are vexatious to the people at the same time that they are little productive to the state. One of the most common is the impost levied upon the proprietors of the soil by families according to a loose estimate of their supposed means, and rather resembles a property than a land tax. Nearly all the cultivated land of the kingdom is assigned to favourites of the court or to public functionaries in lieu of stipends or salaries, or is appropriated to the expenses of public establishments, such as war-boats, elephants, &c.; and this assignment conveys a right to tax the inhabitants according to the discretion of the assignee. The court favourites who receive these grants generally appoint agents to manage their estates; they pay a certain tax or quit-rent to the crown, and their agents extort from the cultivators as much more as they can by every mode of oppression, often by torture. Besides this stated tax, extraordinary contributions are levied by the council of the state directly from the lords and nobles to whom the lands are assigned, who in their turn levy it from the cultivators, and generally make it a pretence for plunder and extortion. Taxes are also laid on fruit-trees, on the teak forests, on the petroleum springs, on mines of gold and recious stones, on the fishery of ponds, lakes, rivers, and salt water creeks, on the manufacture of salt, on the eggs of the green turtle, and on esculent swallows' nests. There are no transit duties, nor any duties at fairs or markets; and as the consumption of wines, spirits, opium, and other intoxicating drugs, is forbidden by law, they cannot of course be subject to any tax.

In the useful arts the Burmese have not made any great advances. The whole process of the cotton manufacture is performed by women, who use a very rude species of loom,

Burmah. There is also an order of nuns or priestesses, who make a and are much inferior in dexterity to the Indian artisans Burmah. No fine linen is ever made at home; and the home manufacturer, even in the interior of the country, cannot withstand the competition of British cotton goods. Silk cloths are manufactured at different places; the finest at Ava or Amarapura, from raw Chinese silk. The common coarse unglazed earthenware, which is manufactured in Ava, is of an excellent quality; and a better description of pottery is also made. They are entirely ignorant of the art of making porcelain, which is imported from China. Iron ore, as already mentioned, is smelted; but the Burmans cannot manufacture steel, which is brought from Bengal. Coarse articles of cutlery, including swords, spears, knives, also muskets and matchlocks, scissors, and carpenters' tools, are manufactured at Ava. Gold and silver ornaments are produced in every considerable place in the country, but in a decidedly rude and clumsy manner. About 40 miles from Ava, on the eastern bank of the Irrawaddy, is an entire hill of pure white marble. Here are sculptured marble images of Gautama or Buddha. The marble is of the finest quality; but the workmanship is rude, and displays neither taste nor fancy. Since Burmah was deprived of its harbours and maritime districts, its commerce has been extremely limited. The trade of the country centres chiefly in Ava, the capital. The imports are rice, pickled and dried fish, and foreign commodities imported from Bengal, the Asiatic Archipelago, and Europe. Petroleum, which, as already mentioned, is a great article of internal consumption: saltpetre, lime, paper, lacquer ware, cotton and silk fabrics, iron, cutlery, some brass ware, terra japonica, sugar, and tamarinds, are given in exchange. One of the most important branches of the trade of Ava is that carried on with the Chinese province of Yunan. The principal marts of this trade are Midé, six miles to the N.E. of Ava; and B'hamo, the chief place of a province of the same name, bordering on China. It is carried on at annual fairs. The Chinese caravan, setting out from the western province of Yunan at the close of the periodical rains, generally reaches Burmah in the beginning of December, after a journey of six weeks over difficult and mountainous roads, on which only horses, mules, and asses can travel. No part of the journey is by water; from which it would appear that the upper streams of the Irrawaddy, near to the Chinese frontier, are not navigable. The principal fair is, however, held at B'hamo, comparatively few traders arriving at Ava. The articles imported from China are wrought copper; orpiment or yellow arsenic from the mines in Yunan, of a very fine quality, which finds its way into western Asia, and into Europe through Calcutta; quicksilver, vermilion, iron pans, brass wire, tin, lead, alum, silver, gold and gold-leaf; earthenware, paints, carpets, rhubarb, tea, honey, raw silk, velvets and other wrought silks; spirits, musk, verdigris, dry fruits, paper, fans, umbrellas, shoes, and wearing apparel. The metals are chiefly produced in the province of Yunan, which, though poor, is rich in minerals. The tea, which is coarse and black, is supposed to be from the same province. The articles sent to China consist of raw cotton, by far the most considerable article of export; feathers, chiefly of the blue jay, for ornamenting the dresses of ceremony of the Chinese mandarins; esculent swallows' nests, ivory, rhinoceros' and deers' horns; sapphires, used for buttons to the caps of the Chinese officers of rank, and noble serpentine, with a small quantity of British woollens.

The progress and civilization of a country may be generally very accurately measured by the state of its currency; and that used by the Burmese is of the rudest description. For the smaller payments lead is employed; and for the larger payments gold or silver, but principally the latter. These are not coined into pieces of any known weight and fineness; and in every payment of any consequence the metal must be weighed and generally assayed, for which

Religion.

History.

Burmah. a premium is paid to the bankers or money-changers of 2½ per cent, besides 1 per cent which they say is lost in the operation. These bankers are said by Symes to be workers in silver; and every merchant has one with whom he lodges his cash, and who receives on this account a commission of 1 per cent. The want of a more convenient currency must tend greatly to embarrass the operations of trade. The high rate of interest for money-which is 25 per cent., and 60 per cent. when no security is given—is another proof of the low state of commerce among the Burmese.

The Burmese, as may be supposed, are entirely ignorant of literature and science. Their astronomy and astrology they have borrowed from the Hindus. They are ignorant of navigation; and in their voyages to Calcutta, during the fine season, they creep along the coast, never losing sight of it. Morality is at a low ebb among them, and their rulers have no conception of either the excellence or utility of good faith. "They would," says the Rev. Mr Judson, the American missionary, "consider it nothing less than folly to keep a treaty if they could gain anything by breaking it." fidelity observed by the British government in fulfilling the stipulations of the late treaty stupified the Burmans. They knew not what to make of it, but some of them have now begun to admire it. "I heard many make use of expressions like the following: 'These Kulas (English), though they drink spirits and slay cattle, and are ambitious and rapacious, have a regard for truth and their word, which is quite extraordinary; whereas in us Burmesc there is no truth.' first circumstance in the conduct of the British which struck them with surprise was the return of Dr Sandford on his parole; and next, Sir A. Campbell's returning six lacs of rupees offered him after the money was in his power."

The Burmese are not votaries of Brahma, but sectaries of Buddha, who is universally considered by the Hindus as the ninth Avatar, co-descent of the Deity in his capacity of preserver; and the rites doctrines, and priesthood are nearly the same as in other countries where Buddhism prevails. Neither Christianity nor Mahommedanism has made any progress. Foreigners enjoy religious toleration, but the Burmese rulers view any attempt to convert the natives to the Christian or any other foreign faith as an interference with their allegiance, and they discourage all such schemes. An American mission was settled in the country under the conduct of Mr Judson before mentioned, who brought to the execution of this perilous service zeal and sound discretion; but it entirely failed of success, not from any bigotry on the part of the natives, but from the opposition of men in power. On the war breaking out with the British, the missionaries were imprisoned, and narrowly escaped with their lives. They are now prosecuting their missionary labours in the British province of Martaban.

The ancient history of Ava is very imperfectly known; the more early records relating chiefly to dynasties of which little more is given than their names. We learn from the Portuguese navigators that about the middle of the sixteenth century four powerful states ruled over those countries which lie between the S.E. province of British India, Yunan in China, and the Eastern Sea, namely, Arracan, Ava, Pegu, and Siam. By the help of the Portuguese the Burmans subdued the Peguans, and maintained their supremacy over them throughout the seventeenth and during the first forty years of the eighteenth century, when the Peguans revolted, and a war ensued, in the course of which, by the aid of arms procured from Europeans, they gained several victories over the Burmans, and having taken their capital Ava, and made the king prisoner, they reduced the whole country to submission. Alompra, who had been left by the conqueror in charge of Monchaboo, an inconsiderable village, planned the deliverance of his country. He attacked the usurpers at first with small detachments; but when his forces increased, he suddenly advanced, and took

possession of the capital in the autumn of 1753. In 1754 Burmah. the Peguans, anxious to recover their lost conquests, sent an armament of war-boats against Ava; but after an obstinate and bloody battle they were totally defeated by Alompra. In the districts of Prome, Donabew, Loonzay, &c. the Burmans revolted, and succeeded either in expelling or putting to the sword all the Pegu garrisons in their towns. In 1754 Prome was besieged by the king of Pegu, who was again defeated by Alompra in a severe battle, and the war was transferred from the upper provinces to the mouths of the navigable rivers, and the numerous creeks and canals which intersect the lower country. In 1755 Alompra defeated in a general battle Apporaza the king of Pegu's brother, after which the Peguans were driven from Bassein and the adjacent country, and were forced to withdraw to the fortress of Syriam, distant twelve miles from Rangoon. Here they enjoyed a brief repose, Alompra being called away to quell an insurrection of his own subjects, and to repel an invasion of the Siamese; but returning victorious, he laid siege to the fortress of Syriam and took it by surprise, when the garrison were mostly put to the sword, the Europeans being made prisoners. In these wars the French sided with the Peguans, the English with the Burmans. Dupleix, the governor of Pondicherry, had sent two ships to the aid of the former; but the master of the first was decoyed up the river by Alompra, when his vessel was taken, and he, along with his whole crew, was massacred. The other escaped by being accidentally delayed, and carried accounts of this disaster to Pondicherry. Alompra was now master of all the navigable rivers; and the Peguans, being entirely shut out from foreign aid, were finally subdued. In 1757 the conqueror laid siege to the city of Pegu, which finally capitulated, on condition that the king should govern the country, but that he should do homage for his kingdom, and should also surrender his daughter to the victorious monarch. Alompra, with Asiatic perfidy, never contemplated the fulfilment of the earlier of these conditions; and having succeeded in obtaining possession of the town, through the imbecility of the king, abandoned it to the fury of his soldiers. In the following year the Peguans endeavoured to throw off the yoke, but they were overthrown in a decisive engagement near Rangoon; and Alompra arriving soon after, quelled the rebellion. He afterwards reduced the town and district of Tavoy, and finally undertook the conquest of the Siamese. His army advanced to Mergui and Tennasserim, both which towns were taken; and he was besieging the capital of Siam when he was taken ill. He immediately ordered his army to retreat, in hopes of reaching his capital alive; but he expired on the way, in 1760, in the fiftieth year of his age, after he had reigned eight years. He was succeeded by his oldest son Namdojee Praw, whose reign was disturbed by the rebellion of his brother Shembuan, and afterwards by one of his father's generals. By his vigour he succeeded in quelling these revolts; and he afterwards turned his arms against the refractory Peguans, whom he reduced to subjection. He died in little more than three years, leaving one son in his infancy. On his decease the throne was seized by his brother Shembuan. He was intent, like his predecessors, on the conquest of the adjacent states; and he accordingly made war in 1765 on the Munnipore Cassayers, and also on the Siamese, with partial success. In the following year he renewed the war with the latter, defeated the Siamese, and, after a long blockade, obtained possession of their capital. But while the Burmans were extending their conquests in this quarter, they were invaded by a Chinese army of 50,000 men from the province of Yunan. This army was hemmed in by the skill of the Burmans; and being reduced by the want of provisions, it was afterwards attacked and totally destroyed, with the exception of 2500 men, who were sent in fetters to work in the Burmese capital at their several trades. In the meantime the Siamese revolted from the Burmese

Burmah. voke; and while the Burman army was marching against them, the Peguan soldiers who had been incorporated in it rose against their companions, and commencing an indiscriminate massacre, pursued the Burman army to the gates of Rangoon, which they besieged, but were unable to capture. In 1774 Shembuan was engaged in reducing the marauding tribes. He took the district and fort of Martaban from the revolted Peguans; and in the following year he sailed down the Irrawaddy with an army of 50,000 men, and, arriving at Rangoon, put to death the aged monarch of Pegu along with many of his nobles, who had shared with him in the offence of rebellion. He died in 1776, after a reign of twelve years, during which he had extended the Burmese dominions on every side, having reduced to a state of vassalage the petty states in the neighbourhood, and the uncivilized tribes in the western hills, as well as those in the mountainous tracts to the east of the Irrawaddy. He was succeeded by his son, a youth of eighteen, who proved himself a bloodthirsty despot, and was put to death by his uncle Mindragee Praw in 1782, who ascended the vacant throne, and in 1783 sent a fleet of boats against Arracan, which was conquered, and the rajah and his family were made prisoners. Cheduba, Ramnee, and the Broken Isles soon afterwards

> The Siamese who had revolted in 1771 were never afterwards subdued by the Burmans. They retained their dominion over the sea-coast as far as Mergui; and in the year 1785 they attacked the island of Junkseylon with a fleet of boats and an army. But they were ultimately driven back with loss; and a second attempt by the Burman monarch, who in 1786 invaded Siam with an army of 30,000 men, was attended with no better success. In 1793 peace was concluded between these two powers, the Siamese yielding to the Burmans the entire possession of the coast of Tennasserim on the Indian Ocean, and the two important seaports of Mergui and Tavoy.

> In 1795 the Burmese were involved in a dispute with the British in India, in consequence of their troops to the amount of 5000 men entering the district of Chittagong in pursuit of three robbers who had fled from justice across the frontier. Explanations being made, and terms of accommodation offered by General Erskine, the commanding officer, the Burmese commander retired from the British territories, when the fugitives were restored, and all differences for the

time amicably arranged.

But it was evident that the gradual extension of the British and Burmese territories would in time bring the two powers into close contact along a more extended line of frontier, and in all probability lead to a war between them. It happened, accordingly, that the Burmese, carrying their arms into Assam and Munnepore, penetrated to the British border near Sylhet, on the N.E. frontier of Bengal, beyond which were the possessions of the chiefs of Cachar, under the protection of the British government. The Burmese leaders, arrested in this manner in their career of conquest, and flushed with past success, were impatient to measure their strength with their new neighbours. It appears from the evidence of Europeans who resided in Ava, that they were entirely unacquainted with the discipline and great military resources of the Europeans. They imagined that, like the other nations in the East, they would fall before their superior tactics and valour; and their cupidity was inflamed by the prospect of marching to Calcutta and of plundering the country. With such dispositions, it was not to be supposed that causes of quarrel would long be wanting. Petty acts of aggression were first committed. At length their chiefs, throwing off the mask, ventured on the open violation of the British territories. They attacked a party of sepoys within the frontier, seized and carried off British

subjects, and at all points their troops, moving in large Burmah. bodies, assumed the most menacing positions. In the south encroachments were made upon the British frontier of Chittagong. The island of Shaparee, at the mouth of the Naaf river, had been occupied by a small guard of British troops These were attacked on the 23d September 1823, during the night, by the Burmese, and driven from their post with the loss of several lives; and to the repeated demands of the British for redress no answer was returned. Other outrages ensued; and at length, in February 1824, war was

declared by the British government.

Hostilities having commenced, the British rulers in India, with their usual boldness and energy, resolved to carry the war into the enemy's country; and with this view an armament was fitted out under the orders of Commodore Grant and Sir Archibald Campbell, which entered the Irrawaddy river, and anchored off Rangoon on the 10th May 1824. After a feeble resistance this great seaport of the Burmese surrendered, and the troops were landed. The place was entirely deserted by its inhabitants, the provisions were carried off or destroyed, and the invading force took possession of a complete solitude. On the 28th May, Sir A. Campbell ordered an attack to be made on some of the nearest posts of the enemy, which were all carried after a feeble defence. Another attack was made on the 10th June on the stoccades at the village of Kemmendine. Some of these, being too strong to be attacked by escalade, were battered by artillery; and the shot and shells struck such terror into the Burmese that they fled from their works in the utmost precipitation. It soon, however, became apparent, that the expedition had been undertaken with very imperfect knowledge of the country, and without adequate provision for securing supplies. The devastation of the country, which was part of the defensive system of the Burmese, was carried into execution with unrelenting rigour, and the invaders were soon reduced to great difficulties. The health of the men rapidly declined, and their ranks were fearfully thinned by disease. Enraged by the defeats hitherto sustained, the monarch of Ava sent large reinforcements to his dispirited and beaten army; and early in July an attack was commenced on the British line, but proved unsuccessful. On the 8th, the British general directed an assault to be made on the enemy's entrenched positions, in which the armament on the river co-operated with the land force. The enemy were beaten as formerly at all points; and their strongest stoccaded works, battered to pieces by a powerful artillery, were in general abandoned by their defenders. Towards the end of August an attack was made on the British position by the prince of Sarawaddy, which was quickly repelled. But with this exception, the enemy having learned by fatal experience the necessity of caution, had allowed the British to remain unmolested in their quarters during the months of July and August. This interval of leisure was employed by Sir A. Campbell in subduing the maritime provinces of the Burmese to the east, namely, Tavoy, Mergui, and the whole coast of Tennasserim, which quickly submitted to the British arms. This was an important conquest, as the country proved to be salubrious, and afforded convalescent stations to the sick, who were now so numerous in the British army, owing to severe duty, and to the incessant rains and privations of every kind to which they were exposed, that scarcely 3000 soldiers fit for duty could be mustered in the lines. The climate of Mergui proved to be so healthy that the sick who had been languishing for months at Rangoon rapidly recovered. An expedition was about this time sent against the old Portuguese fort and factory of Syriam, at the mouth of the Pegu river, which was taken; and in October the province of Martaban was reduced under the authority of the British.

Burmah.

The rainy season terminated about the end of October; and the court of Ava, alarmed by the discomfiture of its numerous armies, resolved on recalling the veteran legions which were employed in Arracan, under their renowned leader Maha Bandoola, in vain attempts to penetrate the British frontier. Relinquishing his plans of offensive war, Bandoola, with his army, hastened by forced marches to the defence of his country; and by the end of November an army of 60,000 men had surrounded the British position at Rangoon and Kemmendine, for the defence of which Sir Archibald Campbell had only 5000 efficient troops. On the 1st December the enemy in great force made repeated attacks on the post of Kemmendine, nowise daunted by the heavy broadsides which were poured from the shipping in the river. These attacks were invariably repulsed by the steadiness of the troops—the last, which was made after dusk, with great loss; and the fire rafts which had been set affoat for the destruction of the shipping, were towed by the sailors to the shore, where they occasioned no injury. Several encounters took place with the enemy on the succeeding days; and on the 7th the army of Bandoola was completely routed in a general attack by Sir A. Campbell. The fugitives retired to a strong position on the river, which they again entrenched; and here they were attacked by the British on the 15th, who, surmounting every obstacle, carried the stoccaded ramparts at the point of the bayonet, and drove the enemy in complete confusion from the field. After this defeat the remnant of the Burmese army retreated to Donabew.

Sir Archibald Campbell, thus victorious in every encounter, now resolved to advance on Prome, about 100 miles higher up the Irrawaddy river. Having provided the means of transport, and having succeeded in acquiring the confidence of the inhabitants, many of whom had returned to their homes, and were found extremely useful to the army, he moved with his force on the 13th February in two divisions, one proceeding by land, and the other, under General Cotton, destined for the reduction of Donabew, being embarked on the flotilla. Sir Archibald Campbell, taking the command of the land force, continued his advance till the 11th March, when intelligence reached him of the failure of the attack upon Donabew. He instantly commenced a retrograde march; on the 27th he effected a junction with General Cotton's force, and on the 2d April carried the entrenchments at Donabew with little resistance, the enemy being panic struck by the death of the general-in-chief, Maha Bandoola, who was killed by the explosion of a bomb. Sir A. Campbell, resuming his march to Prome, entered that place on the 25th, the Burmese flying at his approach, after setting fire to the town. Here he remained during the rainy season to refresh his troops, exhausted by privations and severe service. On the 17th September an armistice was concluded between the contending armies for one month. In the course of the summer General Morrison had conquered the province of Arracan; in the north the Burmese were expelled from Assam; and the British had made some progress in Cachar, though their advance was finally impeded by the thick forests and jungle with which the country was covered.

The armistice between the Burmese and Sir A. Campbell having expired on the 17th October, the army of Ava, amounting to 60,000 men, advanced in three divisions against the British position at Prome, which was defended by 3000 Europeans and 2000 native troops. But the science, courage, superior equipment, and high discipline of the British still triumphed over the undisciplined hordes of the Burmese army, who being hastily brought together, and inexperienced in war, were unable to withstand the close encounter of their veteran adversaries. After several actions, in which the Burmese were the assailants and were partially successful, Sir A. Campbell, on the 1st December,

attacked the different divisions of their army, which were Burmah, imprudently separated from each other, and which, notwithstanding the entrenchments by which they were protected, were, in the course of four days, successively driven from all their positions and dispersed in every direction. The Burmese retired on Meaday and afterwards on Mellone, along the course of the Irrawaddy, where they occupied, with 10,000 or 12,000 men, a series of strongly fortified heights and a formidable stoccade. On the 26th they sent a flag of truce to the British camp; and a negotiation having commenced, peace was proposed to them on the fol-lowing conditions: 1st, The cession of Arracan, together with the provinces of Mergui, Tavoy, and Yea; 2d, The renunciation by the Burmese sovereign of all claims upon Assam, and its contiguous petty states; 3d, The company to be paid a crore of rupees as an indemnification for the expenses of the war; 4th, Residents from each court to be allowed, with an escort of fifty men. It was also stipulated that British ships should no longer be obliged to unship their rudders and land their guns as formerly in the Burmese ports. This treaty was agreed to and signed, but the ratification of the king was still wanting; and it was soon apparent that the Burmese had no intention to send it, but were preparing to renew the contest. On the 19th January, accordingly, Sir A. Campbell attacked the enemy's position at Mellone and carried it, the Burmese troops abandoning their defences in complete disorder. Another offer of peace was here made, which was found to be insincere; and the fugitive army resolved to make at Pagahm-Mew a final stand in defence of the capital. They were attacked and overthrown on the 9th February 1826; and the invading force being now within four days' march of Ava, Dr Price, an American missionary, who with other Europeans had been thrown into prison when the war commenced, was sent to the British camp with the treaty ratified, the prisoners of war released, and an instalment of 25 lacs of rupees. The war was thus brought to a successful termination, and the British army evacuated the country.

For some years the relations of peace continued undisturbed. Probably the feeling of amity on the part of the Burmese government was not very strong; but so long as the prince by whom the treaty was concluded continued to hold the reins of power, no attempt was made to depart from its main stipulations. That monarch, however, was obliged in 1837 to yield the throne to a usurper who appeared in the person of his brother. This latter personage, at an early period, manifested that hatred of British connection which was almost universal at the Burmese court, and which probably had been shared by the deposed ruler, though he had the prudence to conceal it. For several years it had become apparent, that the period was approaching when war between the British and the Burmese governments would again become inevitable. The British Resident finding his presence at Ava agreeable neither to the king nor to himself, removed in the first instance, under instructions from his government, to Rangoon. Ultimately it became necessary to forego even the pretence of maintaining relations of friendship, and the British functionary was properly withdrawn altogether from a country where his continuance would have been but a mockery. The state of sullen dislike which followed was after a while succeeded by more active evidences of hostility. Acts of violence were committed on British ships and on British seamen, who had proceeded to Burmese ports in the exercise of their lawful calling, and in a friendly spirit; their only purpose being the prosecution of their trade. As the tame submission of the British government to such treatment would have been utterly incompatible with either the national interest or the national honour, remonstrance was made, backed in the only way by which remonstrance could, under such circumstances, be rendered effectual, by a small naval force. The officers

Burman, on whom devolved the duty of representing the wrongs of their fellow-countrymen, and demanding redress, proceeded to Rangoon, the governor of which place had been a chief actor in the outrages complained of; but so far were they from meeting with any signs of regret, that they were treated with indignity and contempt, and compelled to retire without accomplishing anything beyond blockading the ports. A series of negotiations followed; negotiations conducted on one side in a spirit of sincerity, on the other with no feelings but those of rancour and duplicity. Nothing was demanded of the Burmese beyond a very moderate compensation for the injuries inflicted on the masters of two British vessels, an apology for the insults offered by the governor of Rangoon to the representatives of the British government, and the re-establishment of at least the appearance of friendly relations, by the reception of a British agent by the Burmese government. But notwithstanding the severe lessons formerly received, the obduracy of that government led to the refusal alike of remuneration for past

wrongs, though the sum required was of very trifling amount, of any expression of regret for the display of gratuitous insolence, and of any indication of a desire to maintain friendship for the future. Another Burmese war was the result; and as in the former, though success was varying, the British finally triumphed. The chief towns in the lower part of the Burmese kingdom fell to them in succession. The city of Pegu, the capital of that portion which, after having been captured, had again passed into the hands of the enemy, was recaptured and retained, and the whole province of Pegu was, by proclamation of the governor-general, declared to be annexed to the British dominions. No treaty was obtained or insisted upon—the British government being content with the tacit acquiescence of the king of Burmah without such documents; but its intention was declared, that any active demonstration of hostility by him would be followed by retribution. And thus in 1853 closed the war forced on the British government in the previous (D. B-N.) (E. T.)

BURMAN, CASPAR, the son of the famous theologian of Utrecht, Francis Burman, was born in that city about the beginning of the eighteenth century. Of his works, none of which are of much importance, the best known are his Hadrianus VI., published at Utrecht in 1727, and his Trajectum Eruditum, a biographical history of the eminent scholars and philosophers of his native town. He died in 1755.

BURMAN, Francis, a learned biblical critic of the seventeenth century, was born at Leyden in 1632. At the age of twenty-three he became pastor of the Dutch congregation of Hanau in Germany, but in 1661 returned to Leyden as sub-rector of the College of Orders. From Leyden he removed to Utrecht, where he taught theology with much acceptance till his death in 1679. His works, which are very numerous, consist chiefly of commentaries on some of the Old Testament, and are written in Dutch, Latin, and German.

Burman, Francis, a celebrated theologian and sacred poet of Holland, was born at Utrecht in 1671. He studied in his native city under Grævius, and afterwards removed to Leyden, where he made great attainments in mathematics and philosophy. In 1698 he became pastor of Coodom in Friesland, and four years later accompanied the Dutch embassy sent to London to congratulate Queen Anne on her accession to the English throne. On his return to Holland he accepted an invitation to become pastor of Enckhuysen-where he remained for two years. At the end of that period he removed to Amsterdam and resided there for ten years, teaching and preaching with much success. In 1714 he was elected to a theological chair at Utrecht, where he died after a short illness in 1719. Of his numerous works, we may specify his Burmannorum pietas, in which he vindicates the memory of his father from the charge of Spinozism alleged against him by Philip Limbourg of Amsterdam; and his Theologus, Utrecht, 1715.

BURMAN, John, a distinguished Dutch physician, son of the preceding, born at Amsterdam in 1706. He studied the physical sciences at Leyden with such success, that in 1738 he was appointed professor of botany at Amsterdam in room of the celebrated Ruysch. His merits as a botanist were such, that Linnæus, who was under many obligations to him, called a genus of plants after his name, Burmannia. His dissertation de Chylopoiesi was published at Leyden in 1728, and his Thesaurus Zeylanicus at Amsterdam in 1737. At this latter city he died in 1780.

BURMAN, Peter, a philologer and critic of high reputation, was born at Utrecht on the 26th June 1668. His father, Francis Burman, professor of divinity in that university, was the son of a German clergyman, whom the destruc-

tive war of the Palatinate had driven from Frankenthal; his mother was Mary the daughter of Abraham Heydan, professor of divinity in the university of Leyden. Thus he was doubly connected with men of letters, and various members of the same family distinguished themselves by their writ-While he was yet in the eleventh year of his age, he had the misfortune to lose his pious and learned father; but this loss, great as it certainly was, appears to have been in a very considerable degree supplied by the assiduity, prudence, and piety of his mother. He was educated in the public school of Utrecht, where his progress must have been very rapid, for at the age of thirteen he became a student in the university. For several years he attended the lectures of Grævius, a professor of great learning and eminence, who ably blended Greek with Latin erudition, and to whose private friendship, joined to his public instructions, Burman seems to have been in a great measure indebted for that strong predilection which he continued to evince for philological studies. Here, among other departments of literature, he assiduously cultivated Latin composition, and he gradually attained to no mean proficiency both as an orator and a poet.

Burman's original destination was for the legal profession; and after having devoted some years to literature, he next applied himself to the study of the law. The university of Utrecht was then highly distinguished as a school of jurisprudence, and among other great names, it could boast of Noodt, one of the ablest civilians of modern times. He attended the lectures of this professor, and likewise those of Van Muyden and Van de Poll, who both taught the municipal as well as the civil law; nor did he neglect the lectures of H. Cocceii on the feudal law, and on the treatise of Grotius De Jure Belli ac Pacis. A further proof of his assiduity he exhibited in a dissertation De Vicesima Hæreditatum, which he publicly defended with

It is a common practice for the more liberal and inquisitive students of Holland and Germany to pass from one university to another, and the practice has an obvious tendency to improve the youthful mind, by removing local prejudices, and by introducing a new current of refined thought. Burman accordingly spent a year at Leyden, where he studied philosophy under Volder, but in the mean time did not neglect his favourite pursuits of classical erudition. He attended the lectures of the younger Gronovius on some of the Greek writers, together with those of Ryckius on Tacitus. Of this Latin historian, the latter professor was about that period engaged in preparing a new edition, with a separate volume of animadversions. Returning to the university of Utrecht, he continued to

instructions and advice. In the month of March 1688 he took the degree of doctor of laws, having previously written and defended a learned dissertation De Transactionibus. "The attainment of this honour," as Dr Johnson has remarked, "was far from having upon Burman that effect which has been too often observed to be produced in others, who, having in their own opinion no higher object of ambition, have elapsed into idleness and security, and spent the rest of their lives in a lazy enjoyment of their academical dignities. Burman aspired to further improvements, and, not satisfied with the opportunities of literary conversation which Utrecht afforded, travelled into Switzerland and Germany, where he gained an increase both of fame and learning.

But having made choice of a profession, it had now become necessary to enter upon a new course; and on his return to his native city, he applied his talents and learning to the practice of the law. We are informed that he pleaded various causes with much force and eloquence; nor will this account appear improbable to those who are acquainted with the vigour and decision displayed in his ordinary strain of composition. On the first of December 1691 he was appointed receiver of the tithes which were originally paid to the bishop of Utrecht: this was an office of considerable credit, and was usually bestowed upon persons of some distinction. While engaged in these occupations, he married Eve Clotterboke, the daughter of a burgomaster of Briel, much commended for her beauty and accomplishments. She became the mother of ten children, eight of whom died at an early age, and only two sons survived their father. This learned advocate might have risen to great eminence in his profession; but as the love of letters was his predominant passion, he gladly availed himself of an opportunity of leaving the bar and returning to the university. A recommendation from his friend Grævius to the magistrates of Utrecht procured him the professorship of eloquence and history, to which was afterwards added the professorship of the Greek language, and that of politics. His first appointment was that of an extraordinary professor, or of a professor extra ordinem. He took possession of his chair on the 10th of December 1696; and on that occasion pronounced an oration De Eloquentia et Poetice. His academical labours, which were thus so various, must likewise have been very formidable; but being a man of an excellent capacity, and of unwearied application, he ably performed whatever he had undertaken, and gradually acquired a high and merited reputation. His lectures attracted a numerous auditory, and his multifarious publications rendered his name familiarly known wherever ancient learning was successfully cultivated. The most serious labours of his life were devoted to the illustration of few rivals.

Soon after his appointment to the professorship, he published a collection of letters from learned men, and chiefly relating to topics of learning: "Marquardi Gudii

Burman. cultivate the friendship of Grævius, and to profit by his bibliotheca auctiores; curante Petro Burmanno." Ultra- Burman. jecti, 1697, 4to. About the same period he prepared an edition of Phædrus. Amst. 1698, 8vo. This edition was twice reprinted; and after an interval of nearly thirty years, he published the same poet with a new commentary. He next produced "Q. Horatius Flaccus. Accedunt J. Rutgersii Lectiones Venusinæ." Traj. Batav. 1699, 12mo. Burman has prefixed a dedication and preface, but the only notes which occur are those of Janus Rutgersius, who died in the year 1625, after having established no mean reputation as a scholar by the publication of his Varia Lectiones. These editions were followed by a learned dissertation, entitled " Zeus Karascarns, sive Jupiter Fulgerator in Cyrrhestarum Nummis." Traj. Bat. 1700, 4to. Resuming the illustration of the Latin poets, he now prepared an edition of Valerius Flaccus. Ultraj. 1701, 12mo. This edition includes the notes of N. Heinsius, who had himself published the text in 1680; but after a long interval, Burman edited the same poet with more ample illustrations, which were partly derived from various other critics. Leidæ, 1724, 4to. He was chosen rector of the university in 1703, and again in 1711.

Grævius, one of the chief ornaments of the university of Utrecht, died in the year 1703, and his grateful pupil honoured his memory by a funeral oration, which is ably and affectionately written, and contains an interesting sketch of his life and character. His great and valuable collection of writers on Roman antiquities is well known among scholars. He engaged in a more extensive undertaking, a collection of writers on the history and antiquities of Italy; and after his decease, the charge of inspecting its progress devolved upon Burman, who contributed nine different prefaces. "Thesaurus Antiquitatum et Historiarum Italiæ." Lugd. Bat. 1704-25, 45 tom. fol. The book is described in the title as "tomis x. vel voluminibus xlv. distinctus;" each volume consisting of several parts, which amount to the size of volumes. Burman likewise wrote the preface to an edition, undertaken by Grævius, of Gruter's "Inscriptiones Antiquæ totius Orbis Romani." Amst. 1707, 2 tom. fol.

His next literary enterprise was an edition of a prose writer, Petronius Arbiter. Traj. ad Rhen. 1709, 4to. The learned editor was attacked in an anonymous publication, consisting of a few pages, and bearing the title of "Burmanniana, sive Calumniarum Petri Burmanni in Collegas et Populares Specimen." Amst. 1710, 12mo. These calumnies are collected from his annotations on Petronius. His most elaborate edition was very unfavourably noticed by Le Clerc, who by the freedom of his strictures in various publications, more particularly in his different Bibliotheques, had excited the resentment of many eminent members of the republic of letters. Of grammarians and verbal critics he spoke with habitual contempt, and thus the Roman classics, and in this department he had but increased the offence that was merely personal. Some of his philological mistakes had been exposed by Perizonius, but he was attacked by Burman in a more ferocious manner. His literary delinquencies were fiercely discussed in the preface to Petronius; and his contemptuous review et doctorum Virorum ad eum Epistolæ; quibus accedunt of the edition was followed by a volume entitled "Le ex bibliotheca Gudiana clarissimorum et doctissimorum Gazettier Menteur, ou Mr. Le Clerc convaincu de Men-Virorum, qui superiore et nostro sæculo floruerunt, et songe et de Calomnie, par Pierre Burman." Utrecht, Claudii Sarravii, Senatoris Parisiensis, Epistolæ ex eadem 1710, 12mo. Whatever may have been the extent of the

¹ Bibliothèque Choisie, tom. xix. p. 351.—Le Clerc commences his review in the following terms: "Je ne mets pas ici cette edition," pour en rendre compte au public. Il n'y a rien qui mérite son attention." The rest of the article is written in the same strain of disparagement, nor has the author confined himself to his adversary's literary character. The subsequent passage refers to his morals: "Je ne parlerai pas de l'imprudence qu'il y a è parler ainsi, pendant un procès, où une fille l'accuse de l'avoir débauchée." P. 365. The learned professor has adverted to this charge, but, as it appears to us, not in such clear and direct terms of disavowal as might naturally have been expected from a man conscious of his innocence. (Burman, Gazettier Menteur, p. 24.) Le Clerc ascribes to him a satire against himself, published the year 1703, in the form of a Latin dialogue between Spudæus and Gorallus; and the manner in which Burman speaks of it seems to justify his suspicions. manner in which Burman speaks of it seems to justify his suspicions,

Burman. provocation, and it was by no means inconsiderable, the he had so often praised; and, as a real proof of his re- Burman. not equalled by his learning.1 "Chrestomathia Petronio-Burmanniana; sive Cornu-copiæ Observationum eruditissimarum et ante plane inauditarum, quas vir illuminatissimus, rerum omnium, et multarum præterea aliarum, peritissimus, Petrus Burmannus congessit in Petronium Arbitrum, scriptorum sanctissimum. Accessit Specimen Latinitatis novæ, Romanis incognitæ, e Notis Petri Burmanni ad Petronium." Florentiæ, 1734, 8vo. Although the work thus bears the imprint of Florence, the typography is apparently Dutch. Another edition of Petronius appeared after the death of the indefatigable editor. Lugd. Bat. 1743, 4to. Le Clerc had published his unfortunate edition of Menander and Philemon in the year 1709; and in the course of the ensuing spring Dr Bentley, under an assumed name, transmitted his Emendationes to Burman, who lost no time in communicating to the public such a morsel of criticism. Traj. ad Rhen. 1710, Svo. Under his own name, he prefixed a preface of thirty-four pages, in which he assailed Le Clerc with extreme virulence, and enumerated many errors which the author had left unnoticed. Not satisfied with relieving his spleen in this manner, he added a poetical address to the Manes of the injured poets, in which he endeavoured to condense the esreader may be enabled to judge from a brief specimen

> Scilicet hæc nostris servata informia seclis Prodigia, et nullis monstra pianda sacris.

Burman soon afterwards published a compendium entitled "Antiquitatum Romanarum brevis Descriptio." Ultraj. 1711, 8vo. His early study of jurisprudence was not without its advantages in those departments of literature to which he devoted himself with such persevering energy. His knowledge of the civil law he found of frequent use in illustrating the Latin classics; and he published an elaborate and valuable work which bears a refe-Romani Dissertatio." Ultraj. 1714, 8vo. Of this dissertation the original sketch had appeared in 1694; and he lived to publish an edition greatly improved, and combined with his Jupiter Fulgerator. Leidæ, 1734, 4to.

of visiting Paris, not only for the sake of conferring in person, upon questions of literature, with the learned men of that place, and of gratifying his curiosity with a more familiar knowledge of those writers whose works he admired, but with a view more important, of visiting the libraries, and making those enquiries which might be of advantage to his darling study. The vacation of the university allowed him to stay at Paris but six weeks, which he employed with so much dexterity and industry, that he had searched the principal libraries, collated a great number of manuscripts and printed copies, and brought back a great treasure of curious observations. In this visit to Paris he contracted an acquaintance, among other learned men, with the celebrated Father Montfaucon, with whom he conversed, at their first interview, with no other character than that of a traveller; but their discourse turning upon ancient learning, the stranger soon gave such proofs of his attainments, that Montfaucon declared him a very uncommon traveller, and confessed his curiosity to know his name; which he no sooner heard, than he rose from his seat, and, embracing him with the utmost ardour, expressed his satisfaction at having seen the man whose productions of various kinds

spirit of this work is not to be commended. Burman's gard, offered not only to procure him an immediate adedition was long afterwards attacked in a separate volume, mission to all the libraries of Paris, but to those in remotwritten by some anonymous author, whose animosity was er provinces, which are not generally open to strangers, and undertook to ease the expenses of his journey by procuring him entertainment in all the monasteries of his order. This favour Burman was hindered from accepting by the necessity of returning to Utrecht, at the usual time of beginning a new course of lectures, to which there was always so great a concourse of students, as much increased the dignity and fame of the university in which he taught."

When his talents and learning had thus procured him a high and well-earned reputation, the death of Perizonius left a vacancy in the professorship of history, the Greek language, and eloquence, in the university of Leyden; and Burman had the honour of being nominated the successor of a man who had occupied a very conspicuous place among the scholars of the age. He was distinguished by the acuteness of his intellect, and the solidity of his judgment: he was equally skilled in Greek and Roman literature, and with his critical skill he united a masterly knowledge of the most abstruse departments of ancient history. Burman, who was no unworthy successor, took possession of his chair on the 2d of July 1715, and then pronounced an inaugural oration, "De publici Humanioris Disciplinæ Professoris proprio Officio et Munere." He was sence of his vituperation. Of the spirit of this effusion the afterwards appointed professor of the history of the United Provinces, and likewise of poetry; and to all these functions was finally added the office of keeper of the university library. He was twice chosen rector of the university, namely, in 1719 and in 1731.

In the midst of these academical toils, which would have been more than sufficient for a person of ordinary application, he still found leisure for the preparation of elaborate editions of Latin classics, and, among the rest, for an edition of Velleius Paterculus. Lugd. Bat. 1719, 8vo. It was reprinted after the death of the editor. Lugd. Bat. 1744, Svo. From this ancient historian he made a tranrence to law as well as history, " De Vectigalibus Populi sition to an ancient rhetorician, and completed an edition of the works of Quintilian. Lugd. Bat. 1720, 3 tom. 4to. The last volume is occupied with the declamations ascribed to that writer, and with those of Calpurnius Flaccus. A pompous edition of Quintilian was afterwards produced "In 1714," says Dr Johnson, "he formed a resolution by Capperonnier (Paris, 1725, fol.); and as Burman thought himself treated with less than due respect, he took an ample revenge in a work entitled "Petri Burmanni Epistola ad Claudium Capperonnerium, Theologum Licentiatum, Diaconum Ambianensem, et Græcæ Linguæ Professorem, de nova ejus M. Fabii Quinctiliani de Institu-tione Oratoria Editione." Leidæ, 1726, 4to. Among other branches of learning, the Parisian professor has betrayed his ignorance of the Roman law, and on this account is severely chastised by his unrelenting adversary. But in the mean time Burman had superintended an edition of Justin, which is without a commentary, but contains an excellent preface. Lugd. Bat. 1722, 12mo.

His editorial labours were next bestowed upon a modern author, whose fame is nearly classical. An elaborate edition of Buchanan had been published by Ruddiman in the year 1715. The value of his annotations was very generally acknowledged, but the narrow and pitiful prejudices of a Jacobite frequently entangled his judgment; and every subject which bore to politics any reference, however remote, was viewed through a dim medium. The political tendency of his preface and notes was so far from being agreeable to the admirers of Buchanan, that a Whig

¹ "In qua voluit errorum graviorum arguere Burmannum, ipse, dum repehendere voluit, gravissime sæpe lapsus, risum præbuit." (Fabricii Bibliotheca Latina, tom. ii. p. 160. edit. Ernesti.)

press purpose of vindicating their favourite author in a new edition of his works. Their efforts however proved abortive, and the task of editorship devolved into more able hands. Arrested by the frequent and wide variation between the author and his jure divino editor, Burman had nearly been induced to relinquish his undertaking, and to advise his printer Langerak to procure assistance from Scotland, where the authenticity of the facts could best be ascertained. Of the new edition projected at Edinburgh he was likewise apprized; though it does not appear, as some writers pretend, that the associated critics made him a voluntary offer of private assistance. The printer however urging him to proceed without waiting for this vindicatory edition, he at length republished the works of Buchanan, together with Ruddiman's preface, notes, dissertation, and other appendages. The annotations which he himself subjoined are almost entirely philological. His other engagements did not permit him to undertake the task of correcting the press; and accordingly his edition is somewhat less accurate than that of his predecessor. The general value of Ruddiman's labours he acknowledges in terms of due respect; but he occasionally rejects his particular opinions in a manner which that learned man was disposed to regard as contemptuous; and some of his expressions relative to British literature, and to the native country of Buchanan, were such as could not easily be forgotten. Two years afterwards, when Ruddiman edited the Latin poems of Dr Pitcairne, he eagerly embraced an opportunity of asserting the honour of his native country; and the same topics were yet fresh in his recollection when he resumed his long labours at the venerable age of eighty-one.

Of the epistolary correspondence of literary men, Burman was a curious and diligent collector. At a much earlier period of his life he had published the epistle of Gudius and other scholars; and he now prepared a more ample and voluminous work, which appeared under the title of " Sylloge Epistolarum a Viris illustribus scriptarum." Leidæ, 1727, 5 tom. 4to. This collection, which forms a great repository of literary anecdote and critical disquisition, is occasionally illustrated with the notes of the editor. In the course of the same year, he completed the printing of a work which holds a very distinguished place among his learned labours, namely, his edition of the works of Ovid. Amst. 1727, 4 tom. 4to. Like several of his other editions of the classics, it contains not merely his own notes, but likewise those of various commentators. Ovid was evidently one of his favourite authors, and he has bestowed much care and attention in the adjustment of the text, as well as in its illustration. With regard to the text, his chief guide is Nicolaus Heinsius, a most able critic in Latin poetry. Burman had formerly published a small edition without a commentary. His next edition, cum notis variorum, was that of the "Poetæ Latini Minores." Leidæ, 1731, 2 tom. 4to. This curious collection was succeeded by an edition, equally elaborate, of the works of Suetonius. Amst. 1736, 2 tom. 4to. After another short interval followed "M. Annæi Lucani Pharsalia, cum commentario Petri Burmanni." Leidæ, 1740, 4to. In the preface to this publication, he speaks of Bentley with some degree of asperity. They were both men of great eminence in classical literature; and although they were both of the same irascible temper, the friendly relations between them had been of long duration. Some suspicions

Burman. association was speedily formed at Edinburgh for the ex- their having each projected an edition of Lucan at a much Burman. earlier period; and the breach had been rendered irreparable, by Burman's decisive measure of subjoining Dr Hare's Epistola Critica to his fourth edition of Phædrus.2

But the labours of this indefatigable scholar were now drawing to a close. His health had originally been vigorous, and those who have the slightest acquaintance with his history must be aware that he was capable of enduring great and continued toil. His temperate mode of living, and his attention to bodily exercise, long contributed to preserve a healthful constitution; but a scorbutic disease, incidental to that climate, having supervened, he found himself unable to take his usual walks, or other recreation, and was at last afflicted with many painful symptoms of a decayed frame and shattered nerves. While he languished in a state of hopeless decay, he had the honour of receiving a letter from Bignon, keeper of the royal library at Paris, accompanying a copy of the printed catalogue, transmitted to him by his majesty's command. This mark of royal favour might possibly cast a faint gleam of earthly comfort on his bed of sickness; but he now required consolation from a higher source, and with a due mixture of fervour and humility he appears to have approached the fountain of living waters. His religious opinions had either been misunderstood or misrepresented; and he felt a commendable solicitude to remove this erroneous impression, by the most unequivocal declaration of his hopes in the mercy of God through the mediation of Jesus Christ. In this devout frame of mind he closed a long and active life, on the 31st day of March 1741, in the seventy-third year of his age.

At the period of his death, he had made great progress in a new edition of Virgil, and it was afterwards completed by his learned nephew, who bore the same name with himself. Amst. 1746, 4 tom. 4to. To the younger Burman we are likewise indebted for the collective edition of his poems, which appeared under the following title: " Petri Burmanni Poematum libri quatuor, nunc primum in lucem editi, curante Petro Burmanno Juniore." Amst. 1746, 4to. His orations were collected by another editor, Nicolaus Bondt: "Petri Burmanni Orationes, antea sparsim editæ, et ineditis auctæ. Accedit Carminum Appendix." Hagæ Comitis, 1759, 4to. Of the Latin language Burman possessed a masterly knowledge, and in verse as well as prose he writes with vivacity and energy; but he is less scrupulous in his diction than some more recent members of the same university, especially Ruhnkenius and Wyttenbach. He is entitled to the praise of a skilful versifier; and his elegiac poems are sufficient to evince that he had, not studied Ovid in vain. His orations, which are eighteen in number, had been delivered on various occasions of academical solemnity, and several of them contain a large infusion of verse. The collection is closed by a funeral oration, written by his colleague, H. Oosterdyk Schacht, from which we have borrowed most of our notices respecting his personal history; but our account of his writings is necessarily derived from other sources. In this enumeration of his posthumous works, it remains to be mentioned that his annotations on Claudian were printed in his nephew's edition of that poet.

The character of Burman is ably and impartially delineated by Dr Johnson. "He was a man of moderate stature, of great strength and activity, which he preserved by temperate diet, without medical exactness, and by allotting proportions of his time to relaxation and amuseand jealousies had however intervened, in consequence of ment, not suffering his studies to exhaust his strength, bu

Georgii Buchanani Opera omnia. Lugd. Bat. 1725, 2 tom. 4to.

² Phædri, Augusti Liberti, Fabularum Æsopiarum libri quinque, cum novo commentario Petri Burmanni. Leidæ, 1727, 4to.

that omits will find at last that time may be lost, like money, by unseasonable avarice. In his hours of relaxation he was gay, and sometimes gave way so far to his temper, naturally satirical, that he drew upon himself the ill-will of those who had been unfortunately the subjects of his mirth; but enemies so provoked he thought it beneath him to regard or to pacify; for he was fiery, but not malicious, disdained dissimulation, and in his gay or serious hours preserved a settled detestation of falsehood. So that he was an open and undisguised friend or enemy, entirely unacquainted with the artifices of flatterers, but so judicious in the choice of his friends, and so constant in his affections to them, that those with whom he had contracted familiarity in his youth had for the greatest part his confidence in his old age.

" His abilities, which would probably have enabled him to have excelled in any kind of learning, were chiefly employed, as his station required, on polite literature, in which he arrived at very uncommon knowledge, which however appears rather from judicious compilations, than original productions. His style is lively and masculine, but not without harshness and constraint, nor perhaps always polished to that purity which some writers have attained. He was at least instrumental to the instruction of mankind, by the publication of many valuable performances, which lay neglected by the greatest part of the learned world; and, if reputation be estimated by usefulness, he may claim a higher degree in the ranks of learning than some others of happier elocution or more vigorous imagi-

nation."2 Such was the personal and literary character of Burman, as it presented itself to the sagacious observation of this distinguished writer. His name however is less favourably known to the readers of English poetry, where it is repeatedly used to denote whatever is dull and pedantic. Pope, who was not himself a very profound scholar, endeavoured to restore a sort of equilibrium by disparaging the attainments of those who were most conspicuous for their erudition. Bentley is supposed to have excited his spleen by bestowing a too scanty measure of praise on his translation of Homer; nor did the poet neglect any opportunity of directing the edge of his satire against "that awful Aristarch," and those who successfully cultivated similar studies. The following verses occur in the Dunciad, b. iv. v. 235.

> How parts relate to parts, or they to whole, The body's harmony, the beaming soul, Are things which Kuster, Burman, Wasse, shall see When man's whole frame is obvious to a flea.

If to his other qualifications Pope had added one half of the critical learning possessed by Bentley, Kuster, Burman, or Wasse, he would have found himself in a better condition for writing notes on Homer. Mallet, who was anxious to recommend himself to the favour of so great a poet, aimed his shafts in the same direction. His poem Of Verbal Criticism contains the subsequent passage:

Such the choice anecdotes, profound and vain, That store a Bentley's and a Burman's brain: Hence Plato quoted, or the Stagyrite, To prove that flame ascends, and snow is white; Hence much hard study, without sense or breeding, And all the grave impertinence of reading.

Burman. relieving them by frequent intermissions; a practice con-similar vein of sarcasm; nor do we feel much inclination Burman. sistent with the most exemplary diligence, and which he to commend these lines in his Art of Preserving Health, b. iv. v. 52.

> The strong-built pedant, who both night and day Feeds on the coarsest fare the schools bestow, And crudely fattens at gross Burman's stall O'erwhelm'd with phlegm lies in a dropsy drown'd.

The injustice and absurdity of such censures as these it would here be idle to expose. If we admit the value of the ancient classics, we must also admit the expediency of their being rendered intelligible; and how this could have been effected without the intervention of critics and philologers, it would not perhaps be so easy to discover. Bentley, Burman, and many other verbal critics who might be enumerated, were possessed of uncommon talents, as well as erudition; and the ingredients which enter into the formation of an able commentator on the classics, are more rare and more numerous than some individuals may be apt to imagine.

Of the two surviving sons of Burman, the elder, named Francis, made choice of a military life, and obtained promotion in the army. His brother Caspar, who betook himself to the profession of the law, was elevated to the bench, and was elected a deputy to the states general. He was likewise a man of letters, and published several works, which illustrate the civil and literary history of his native country. " Analecta Historica de Hadriano VI. Pontifice Maximo." Traj. ad Rhen. 1727, 4to. "Trajectum eruditum, Virorum Doctrina inlustrium, qui in Urbe Trajectina, et Regione Trajectensi nati sunt, sive ibi habitarunt, Vitas, Fata, et Scripta exhibens." Traj. ad Rhen. 1738, 4to. He is also the author of a work in the Dutch language, published in 1750-1 under the title of Utrechte Jaarboeken, and extending to three volumes. He died on the 22d of August 1755.

His grandfather Francis Burman, who has already been mentioned as professor of divinity at Utrecht, published various works on theology.3 He was born at Leyden in 1632, and died at Utrecht in 1679. His son Francis was born at Utrecht in 1671, became professor of divinity in that university in 1715, and died in 1718. He was the author of different works, written in the Latin and Dutch languages. His son John Burman, M.D. was born in 1707, was appointed professor of botany at Amsterdam, and died in 1780. He evinced much zeal in his own branch of science, and published several works on botany. Nicolas Laurens Burman, M. D. his son, and his successor in the botanical chair, was born in 1734, and died in 1793, after having produced some works in his own department. Francis Burman, the brother of John, was the third individual of the same name and family who held the professorship of divinity at Utrecht.4

But a more conspicuous member of the same remarkable family, was his other brother Peter Burman. On the 13th of October 1714 he was born at Amsterdam, where his father was then a minister. When only four years of age he lost his father, and the care of his education devolved upon his uncle, who communicated to him his own ardent love of classical learning. His academical studies he completed at Utrecht, where in 1734 he took the degree of doctor of laws, having previously written and defended a dissertation De Jure Annulorum aureorum, which has been thought worthy of being reprinted in the collection Dr Armstrong, a contemporary poet, has indulged in a of Oelrichs.⁵ In 1736 he was nominated professor of elo-

A Of his own habits of life, Burman has favoured us with some account in his Gazettier Menteur, p. 164.

Johnson's Works, vol. iv. p. 489.

Casp. Burmanni Trajectum eruditum, p. 50. 4. Biographie Universelle, tom. vi. p. 333.

Thesaurus Dissertationum juridicarum in Academiis Belgicis habitarum, vol. ii. tom. i. p. 199.

Burnet.

Burman. quence and history in the university of Francker, in the room of Wesseling, who had been removed to Utrecht. The chair of poetry was in 1741 added to his other appointments; but in the course of the following year he accepted of an invitation to the Athenæum of Amsterdam, where he became professor of history, eloquence, the Greek language, and poetry, keeper of the public library, and visitor of the Latin schools. In his literary character he bore a considerable resemblance to his more celebrated uncle, and was evidently a man of extensive learning.1 He published several detached orations, and other tracts, and an ample collection of his Latin poems. " Petri Burmanni Secundi Poematum libri quatuor." Lugd. Bat. 1774, 4to. "Carminum Appendix." Lugd. Bat. 1779, 4to. He edited several of the classics on a plan similar to that commonly adopted by his uncle. We have already mentioned the edition of Virgil, completed by his learned labour, and must now continue the enumeration of his classical publications. "Anthologia veterum Latinorum Epigrammatum et Poematum, sive Catalecta Poetarum Latinorum." Amst. 1759-73, 2 tom. 4to. "Aristophanis Comædiæ undecim Græce et Latine." Lugd. Bat. 1760, 2 tom. 4to. "Claudii Claudiani Opera." Amst. 1760, 4to. "Ciceronis (vel incerti auctoris) Rhetoricorum ad Herennium libri quatuor, et de Inventione libri duo." Lugd. Bat. 1761, 8vo. "Propertii Elegiarum libri IV." Traj. ad Rhen. 1780, 4to. This last work, which he did not himself bring to a conclusion with the did not himself bring to a conclusion. self bring to a conclusion, was conducted through the press by Van Santen, an elegant and correct scholar, who, under the name of Santenius, is well known to those who are acquainted with the literary history of that age. At an the same elaborate and splendid manner. "Petri Lotichii Secundi Opera omnia." Amst. 1754, 2 tom. 4to. He likewise undertook the task of editing the works of some modern critics. "Henrici Valesii Emendationum libri V. et de Critica libri duo," &c. Amst. 1740, 4to. "Nicolai Heinsii Adversariorum libri IV." &c. Harlingæ, 1742, 4to. Of his personal history, a few particulars remain to be told. He was thrice married. About a year before his death, he resigned his professorship, and having received a liberal pension from the curators of the Athenæum, he retired to his villa at Santhorst, in the hope of long enjoying literary repose; but having been struck with apoplexy, he expired on the 24th of June 1778. He appears to have been a person of a disposition sufficiently irritable: he was from time to time involved in various strifes and contentions; and his quarrels with a Dutch and a German professor, Saxius and Klotz, gave occasion to many invectives in the Latin, Dutch, and German languages.2 According to the testimony of his adversaries, he was not remarkable for his sobriety. To this alleged failing Klotz alludes in the following ludicrous verses, written in the character of the schoolmaster of Santhorst.

> O cœlum! noster dominus, Petrus Burmannus Secundus, Est mortuus, ut unus mus. Quid nos incipiamus? Cum quo nos nunc bibamus, Ni Petrum nostrum dominum, ni Petrum habeamus?

> > Habebat multos cyathos, Habebat scyphos vitreos. Et calices argenteos.

Sic est, sic omnia sunt vana, Sic vita aufugit humana, Discessit noster dominus, disrumpitur ut rana.

> Ille bibebat fortiter, Et tonans terribiliter, Exhauriebat bis et ter Unam magnam lagenam, Quam dicebat Hippocrenam,

Nunc dedit noster dominus, nunc dedit morti pænam.

Although it certainly is not safe to take any person's character from his enemies, yet even by his enemies a very sober man will not often be accused of intemperance. (D. I.)

BURNET, Thomas, a distinguished writer, was born at Croft in Yorkshire about the year 1635, but is supposed to have been descended of a Scottish family. His early education he received at the free-school of Northallerton, in the same county, under Thomas Smelt, who used to propose him as an example to the rest of his scholars. On the 26th of June 1651, he was admitted a pensioner of Clare Hall at Cambridge, under the tuition of Tillotson, who continued to remember him with kindness; but in the year 1654, he removed to Christ's College, on the election of Dr Cudworth to the mastership, and there he obtained a fellowship in the year 1657. In 1661 he became senior proctor of the university. He was successively domestic tutor to Charles duke of Bolton, and to James earl of Ossory, afterwards duke of Ormonde, grandson to the first duke; and by the interest of the latter nobleman he was chosen master of the Charter-house in 1685. Among the electors, some of the bishops opposed him on account of his wearing a lay-habit; but the duke was satisearlier period, Burman had published a modern poet in fied that he possessed the more essential qualifications of a life and conversation suitable to his clerical character. After this appointment, he took the degree of D.D. In his capacity of master, he made a noble stand against the admission of a papist named Andrew Popham, as a pensioner of the house: on the 26th of December 1686, the king addressed to the governors a letter dispensing with the statutes; but the opposition of the master being vigorously supported by other governors, James deemed it prudent to desist from this illegal attempt.

Dr Burnet had already published his *Telluris Theoria* sacra. Lond. 1681, 4to. This work attracted an unusual share of the public attention, and he was afterwards encouraged to exhibit it in an English dress. His Sacred Theory of the Earth was printed in folio, the first part in 1684, and the conclusion in 1689. Addison commended the author in a Latin ode. His fanciful theory was however attacked by Dr Keill, Mr Whiston, and Mr Warren, to all of whom he returned an answer. He had now acquired a high reputation as a man of talents; and after the revolution, he was introduced at court by Archbishop Tillotson, whom he succeeded as clerk of the closet to King William.4 He seemed already to be on the direct road to much higher preferment, when he suddenly marred his own prospects by the publication of a learned and ingenious work, entitled Archæologiæ Philosophicæ: sive Doctrina antiqua de Rerum Originibus. Lond. 1692, 4to. The mode in which he discussed the history of the fall of man, excited a great clamour against him; and the king was obliged to remove him from his office at court. Of this book an English translation was executed by Mr Foxton. Lond. 1729, 8vo. Dr Burnet next published

¹ "Habebat enim cum ipse maximam doctrinæ copiam, tum vero litteratam supellectilem ex libris virorum doctorum ineditis tantam quantam privatorum quidem hominum haud scio an nemo unquam habuerit." (Wyttenbachii Opuscula, tom. i. p. 136. Lugd. Bat. 1821, 2 tom. 8vo.)

Harlesius de Vitis Philologorum, vol. i. p. 114.
 Harlesius de Vitis Philologorum, vol. i. p. 114.
 Funus Petri Burmanni Secundi, edidit Christianus Adolphus Klotzius, p. 61. Altenburgi, 1762, 8vo.
 Birch's Life of Tillotson, p. 278. Lond. 1752, 8vo.

Burnet. "Remarks upon an Essay concerning Human Understanding, in a Letter address'd to the Author." Lond. 1697, 4to. "Second Remarks, &c. being a Vindication of the first Remarks against the Answer of Mr Locke, at the end of his Reply to the Lord Bishop of Worcester." Lond. 1697, 4to. "Third Remarks," &c. Lond. 1699, 4to. These remarks were answered by Catherine Trotter, afterwards Mrs Cockburn, in her "Defence of Mr Locke's Essay," written when she was twenty-three years of age, and printed at London in 1702. He died at the Charterhouse on the 27th of September 1715, at a very advanced age. Two of his works were published several years after his death. De Fide et Officiis Christianorum Liber posthumus. Lond. 1722, 4to. De Statu Mortuorum et Rewas published by Dr Teller of Berlin. Halæ Magdeburg. 1786, 8vo. The second has likewise been more than once reprinted; and two English translations were published by Matthias Earbery and John Dennis. The author was evidently a man of genius and learning; but his fancy being sometimes more vigorous than his judgment, he is maintains the doctrine of the middle state, the Millennium, and the limited duration of future punishment. Muratori, an Italian writer of great eminence, published copious animadversions upon it, under the subsequent title: "De Paradiso Regnique Cælestis Gloria, non expectata Corporum Resurrectione, Justis a Deo conlata; adversus Thomæ Burneti Britanni Librum de Statu Mortuorum." Veronæ, 1738. 4to. The name of Burnet appears in the following publication, but his only contribution consists of a few pages translated from his treatise on the faith and duties of Christians: "The Judgment of Dr Thomas Burnet, late Master of the Charter-House, concerning the Doctrine of the Trinity: and the Judgment of Dr Samuel Clarke, late Rector of St James's, concerning 1. the Satisfaction, 2. the Merits, 3. the Mediation and Intercession of Christ, 4. the ordinary Influence and Assistance of the Holy Spirit, 5. the two Sacraments. With a preface concerning Mr Lock, Sir Isaac Newton, and Mr Wollaston." Lond. 1732, 8vo. (D. I.)

BURNET, Gilbert, bishop of Salisbury, was born at Edinburgh in 1643, but was descended of an ancient family in the county of Aberdeen. His father being bred to the law, was, at the restoration of King Charles II., appointed one of the lords of session, by the title of Lord Crimond, as a reward for his constant attachment to the royal party during the civil wars. Gilbert, the youngest son of his father, was instructed by him in the Latin tongue; and at ten years of age he was sent to Marischal College, Aberdeen, where he was admitted A. M. before he was fourteen years of age. His own inclination led him to the study of the civil and feudal law; and he used to say that it was from this study he had received more just notions concerning the foundations of civil society and government, than those which some divines maintain. He afterwards changed his views, and, to the great satisfaction of his father, began to apply to divinity. He received ordination before the age of eighteen; and Sir Alexander Burnet, his cousin-german, offered him a benefice, but he refused to accept of it.

In 1663, about two years after the death of his father, he came into England; and after six months stay at Oxford and Cambridge, returned to Scotland; which he soon left again to make a tour of some months, in 1664, in Hol-

rabbi, he perfected himself in the Hebrew language; and Burnet. likewise became acquainted with the leading men of the different persuasions tolerated in that country, Calvinists, Arminians, Lutherans, Anabaptists, Brownists, Papists, and Unitarians; among each of which sects he used frequently to declare he met with men of such unfeigned piety and virtue, that he became fixed in a strong principle of universal charity, and an invincible abhorrence of all severities on account of religious dissensions.

Upon his return from his travels, he was admitted minister of Saltoun; in which station he served five years in the most exemplary manner. He drew up a memorial, in which he took notice of the principal errors in the conduct of the Scottish bishops, which he observed not to be consurgentium Tractatus. Lond. 1723, 4to. Of the first of formable to the primitive institution; and sent a copy of these works, there are several other editions, one of which it to several of them. This exposed him to their resentments; but to show he was not actuated by a spirit of ambition, he led a retired course of life for two years, which so endangered his health that he was obliged to abate his excessive application to study. In the year 1668 he was appointed professor of divinity in the university of Glasgow; and, according to the usual practice, he read his not on all occasions a very safe guide. In this work he lectures in the Latin language. It was apparently at this period that he laid the chief foundation of that theological learning for which he became so distinguished. In 1669 he published his "Modest and free Conference between a Conformist and Nonconformist." He became acquainted with the Duchess of Hamilton, who communicated to him all the papers belonging to her father and her uncle; upon which he drew up the "Memoirs of the Dukes of Hamilton," afterwards printed at London, in folio, in the year 1677. The Duke of Lauderdale, hearing he was engaged in this work, invited him to London, and introduced him to King Charles II. He returned to Scotland, and married Lady Margaret Kennedy, daughter of the Earl of Cassillis, a lady of great knowledge, and highly esteemed by the Presbyterians, to whose sentiments she was strongly inclined.1 As there was some disparity in their ages, that it might be sufficiently evident that this match was wholly owing to inclination, and not to avarice or ambition, the day before their marriage he delivered to the lady a deed, by which he renounced all pretensions to her fortune, which was very considerable, and must otherwise have fallen into his hands, she herself having no intention to secure it. His "Vindication of the Authority, Constitution, and Laws of the Church and State of Scotland,' printed at Glasgow, in octavo, in the year 1673. This was considered as so material a service to the government, that he was again offered a bishopric, with a promise of the next vacant archbishopric; but he did not accept of it, because he could not approve of the measures of the court, the great view of which he perceived to be the advancement of popery. The publication itself was one of those which the author could not afterwards recollect with much satisfaction.

His intimacy with the Dukes of Hamilton and Lauderdale procured him frequent messages from the king and the Duke of York, who had conversations with him in private. But Lauderdale, who was the most unprincipled man of the age, conceiving a resentment against him on account of the freedom with which he spoke to him, represented at last to the king that Dr Burnet was engaged in an opposition to his measures; and on his return to London he perceived that these suggestions had entirely deprived him of the king's favour, though the Duke of York treated him with greater civility than ever, and dissuaded him land and France. At Amsterdam, by the help of a Jewish from going to Scotland. He accordingly resigned his pro-

I Some degree of attention has lately been directed to this lady in consequence of the publication of a collection of Letters from Lady Margaret Burnet to John Duke of Lauderdale. Edinb. 1828, 4to.

time the living of Cripplegate being vacant, the dean and chapter of St Paul's (in whose gift it was), hearing of his circumstances, and the hardships which he had undergone, made him an offer of the benefice; but, as he had been informed of their first intention of conferring it on Dr Fowler, he generously declined it. In 1675, at the recommendation of Lord Hollis, whom he had known in France as ambassador at that court, he was by Sir Harbottle Grimstone, master of the rolls, appointed preacher at the Rolls chapel, notwithstanding the opposition of the court; and he was soon afterwards chosen lecturer at St Clement's, and became one of the most popular preachers in town. The first volume of his History of the Reformation of the Church of England was published in folio in 1681, the second in 1683, and the third in 1715. For this great work he received the thanks of both houses of parliament. Of the first two volumes he published an abridgment in the year

Dr Burnet about this time happened to be sent for to a woman in sickness, who had been engaged in an amour with the Earl of Rochester. The manner in which he treated her during her illness gave that profligate nobleman a great curiosity for being acquainted with him; and during a whole winter, he spent one evening of the week with Dr Burnet, who discussed with him all those topics upon which sceptics and men of loose morals attack the Christian religion. The happy effects of these conferences occasioned the publication of his account of the life and death of that nobleman. In 1682, when the administration was changed in favour of the Duke of York, being much resorted to by persons of all ranks and parties, in order to avoid returning visits, he built a laboratory, and for above a year pursued a course of chemical experiments. Not long after he refused a living of three hundred pounds a year offered him by the Earl of Essex, on the terms of his not residing there, but in London. When the enquiry concerning the popish plot was on foot, he was frequently sent for and consulted by King Charles with relation to the state of the nation. His majesty offered him the bishopric of Chichester, then vacant, if he would engage in his interests; but he refused to accept it on these terms. He preached at the Rolls till 1684, when he was dismissed by order of the court.

About this period he published various works, among sich we must not overlook the following seven. "Some which we must not overlook the following seven. Passages of the Life and Death of John Earl of Rochester."1 Lond. 1680, 8vo. "The Life and Death of Sir Matthew Hale, Kt. sometime Lord Chief Justice of his Majesties Court of Kings Bench." Lond. 1682, 8vo. "The History of the Rights of Princes in disposing of Ecclesiastical Benefices and Church Lands." Lond. 1682, 8vo. "The Life of William Bedell, D. D. Bishop of Kilmore in Ireland." Lond. 1685, 8vo. "Reflexions on Mr Varillas's History of the Revolutions that have happened in Europe in matters of Religion, and more particularly on his ninth book, that relates to England." Amst. 1686, 12mo. "A Defence of the Reflections on the ninth book of the first volum of Mr Varillas's History of Heresies; being a Reply to his Answer." Amst. 1687, 12mo. "A Continuation of Reflections on Mr Varillas's History of Heresies, particularly on that which relates to English Affairs in his third and fourth tomes." Amst. 1687, 12mo. He bore a very conspicuous part in the controversy which

Burnet. fessorship at Glasgow, and settled in London. About this a complete catalogue of his works would occupy no small Burnet. The following translations deserve to be mentioned in this very brief and inadequate notice. "Utopia, written in Latin by Sir Thomas More, Chancellor of England: translated into English." Lond. 1685, 8vo. "A Relation of the Death of the primitive Persecutors, written originally in Latin by L. C. F. Lactantius: Englished by Gilbert Burnet, D.D. to which he hath made a large preface concerning persecution." Amst. 1687, 12mo.

On King James's accession to the throne, having obtained leave to quit the kingdom, he first went to Paris, and lived in great retirement, till, contracting an acquaintance with Brigadier Stouppe, a Protestant gentleman in the French service, he made a tour with him into Italy. He met with an agreeable reception at Rome. Pope Innocent XI. hearing of his arrival, sent the captain of the Swiss guards to acquaint him he would give him a private audience in bed, to avoid the ceremony of kissing his holiness's slipper; but Dr Burnet excused himself as well as he could. Here, with more zeal than prudence, he engaged in some religious disputes; and, on receiving an intimation from Prince Borghese, he found it necessary to withdraw from this stronghold of priestcraft, and pursued his travels through Switzerland and Germany. He afterwards came to Utrecht, with an intention to settle in some of the seven provinces. There he received an invitation from the prince and princess of Orange (to whom their party in England had recommended him) to come to the Hague, and of this invitation he accepted. He was soon acquainted with the secret of their councils, and advised the preparation of a fleet in Holland sufficient to support their designs and encourage their friends. This, and the account of his travels,2 in which he endeavoured to blend popery and tyranny together, and represent them as inseparable, with some papers reflecting on the proceedings of England, that came out in single sheets, and were dispersed in several parts of England, of most of which Dr Burnet owned himself the author, alarmed King James, and were the occasion of his writing twice against him to the princess of Orange, and insisting, by his ambassador, on his being forbidden the court; which, after much importunity, was done, though he continued to be trusted and employed as before, the Dutch minister daily consulting him. To put an end to these frequent conferences with the ministers, a prosecution for high treason was commenced against him both in England and Scotland; but receiving the intelligence before it reached the states, he avoided the storm, by petitioning for, and obtaining without any difficulty, a bill of naturalization, in order to his intended marriage with Mary Scott, a Dutch lady of considerable fortune, who, with the advantage of birth, united those of a fine person and understanding.

After his marriage with this lady, being legally under the protection of Holland, when Dr Burnet found King James plainly subverting the constitution, he omitted no method to support and promote the design which the prince of Orange had formed of delivering Great Britain; and, having accompanied him in quality of chaplain, he was in the year 1689 advanced to the see of Salisbury. He declared for moderate measures with regard to the clergy who scrupled to take the oaths, and many were displeased with him for declaring for the toleration of nonconformists. As my lord of Salisbury, says the Earl of Shaftesbury, at that time was so ably maintained against the papists; and "has done more than any man living for the good and

² Some Letters, containing an Account of what seemed most remarkable in Switzerland, Italy, &c. written by G. Burnet, D. D. to T. H. R. B. Rotterdam, 1686, 8vo.

t "Which," says Dr Johnson, "the critick ought to read for its elegance, the philosopher for its arguments, and the saint for its piety," (Lives of English Poets, vol. i. p. 303.)

Gurnet. honour of the church of England and the reform'd reli- the least conspicuous part of his character: the church of Burnet gion, so he now suffers more than any man from the tongues and slander of those ungrateful church-men; who tion, having no claim to that of Christianity or Protestant, since they have thrown off all the temper of the former, and all concern or interest with the latter." The same noble writer has elsewhere mentioned him in the following terms lege of justice, was born about the year 1714. He was of commendation: "The bishop of Salisbury's Exposition of the Articles is, no doubt, highly worthy of your study. None can better explain the sense of the church, than one who is the greatest pillar of it since the first founders; one who best explain'd and asserted the reformation its self; was chiefly instrumental in saving it from popery before and at the Revolution; and is now the truest example of laborious, primitive, pious, and learned episcopacy."

and supremacy to King William and Queen Mary, 1689, happening to touch upon the right of conquest, gave such offence to both houses of parliament, that it was ordered to be burnt by the hands of the common executioner. He soon afterwards published a very valuable work, entitled A Discourse of the Pastoral Cure. Lond. 1692, 4to. In 1698 he lost his wife by the small-pox; and as he was almost immediately after appointed preceptor to the Duke of Gloucester, of whose education he took great care, this employment, and the tender age of his children, induced him the same year to supply her loss by a marriage with Mrs Berkeley, a widow, who was eldest daughter of Sir Richard Blake. In 1699 he published his Exposition of the thirty-nine Articles; which occasioned a representation against him in the lower house of convocation in the year 1701, but he was vindicated in the upper house. His speech in the House of Lords in 1704 against the bill to prevent occasional conformity, was severely attacked. He formed a scheme for augmenting the small livings; which he pressed forward with such success, that it ended in an act of parliament passed in the second year of Queen Anne, for the augmentation of the livings of the poor clergy. He died in 1715, and was interred in the church of St James, Clerkenwell, where a monument was erected to his memory.

Bishop Burnet's History of his own Time, consisting of two large volumes in folio, was not published till several years after the author's death; the first volume appeared in 1724, and the second in 1734. An account of his life was added by his youngest son Sir Thomas Burnet, one of the judges of the court of common pleas. The history itself was not printed without mutilations; but after an interval of nearly a century, an edition, containing all the passages which had formerly been suppressed, was published under the superintendence of the learned Dr Routh. Oxford, 1823, 6 vols. 8vo. This is a work of great and intrinsic value: it exhibits many curious and interesting delineations of character, and many striking views of the causes and progress of events. The first volume, which relates to the reigns of Charles II. and his brother James, we consider as the more interesting of the two. His materials are not always very carefully digested, and his style is sometimes supposed to be too familiar; but these defects are abundantly compensated by the copiousness of his information, the benevolence of his sentiments, and the earnestness of his manner. The Conclusion displays superior dignity of composition, and cannot be perused without the most favourable impression of the author's intellectual attainments and moral worth. He uniformly evinces his attachment to the cause of freedom, nor is this

England, in its collective capacity, has always been hostile to civil as well as religious liberty; and its annals exmay well call themselves by that single term of distinc- hibit very few names which tend to remove the general stigma. Those of Burnet and Hoadley ought never to be forgotten.

BURNET, James, Lord Monboddo, a senator of the colthe son of Mr Burnet of Monboddo in Kincardineshire. After passing through the usual course of school education, he prosecuted his studies at the universities of Aberdeen, Edinburgh, and Leyden, with distinguished reputation. He was admitted an advocate in 1737; and on the 12th of February 1767, he was raised to the bench by the title of Lord Monboddo.

A journey to London became a favourite amusement of His pastoral letter concerning the oaths of allegiance his periods of vacation from the business, of the court; and for a time he made this journey once a year. A carriage, a vehicle that was not in common use among the ancients, he considered as an engine of effeminacy and sloth, which it was disgraceful for a man to make use of in travelling. To be dragged at the tail of a horse, instead of mounting upon his back, seemed, in his eyes, to be a truly ludicrous degradation of the genuine dignity of human nature: in all his journeys, therefore, between Edinburgh and London, he was wont to ride on horseback, with a single servant attending him. He continued this practice, without finding it too fatiguing for his strength, till he was upwards of eighty years of age.

Lord Monboddo is well known to the world as a man of letters. His first publication was The Origin and Progress of Language, in two vols. 8vo, 1773, which were followed by four more volumes, the last being published not long before his death. In this work, intended chiefly to vindicate the honour of Grecian literature, he ascribes the origin of alphabetical writing to the Egyptians; and strenuously maintains that the orang-utan is a variety of the human species, and that his want of speech is merely accidental. He also endeavours to establish the reality of the existence of mermaids, and other fictitious animals. He was induced to undertake another work for the purpose of defending the cause of Grecian philosophy, and published, in five vols. 4to, a work entitled Ancient Metaphysics, which, like the other, is remarkable for a surprising mixture of erudition and genius, with the most absurd whim and conceit.

As a judge his decisions were sound, upright, and learned, marked with acute discrimination, and free from those paradoxes and partialities which appear in his writings. He attended his judicial duty with indefatigable diligence till within a few days of his death, which happened at his house in Edinburgh on the 26th of May 1799, at the advanced age of eighty-five.

BURNEY, CHARLES, Doctor of Music, was born in the ancient city of Shrewsbury, the capital of Shropshire, on the 7th of April 1726. He received his earlier education at the excellent free school of that city, and was afterwards sent to the public school at Chester. His first musicmaster was Mr Baker, organist of Chester Cathedral, and a pupil of Dr John Blow. Returning to Shrewsbury when about fifteen years old, he continued his musical studies for three years under his half-brother, Mr James Burney, organist of St Mary's Church; and was then sent to London as a pupil of the celebrated Dr Arne, with whom he remained three years. In 1749 he was appointed organist of a church in the city, with a salary of L.30 ayear; and was also engaged as conductor of a concert esta-

Burney. blished at the King's Arms, Cornhill. In that year and the next, he composed the music of three dramas for Drury Lane theatre—Alfred, Robin Hood, and Queen Mab. His health now became so seriously affected, that his physicians advised him to retire into the country; and he therefore went to Lynn, in Norfolk, where he was elected organist, with an annual salary of L.100, and where he resided for the next nine years. During that time he began to entertain the idea of writing a general history of music. In 1760 he returned to London in good health, and with a young family; the eldest of whom, a girl of eight years of age, surprised the public by her attainments as a harpsichordplayer. In 1766 he produced, at Drury Lane, a free English version and adaptation of J. J. Rousseau's operetta Le Devin du Village, under the title of The Cunning Man, which was favourably received. The university of Oxford conferred upon him, on 23d June 1769, the degrees of bachelor and doctor of music, on which occasion he presided at the performance of his exercise for these degrees. His exercise consisted of an anthem, with an overture, solos, recitatives, and choruses, accompanied by instruments, besides a vocal anthem in eight parts,1 which was not performed for the reason mentioned by Burney.2 His friend, C. P. E. Bach, requested a copy of this exercise, and had it performed in St Catharine's Church at Hamburg, under his own direction, in 1773. It was repeatedly performed at Oxford, "after it had fulfilled its original destination," as Burney tells us (vol. iii. p. 329); and he apologises as follows for saying so much about it. "It is hoped that the reader will pardon this egotism, which has been extorted from me by occasional and sinister assertions, 'that I neither liked nor had studied church music.'" (Ibid.) In 1769 he published An Essay towards a History of Comets.

> Amidst his various professional avocations, Burney never lost sight of his favourite object-his History of Musicand therefore resolved to travel abroad for the purpose of collecting materials that could not be found in Great Britain. Accordingly he left London in June 1770, furnished with numerous letters of introduction, and proceeded to Paris, and thence to Geneva, Turin, &c. The results of his observations he published in The present state of Music in France and Italy, 1 vol. 8vo, London, 1771. Dr Johnson thought so well of this work, that, alluding to his own Journey to the Western Islands of Scotland," he said, "I had that clever dog Burney's Musical Tour in my eye." In 1771 Burney published a translation of Tartini's Letter to Signora Lombardini on Violin-playing. In July 1772 Burney again visited the Continent, to collect further materials; and, after his return to London, published his tour under the title of The present state of Music in Germany, the Netherlands, and United Provinces, 2 vols. 8vo, London, 1773. In the latter year, he was chosen a Fellow of the Royal Society of London. In 1776 appeared the first volume (in 4to) of his long-projected History of Music; in 1782 the second volume; and in 1789 the third and fourth. His Tour in Germany, &c., and the first volume of his History, were sharply criticised by J. N. Forkel, music-director at

Göttingen, in the third volume of his Musikalisch-Kritische Burney. Bibliothek, Gotha, 1779. The Spanish ex-Jesuit, Requeno, in his Italian work Saggj sul Ristabilimento dell' Arte Armonica de' Greci e Romani Cantori, Parma, 1798, 2 vols. 8vo, attacks Burney's account of the ancient Greek music, and calls him lo scompigliato Burney.4 Burney's first tour was translated into German by Ebeling, and printed at Hamburg in 1772; and his second Tour, translated into German by Bode, was published at Hamburg in 1773. A Dutch translation of his second Tour, with Notes, by J. W. Lustig, organist at Gröningen, was published there in 1786. The Dissertation on the music of the ancients, in the first volume of Burney's History, was translated into German by J. J. Eschenburg, and printed at Leipzig, 1781. In the same year that Burney published the first volume of his History of Music, appeared Sir John Hawkins' General History of the Science and Practice of Music, in 5 vols. 4to; but, although Hawkins' work had certain merits, the superior elegance and animation of Burney's style secured the favour of the public; and Hawkins' volumes have always been rather consulted by musical antiquaries, than read for instruction and amusement by professional musicians or amateurs. The Indices appended to Burney's History are so incomplete as to give great trouble in consulting his volumes. This is a serious defect in so large a work. From the two first volumes of Padre Martini's very learned Storia della Musica, Bologna, 1757-1770, Burney derived much aid.5 At the end of the fourth volume of his History of Music, Burney says: "I have at length arrived at the end of a work that has been thirty years in meditation, and more than twenty in writing and printing" (page 684). One cannot but admire Burney's persevering industry, and sacrifices of time, money, and personal comfort, in collecting and preparing materials for his History; and few will be disposed to condemn, too severely, errors and oversights in a work of such extent and difficulty. Dr T. Bushy's History of Music (2 vols. 8vo, 1819), is a mere abridgment of Burney and Hawkins, written in a bombastic style. In 1779 he wrote, for the Royal Society, an account of the infant Crotch,7 whose remarkable musical talent excited so much attention at that time. In 1783, through the treasury influence of his friend Edmund Burke, he was appointed organist to the chapel of Chelsea Hospital, and removing thither with his family, resided there for the remainder of his days. In 1784 Burney published, with an Italian title-page, the music annually performed in the Pope's chapel at Rome during Passion week; a work which A. Choron republished at Paris in 1818. In 1785 he published, for the benefit of the Musical Fund, an account of the first commemoration of Handel in Westminster Abbey in the preceding year, with an excellent life of Handel, 1 vol. 4to. J. J. Eschenburg published a German translation of this at Berlin in 1785. In 1796 he published Memoirs and Letters of Metastasio, 3 vols. 8vo. Towards the close of his life, Burney contributed to the Rev. Dr Rees's Cyclopædia all the musical articles not belonging to Natural Philosophy and Mathematics. For these articles he received L.1000; which seems a remarkable remunera-

¹ In the third volume of his General History of Music, pp. 251-3, Burney gives a copy of this anthem.
2 Dr William Hays, then music professor at Oxford, told Burney that "this movement alone would have well entitled him to a doc-

tor's degree." Ib. p. 329.

3 Forkel published two volumes of a general history of music, Allgemeine Geschichte der Musik, Leipzig, 1788-1801, in 4to. His second
These volumes are very accurate and learned, but volume comes down to the time of the Italian professor, F. Gafori, who died in 1522. These volumes are very accurate and learned, but heavily written. Forkel died in 1818, aged 69. 4 Ibid. Prefazione, p. 24.

The third volume of Martini's Storia was published in 1781, concluding the history of ancient Greek music. The rest of that work remains in MSS. in the library of the Liceo at Bologna; and will probably never be published, as the writer of this article was told in 1819 by the librarian, Signor Barbieri; the cost of printing being greater than the sale would cover. Signor Barbieri confirmed Burney's estimate of the number of books in Padre Martini's library (now in the Liceo), i. e. 17,000.

6 Phil. Trans. abridged, vol. xiv., 1779.

8 See vol ii n 2020 of November 2 than 18 and 1

Phil. Trans. abridged, vol. xiv., 1779.
 Afterwards Uxtord profess
 Sce vol. ii. p. 293 of Diary and Letters of Madame D'Arblay; 7 vols. 8vo, H. Colburn, London, 1842–46.

Burney. tion, considering that most of his materials were merely transcribed from his own History of Music. He was made a member of the Institute of France, and nominated a correspondent in the class of the Fine Arts, in the year 1810.1 He died at Chelsea College on the 12th of April 1814,2 and was interred in the burying-ground of the college on the 20th of the same month. His funeral was attended by many persons of rank and talent. Burney had a wide circle of acquaintance among the distinguished artists and literary men of his day.3 At one time he thought of writing a life of his friend Dr Samuel Johnson; but retired before the crowd of biographers who rushed into that field. His character in private as well as public life, appears to have been very amiable and exemplary. Signor Serafino Lanzoni of Florence-a school-fellow and intimate friend of Cherubini, and who had long resided in London as a protessional musician-told the writer of this article in 1818, that he had frequently met with Dr Burney at musical parties, and spoke highly of him as a man of pleasing and gentlemanly manners; but said that he was too fond of taking a part in singing, upon every occasion, for which he was not fitted by either ear or voice; adding, Stuonava da far crepare i sassi! But, like hundreds more, Burney may have been a very good player on the organ and harpsichord, without having a fine ear, or being able to sing in tune. Dr Burney's sons and daughters were all persons of talent. His eldest son, James, was a distinguished officer in the royal navy, and died a rear-admiral in 1821. He published several works of merit. Dr Burney's second son, the Rev. Charles Burney, D.D., was an eminent Greek scholar; and his second daughter, afterwards Madame D'Arblay, was a very successful novelist in her early life. Her Diary and Letters, already referred to, contain many minute and interesting particulars of her father's public and private life, and of his friends and contemporaries.

Besides the operatic music above mentioned, Burney's known compositions consist of, 1. Six Sonatas for the harpsichord; 2. Two Sonatas for the harp or piano, with accompaniments for violin and violoncello; 3. Sonatas for two violins and a bass: two sets; 4. Six Lessons for the harpsichord; 5. Six duets for two German flutes; 6. Three concertos for the harpsichord; 7. Six concert pieces with an introduction and fugue for the organ; 8. Six Concertos for the violin, &c., in eight parts; 9. Two Sonatas for pianoforte, violin, and violoncello; 10. A Cantata, &c.; 11. Anthems, &c.; 12. XII. Canzonetti a due voci in Canone, pæsia dell' Abate Metastasio. (G. F. G.)

BURNEY, Charles, son of the historian of music, and an eminent classical scholar, was born at Lynn in Norfolk in 1757. At the age of eleven he was sent to the Charterhouse in London, whence he removed to Caius college, Cambridge. He quitted this university without taking his degree; but in 1791 he received the diploma of LL.D. from Aberdeen, and in 1808 that of D.D. from Cambridge. In 1783 he married the daughter of Dr Rose the translator of Sallust, and continued for some time to assist his father-inlaw in the management of his academy. He contributed at this time many articles to the Monthly Review, and afterwards edited for two or three years the London Magazine. Some of his contributions to the first of these periodicals gained him much credit not only among English but Continental scholars. His reputation was now so thoroughly established, that in the course of a short time he realized a handsome fortune, much of which he expended in the formation of his splendid library. The manuscripts and rare books which he collected were considered so valuable that at his death, which happened in 1817, they were purchased by the nation and deposited in the British-Museum.

Burney, Frances, a popular novelist of the last century, was the eldest daughter of the historian of music, and was

born at Lynn in Norfolk in 1752. In the ninth year of Burning. her age she accompanied her father to London, where, from the advantages of her position, she enjoyed excellent opportunities of observing the manners and characters of all classes of society. As soon as she could use the pen, which however was not very early, she began to write little stories for her own amusement and that of her sisters, but her stepmother (for Dr Burney's second marriage took place when Frances was in her sixteenth year) remonstrating against so dangerous a recreation, she abandoned it for a time. But the literary impulse was too strong to be permanently suppressed, and, in 1778, when Miss Burney was in her twenty-sixth year, Evelina appeared. No novel since the days of Smollett had produced so great an effect on the public mind, or gained for its author so wide and rapid a popularity. Four years after appeared Cecilia, which amply sustained Miss Burney's reputation, and instantly took rank as an English classic. In 1785 she became one of the keepers of the robes to Queen Charlotte the consort of George III., a situation which she held for five years, and which gave her ample opportunities of observing and studying the manners of the court, and witnessing many of the historical incidents of the period. These she has recorded in her "Diary." In 1793 she married M. D'Arblay, an exiled officer of French cavalry. Three years later she published her third novel, Camilla, for which it is said that she received no less a sum than 3000 guineas. It is generally agreed that this work, though equal to its predecessors in humour and portraiture of character, is inferior to them in grace and purity of style. In 1803 she went over to Paris to join her husband, and did not again see her native country for ten years. In 1813 she returned in time to witness the demise of her father, who died in that year at the age of eighty-seven. In the following year she published her last novel, the Wanderer, a work which speedily and justly fell into oblivion. In 1832 she published her memoirs of her father, and in 1840 she died, in the eighty-eighth year of her age.

BURNING, the action of fire on some pabulum or fuel. Burning of the Dead, a custom much practised by the ancient Greeks and Romans, and still retained by several nations in the East Indics. The antiquity of this custom reaches as high as the Theban war, where we are told of the great solemnity accompanying this ceremony at the pyre of Menæacus and Archemorus, who were contemporary with Jair, the eighth judge of Israel. Homer abounds with funeral obsequies of this nature. In the interior regions of Asia the practice was of very ancient date, and its continuance long; for we are told that in the reign of Julian the king of Chionia burnt his son's body, and deposited the ashes in a silver urn. Coeval almost with the first instances of this kind in the East was the practice in the western parts of the world. The Heruli, the Getæ, and the Thracians, had all along observed it; and its antiquity was as great among the Celtæ, Sarmatiæ, and other neighbouring nations. This custom seems to have arisen out of friendship to the deceased, whose ashes were preserved, as we preserve a lock of hair, a ring, or a seal, which had been the property of a departed friend.

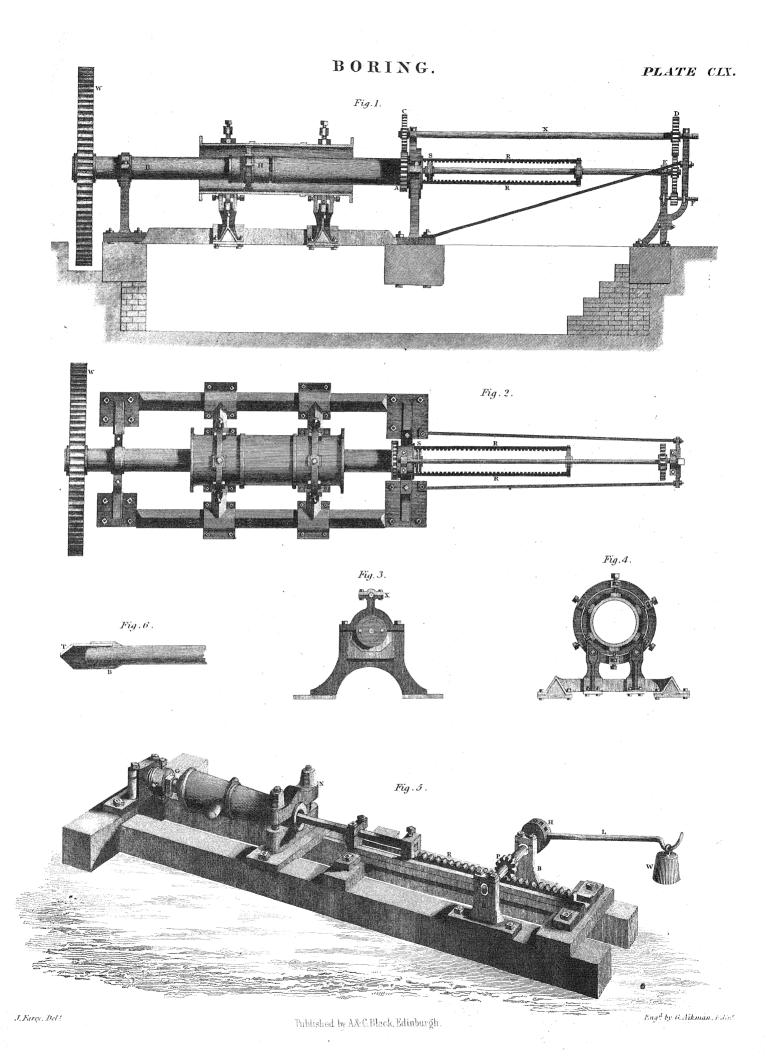
Kings were burnt in cloth made of the asbestos stone, that their ashes might be preserved pure from any mixture with the fuel and other matters thrown on the funeral pile. The same method is still observed with the princes of Tartary. Among the Greeks, the body was placed on the top of a pile, on which were thrown divers animals, and even slaves and captives, besides unguents and perfumes. In the funeral of Patroclus we find a number of sheep and

¹ See Diary, supra cit., vol. vi., pages 338-342.

Burning. oxen thrown in, then four horses, followed by two dogs, and lastly by twelve Trojan prisoners. The like is mentioned by Virgil in the funerals of his Trojans; where, besides oxen, swine, and all manner of cattle, we find eight youths condemned to the flames. The first thing was the fat of the beasts, wherewith the body was covered, that it might consume the faster; it being reckoned a great felicity to be quickly reduced to ashes. For the like reason, where numbers were to be burnt at the same time, care was taken to mix with them some of humid constitutions, and therefore more easily to be inflamed. Thus we are told by Plutarch and Macrobius, that for every ten men it was customary to put in one woman. Soldiers usually had their arms burnt with them. The garments worn by the living were also thrown on the pile, with other ornaments and presents; a piece of extravagance which the Athenians carried to so great a height, that some of their lawgivers were forced to restrain them, by severe penalties, from defrauding the living by their liberality to the dead. In some cases burning was expressly forbidden among the Romans, and even looked upon as the highest impiety. Thus, infants who died before teething were entombed unburnt in the ground, in a particular place set apart for this purpose. The same practice obtained in regard to persons struck dead with lightning. (See BIDENTAL.) Some say that burning was tice of burning the dead also denied to suicides. The manner of burning among end of the fourth century.

the Romans was not unlike that of the Greeks. The Burning. corpse, being brought out without the city, was carried directly to the place appointed for burning it; which, if it joined the sepulchre, was called bustum, if separate from it. ustrina, and there laid on the rogus or pyra, a pile of wood prepared for burning it, and built in the shape of an altar, but differing in height according to the quality of the deceased. The wood commonly used was that of such trees as contain most pitch or resin; and whatever kind was used, they split it, for the more easy catching fire; while round the pile were set cypress trees. The body, stretched on a couch or litter, was placed on the pile; and then the next of kin performed the ceremony of lighting the pile; which was done with a torch, the person turning his face away, as if it were performed with reluctance. During the ceremony, decursions and games were celebrated; after which came the ossilegium, or gathering of the bones and ashes; also washing, anointing, and depositing them in urns. the Romans borrowed the custom of cremation from the Greeks, it was not generally practised at Rome till towards the end of the republic. Sylla was the first of the noble family of the Gens Cornelia that was laid on the funeral pile; and this, it is said, was done to secure his corpse against indignities from his numerous enemies. The practice of burning the dead had fallen into disuse about the

END OF VOLUME FIFTH.







Drimys Winteri.





Linum usitatissimum

Fig. 1.



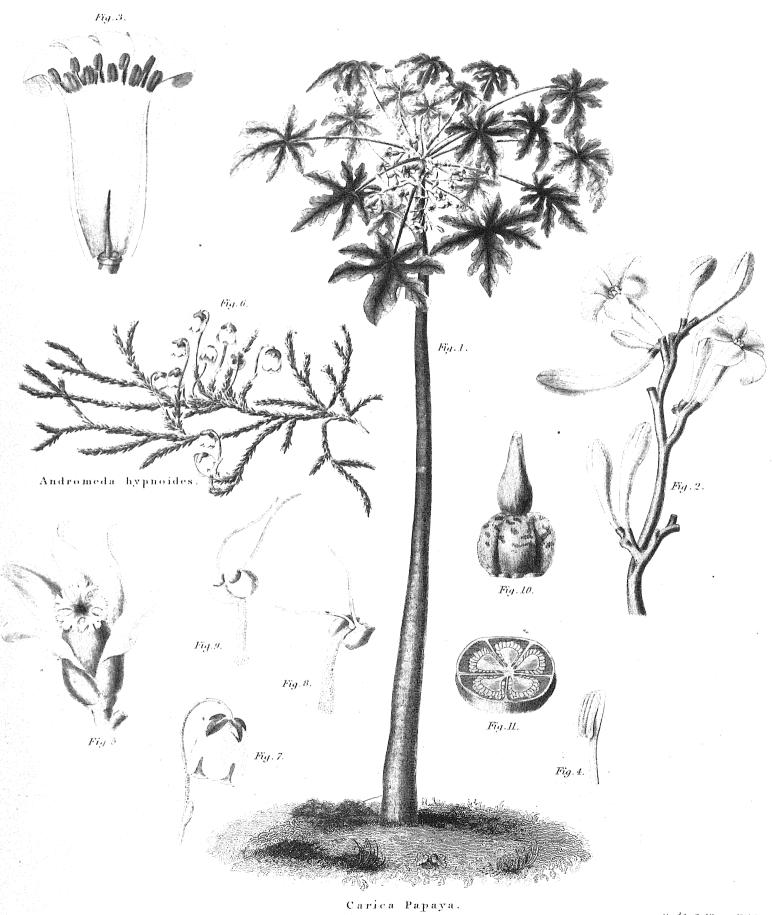
Anacardium occidentale.

(Cashew Nut Tree.)

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Eng.d by G.Aikman, Edin!





(Papaw Tree)
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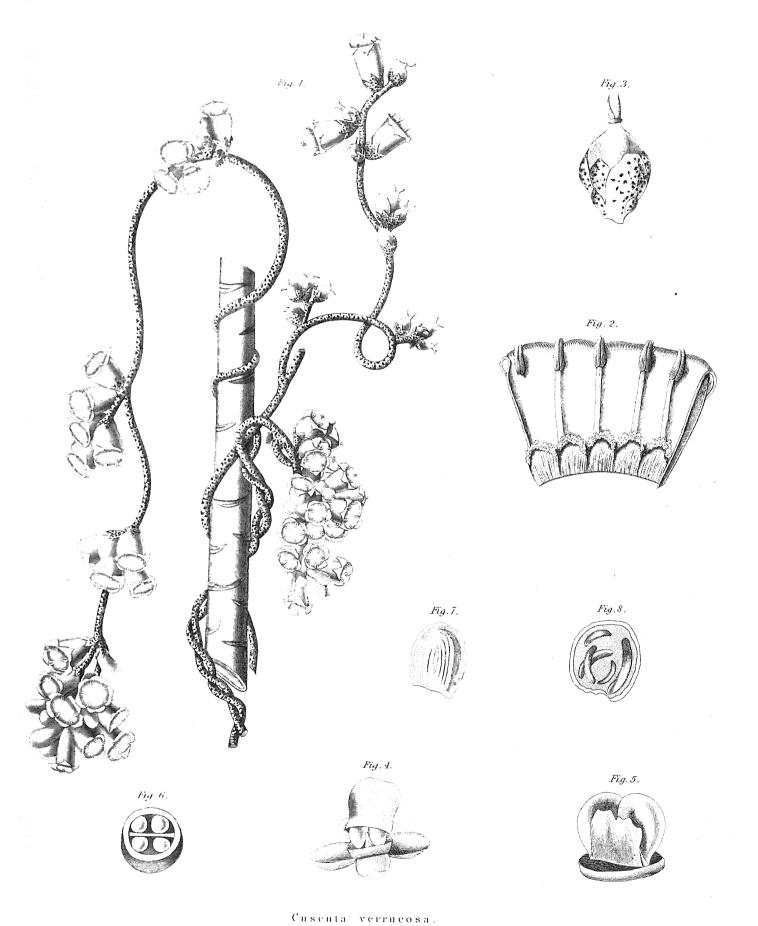






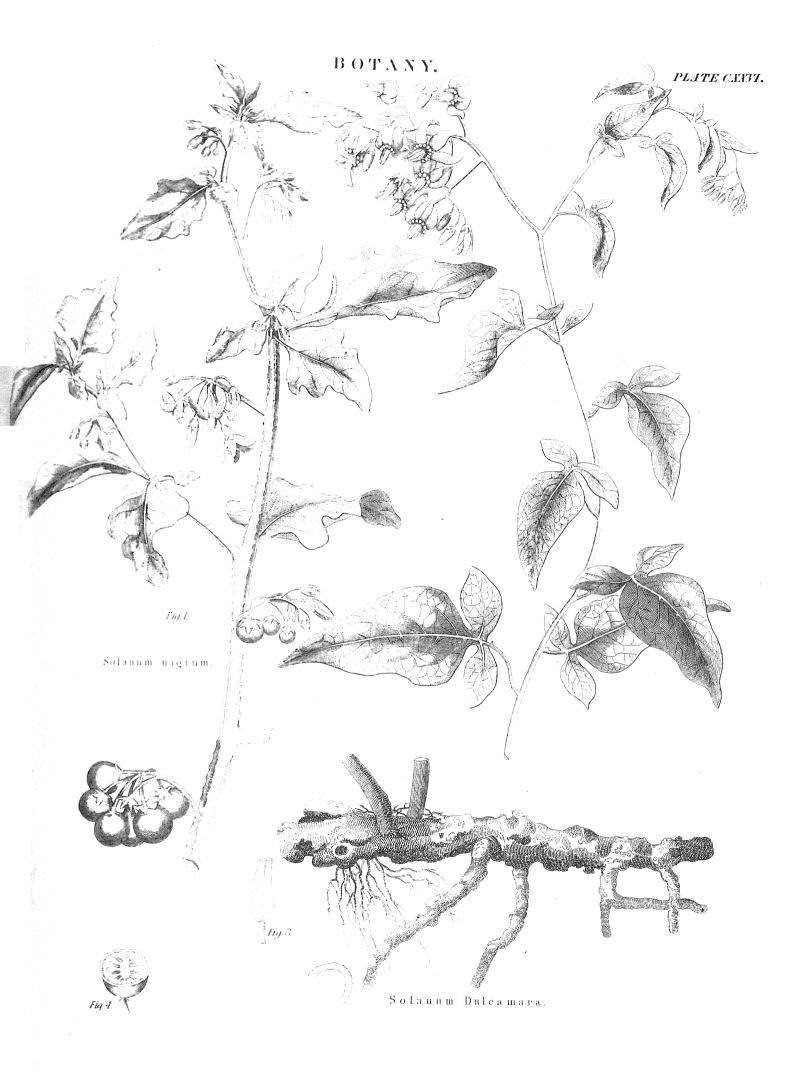






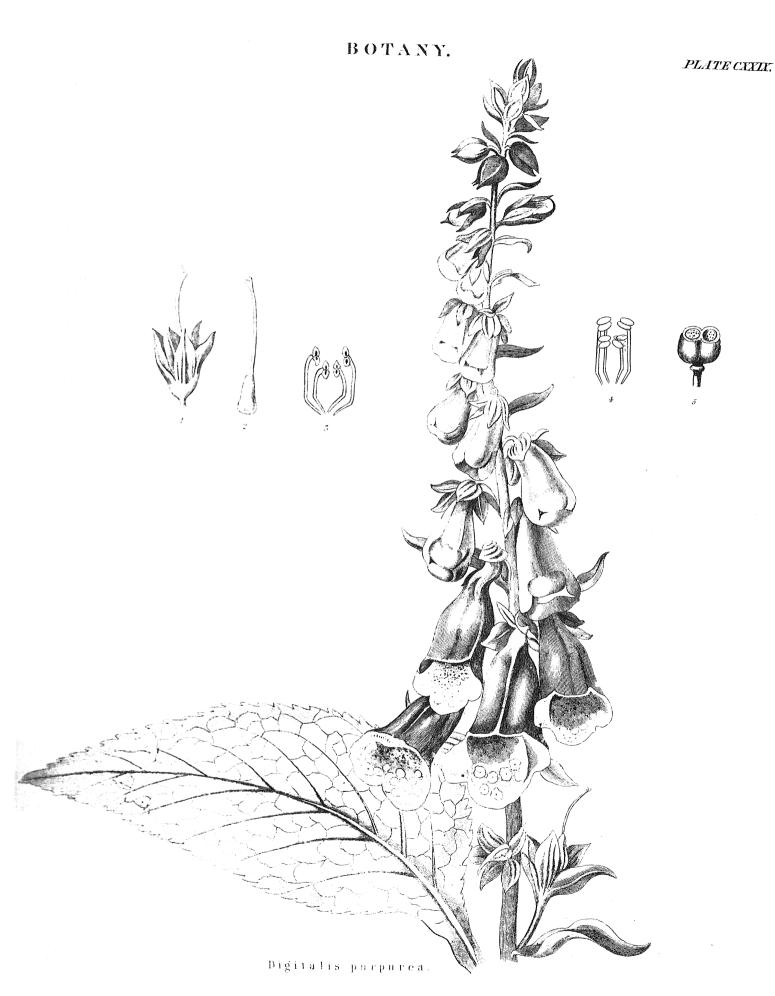
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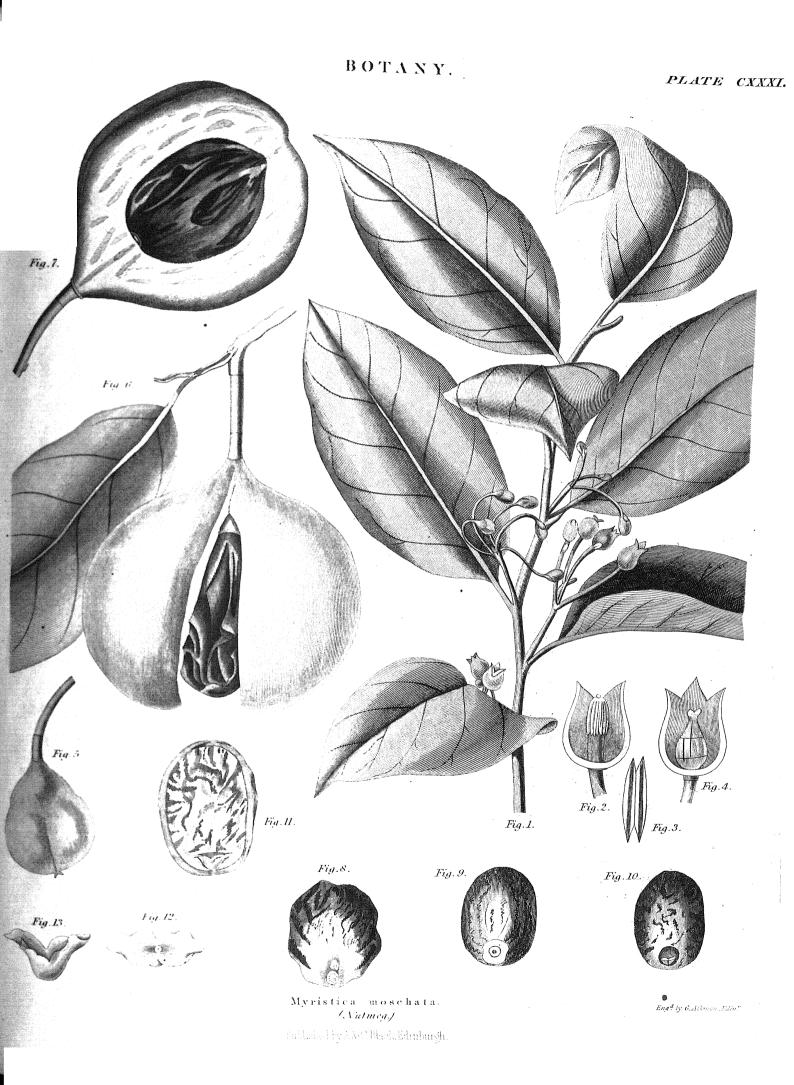


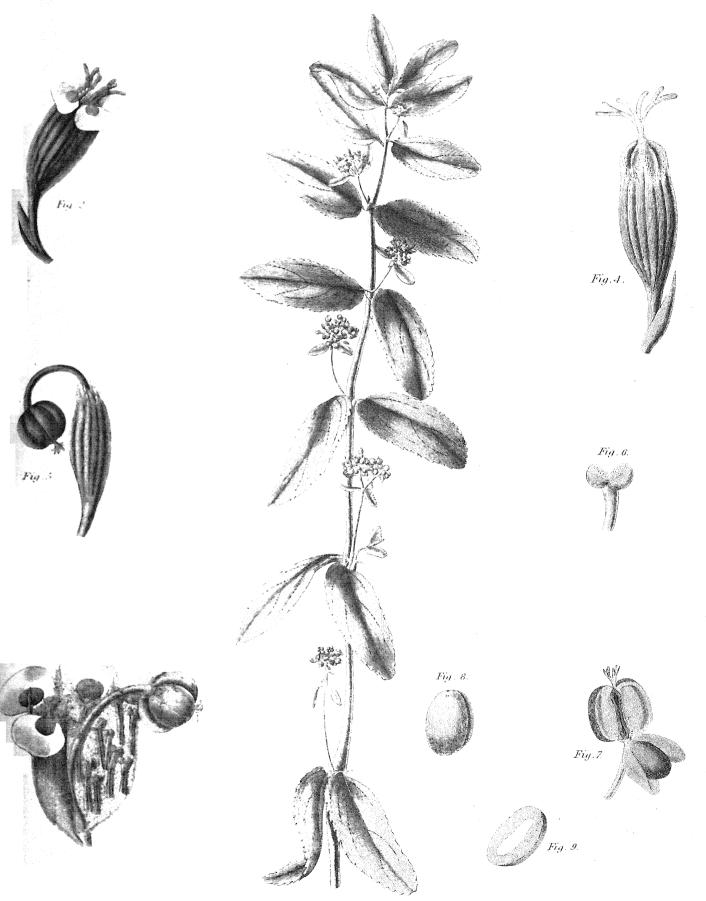








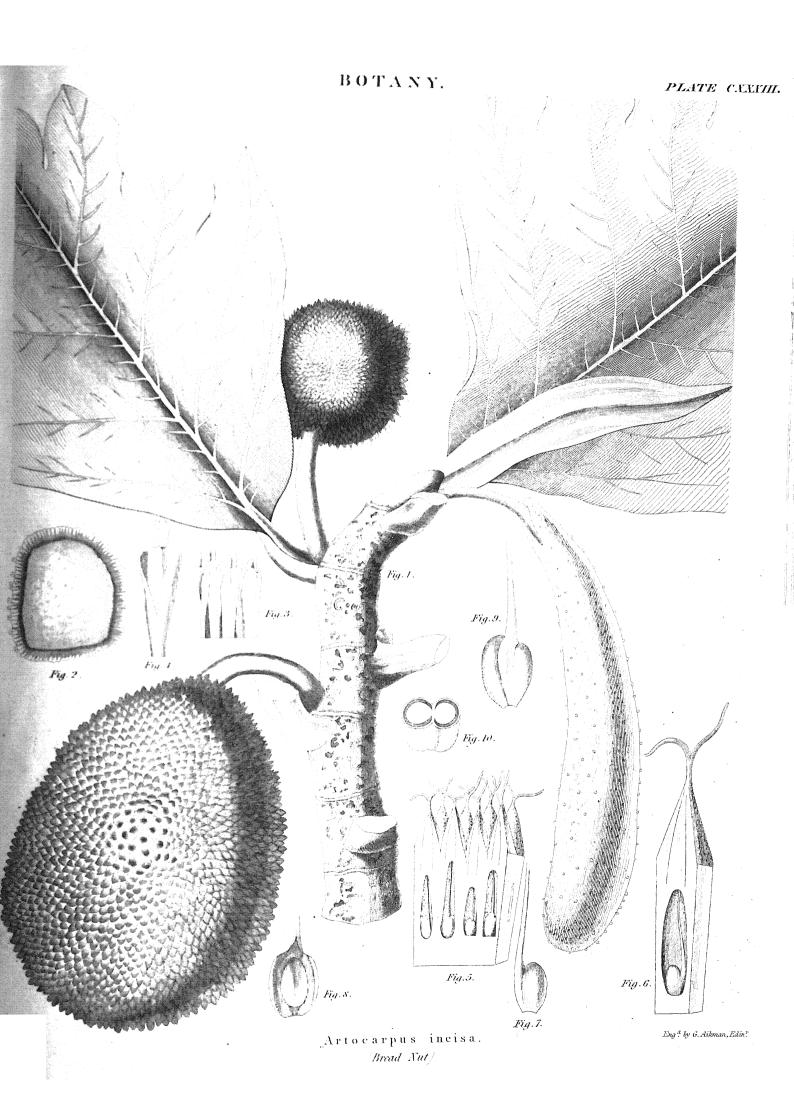


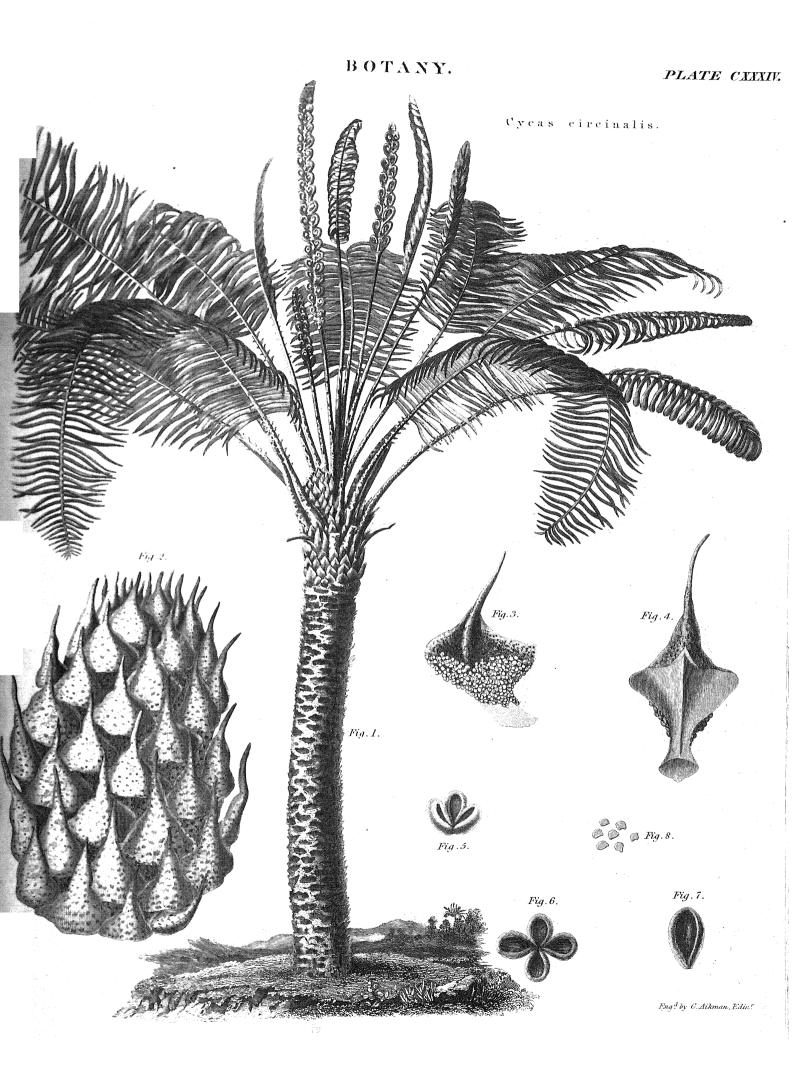


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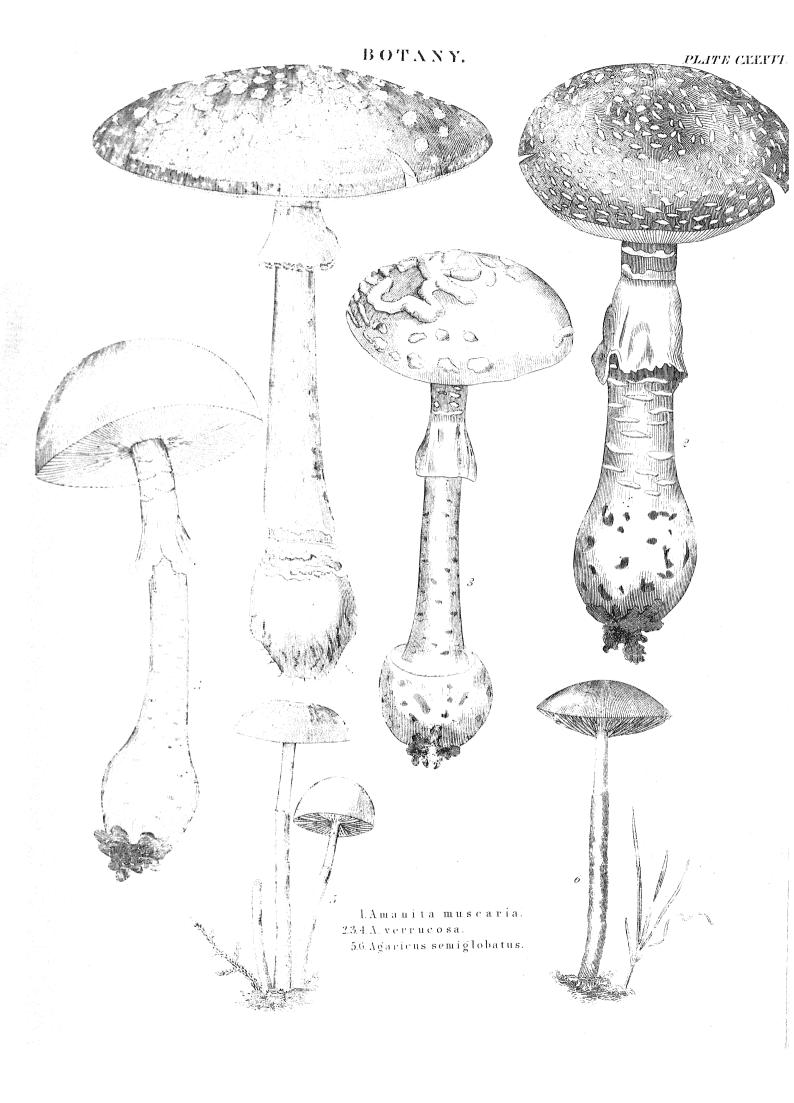
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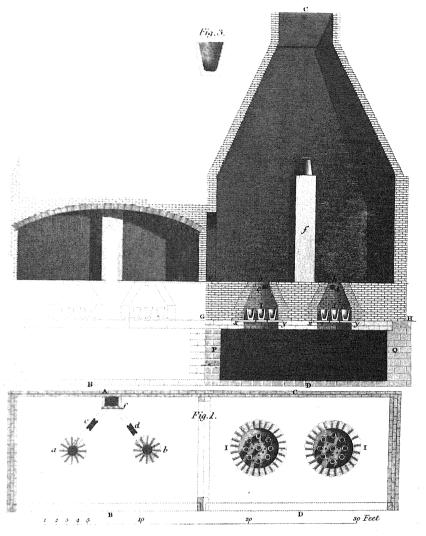


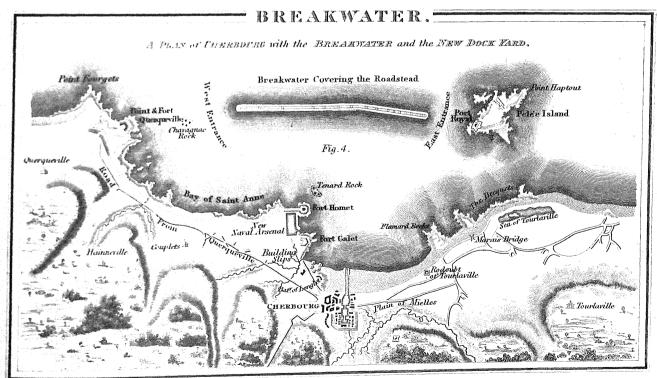






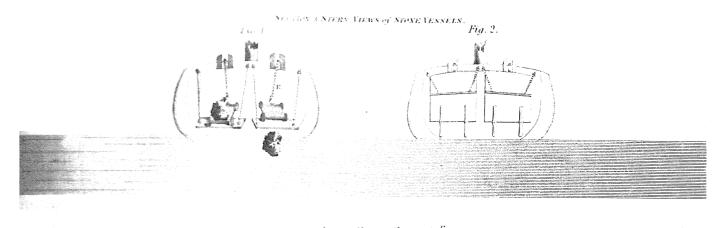
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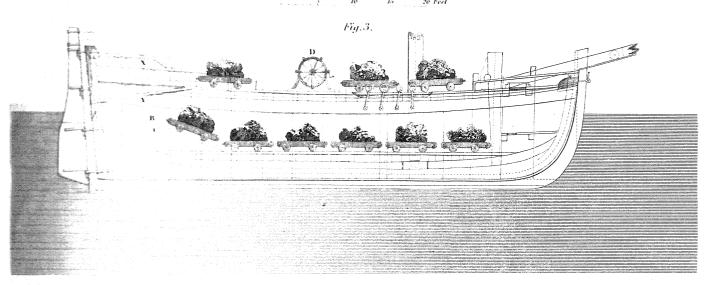


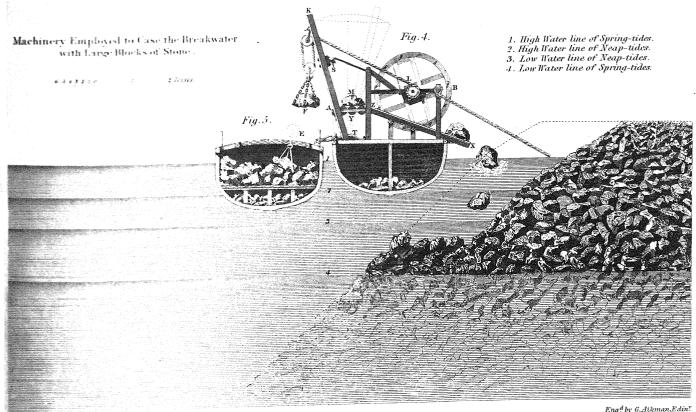


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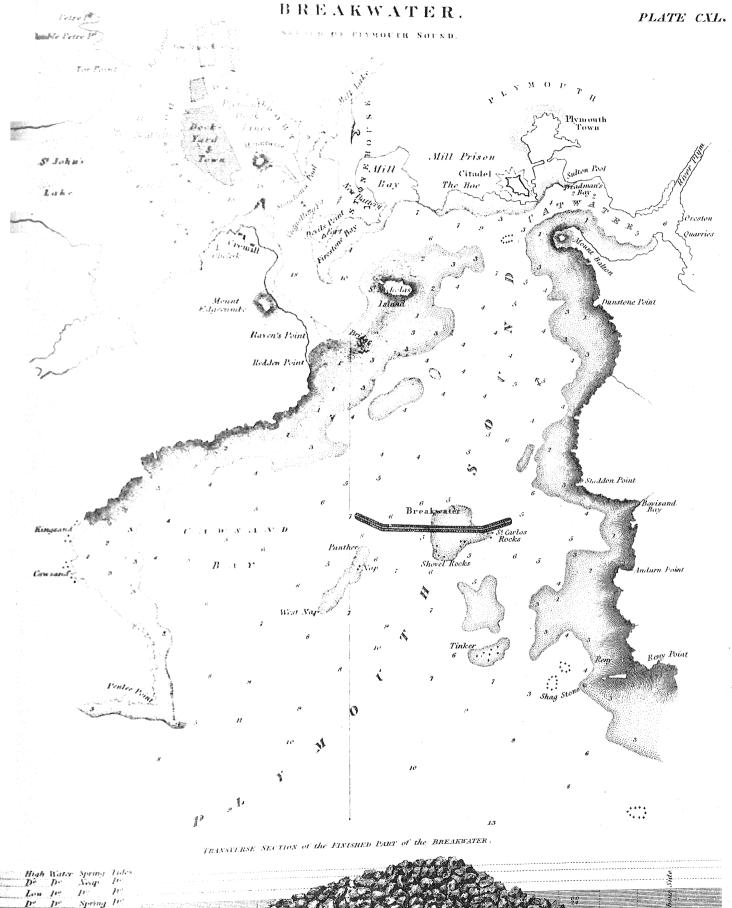
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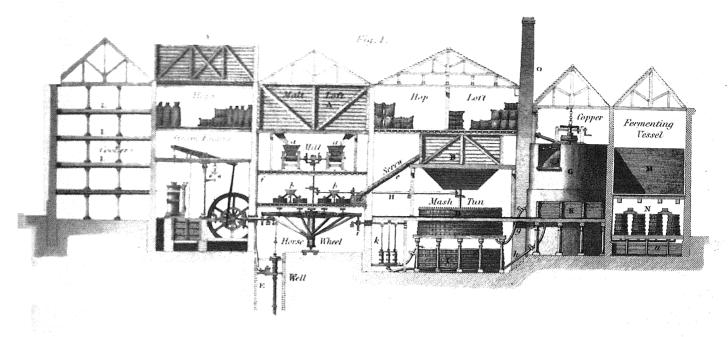
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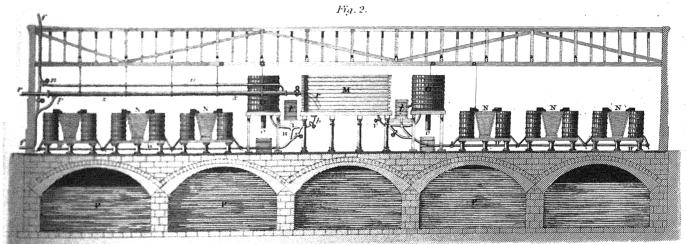


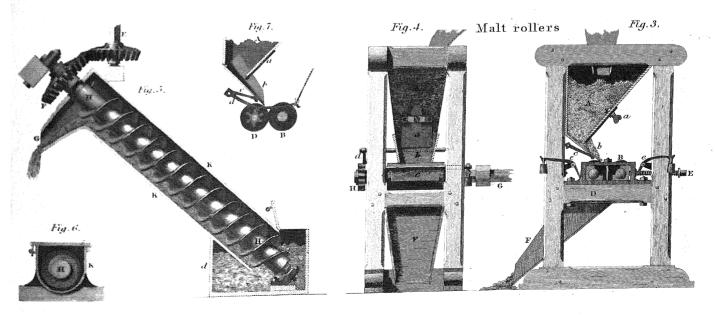
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## BREWING.

PLATE CXLII.

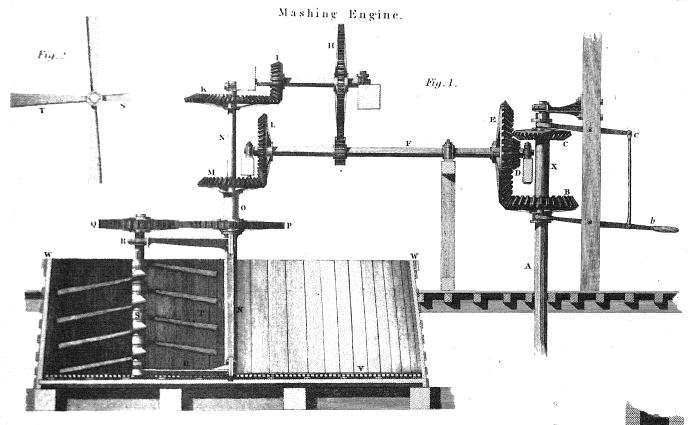
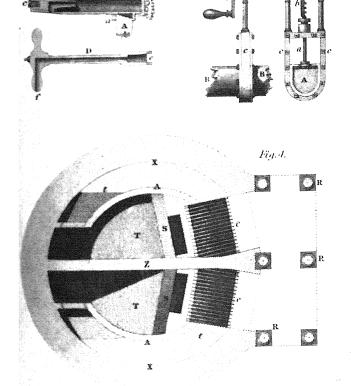
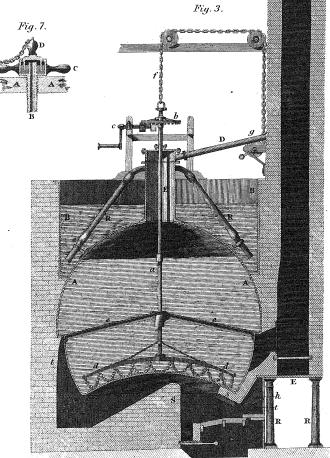


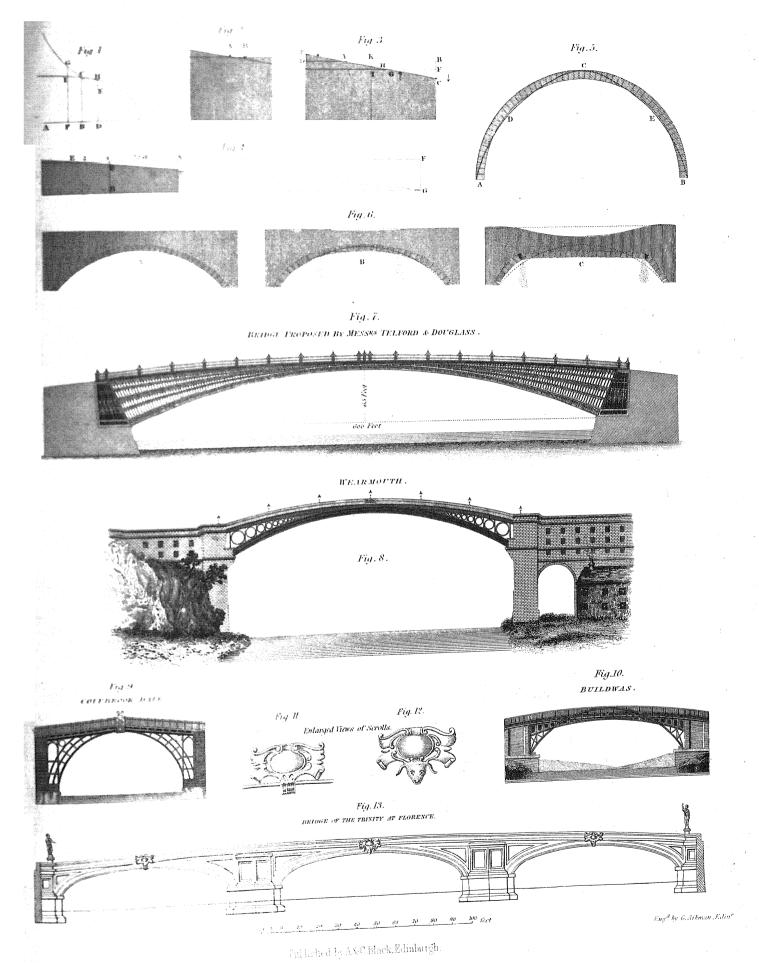
Fig.~G.

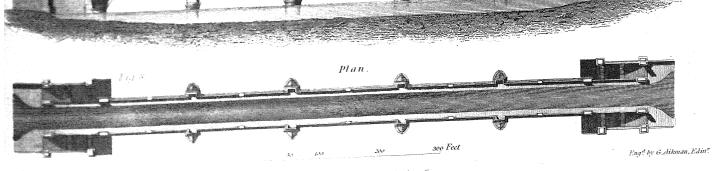




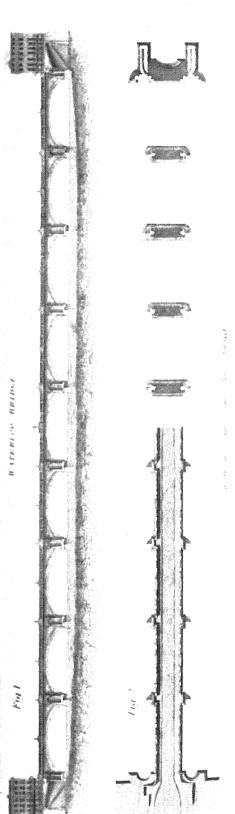
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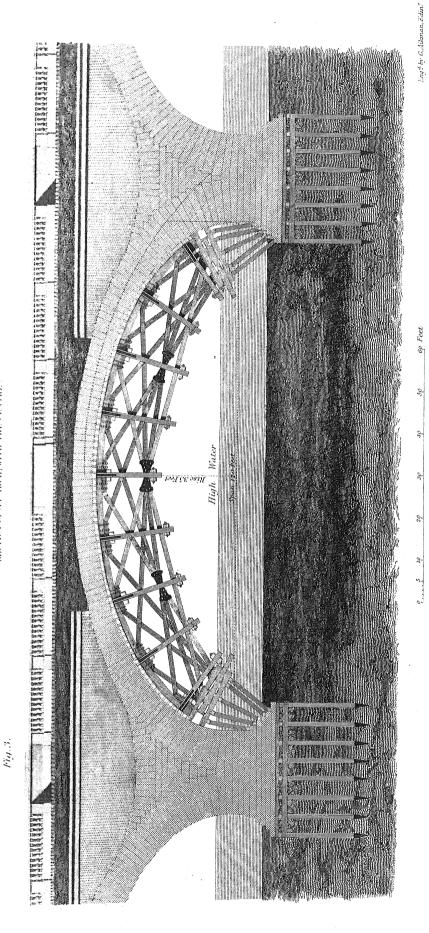




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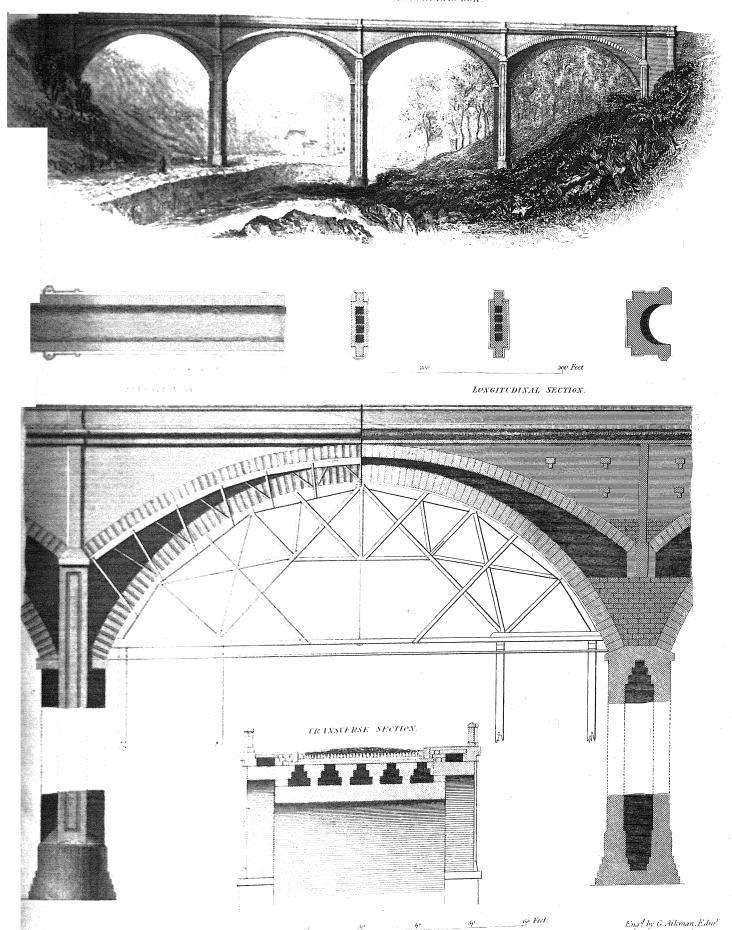


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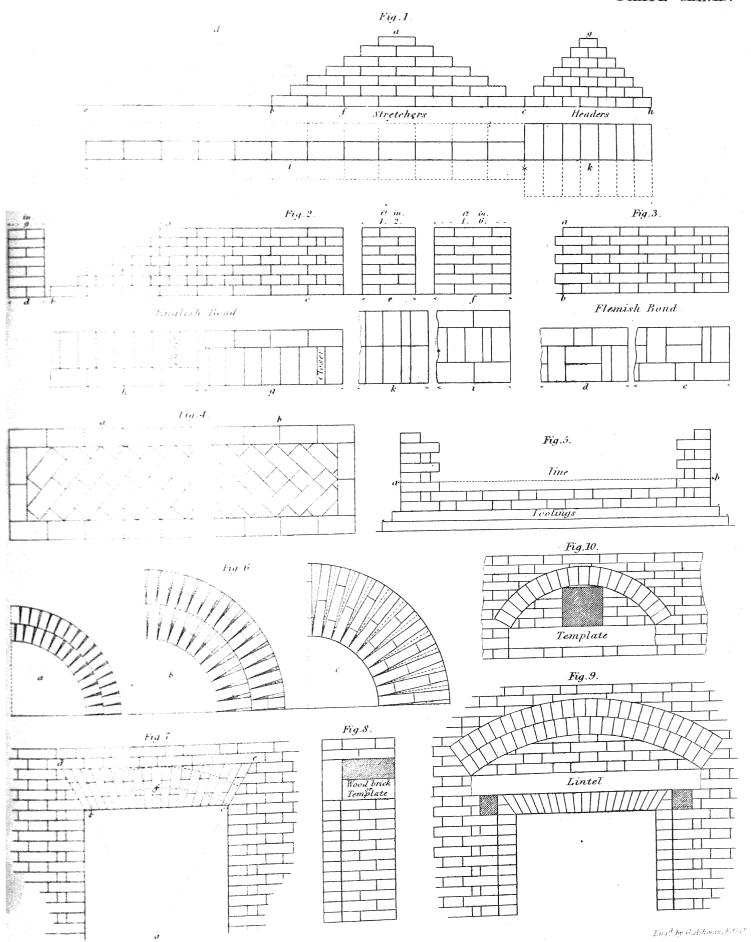


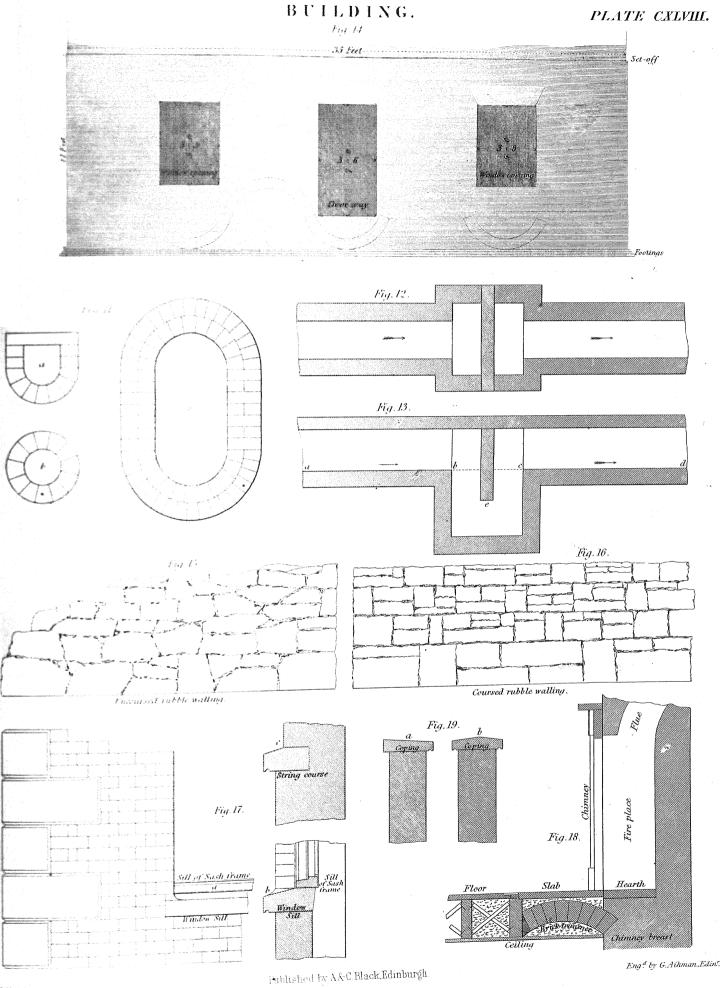
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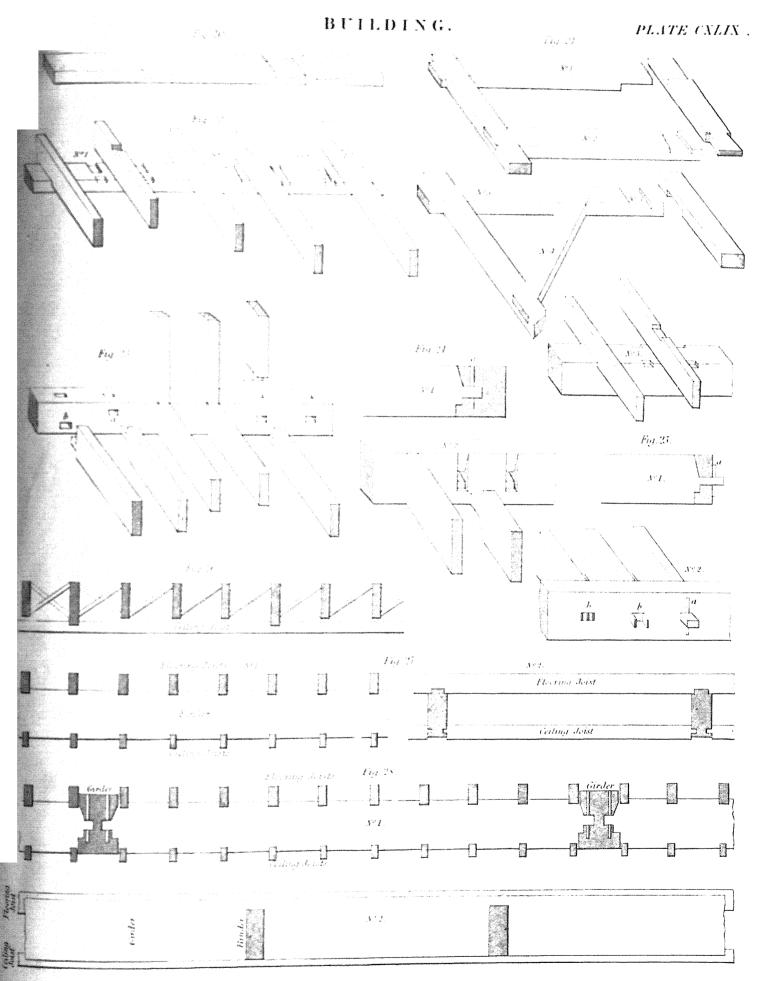
## BUILDING.

## PLATE CXLVII.

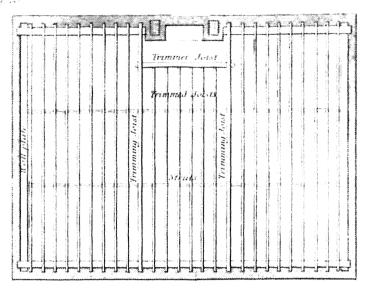


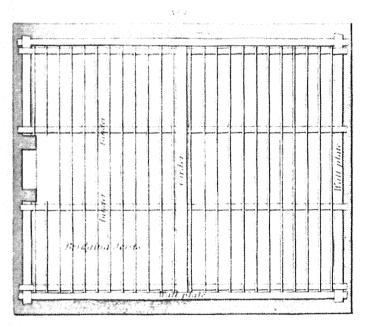


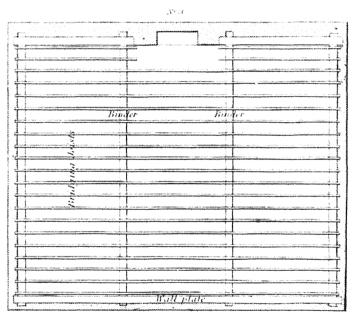
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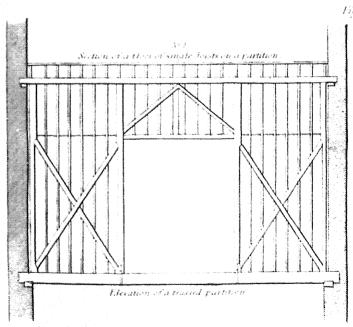


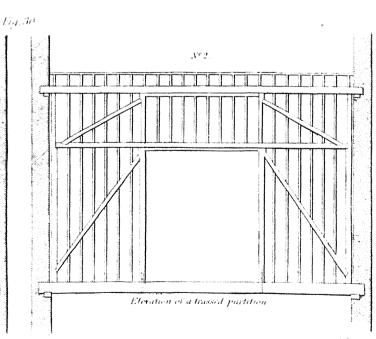
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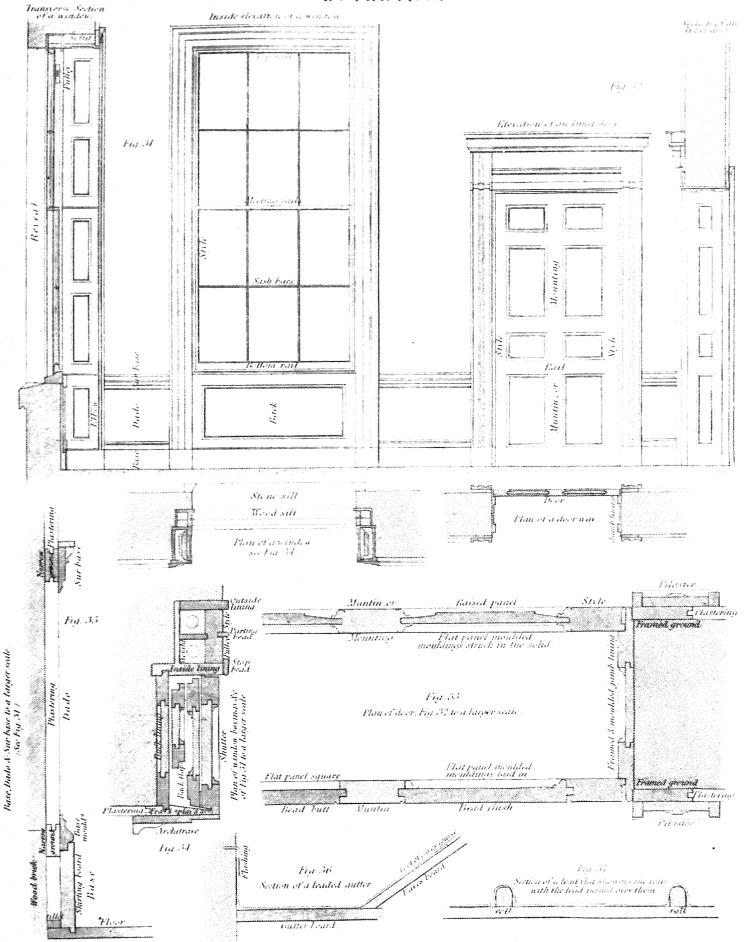


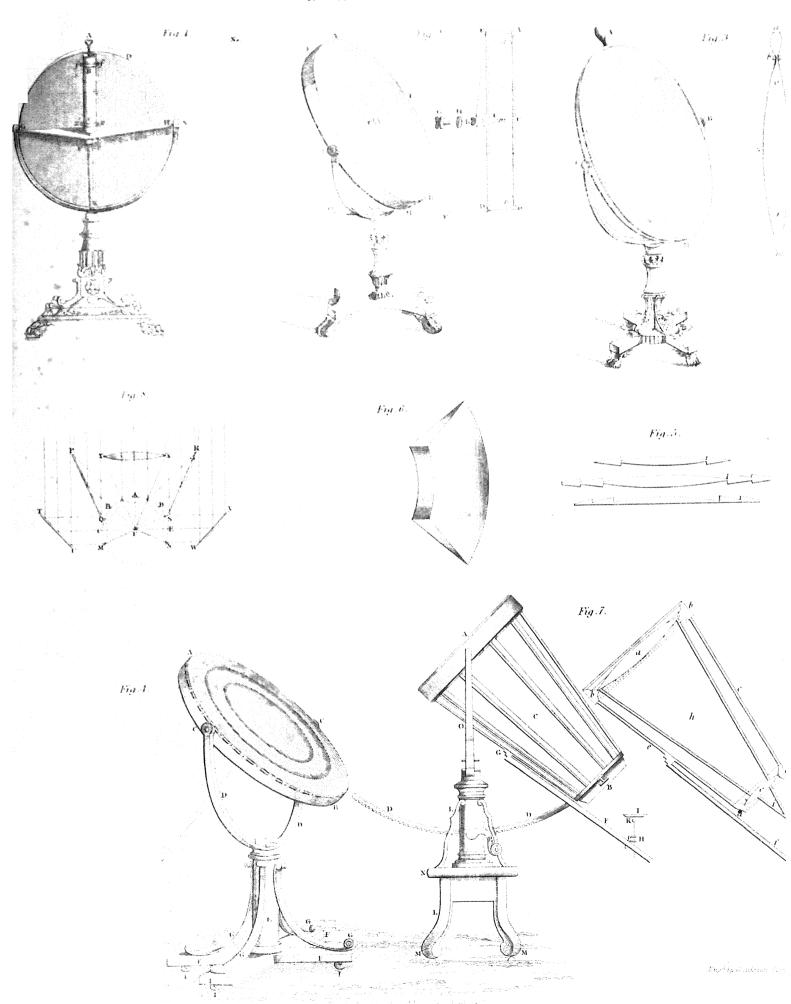












## BURNING GLASS. PLATE 1411 Fig. 2 Fig. 3. Fig. 1. Fig. 5. Fig.8. Fig.7. Fig.12. Fig. g.Fig.6. Fig.10.

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